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THE LINGUISTIC COMPLEXITY AND FACTUAL ACCURACY OF WRITTEN AND VERBAL SUMMARIES OF EXPOSITORY TEXT BY GRADE 10 LEARNERS WITH LEARNING DISABILITY (LD)

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Medicine: Child Health (Neurodevelopment).

Johannesburg, 2020.

DECLARATION

I, Landi Fourie, declare that this Research Report is my own, unaided work. It is being submitted for the Degree of Master of Science in Medicine: Child Health (Neurodevelopment) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



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(Signature of candidate)

18th day of August 2020 in Johannesburg

ABSTRACT

This study investigated the influence of modality on the linguistic complexity and factual accuracy of expository text summaries produced by grade 10 learners with learning disability (LD). Eight participants were asked to produce written and verbal summaries in response to reading novel expository texts. Summaries were analysed in terms of linguistic complexity and factual accuracy, as well as editing, self-assessment, and the influence of prior speech-, occupational-, and remedial therapy on current academic functioning. Paired sample *t*-tests indicated that TTR was the only measure significantly influenced by modality, with a higher TTR in the written modality. Results further indicated that editing and self-assessment were areas of significant difficulty in this population. The main conclusion of the study is that a change in output modality alone is not sufficient to improve the academic performance of learners with LD. Further research into the impact of modality in the LD population is needed.

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LIST OF ABBREVIATIONS

ADHD	-	Attention-Deficit/Hyperactivity Disorder
CAPS	-	Curriculum and Assessment Policy Statement
DLD	-	Developmental Language Disorder
FAP	-	Factual Accuracy Percentage
GDE	-	Gauteng Department of Education
gFAP	-	Global Factual Accuracy Percentage
IQ	-	Intelligence Quotient
LD	-	Learning Disability
LSEN	-	Learner with Special Educational Needs
mFAP	-	Main Idea Factual Accuracy Percentage
NARA	-	Neale Analysis of Reading Ability
NDW	-	Number of Different Words
OT	-	Occupational Therapy
RT	-	Remedial Therapy
SD	-	Standard Deviation
sFAP	-	Self-Assessed Factual Accuracy Percentage
SLI	-	Specific Language Impairment
ST	-	Speech Therapy
TTR	-	Type-Token Ratio
UNICEF	-	United Nations Children's Fund

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INTRODUCTION

Learning Disability (LD) affects thousands of children across the globe. Although LD is not limited to childhood and continues into adulthood, its effects are more acutely evidenced during the school-going years. LD is estimated to affect nearly 10% of children in the United States (Altarac & Saroha, 2007) and approximately 20% of children in Africa (Abosi, 2007). Narrowing the scope to South Africa, the most recent statistics, based on the 2001 National Census, indicate that 0,4% of children present with severe learning difficulties, while a further 2,1% of children present with disabilities that contribute to learning difficulties (UNICEF, 2012). Unfortunately, these statistics for South Africa are not only outdated, but also questionable when compared to the incidence of LD in Africa as a whole. In addition, the UNICEF (2012) report does not differentiate between LD and cognitive impairment in the category of "learning difficulties", thus making it is impossible to determine how many children described in the report truly presented with LD. Consequently, accurate statistics on LD in South Africa do not exist at present (Mazibuko, Flack & Kvalsvig, 2019).

Despite the lack of accurate statistics, the Department of Education in South Africa makes provision for learners with disabilities. According to the most recent information, there are 466 schools in South Africa for learners with special educational needs (South African Government, 2020), but of these only 18 (3,9%) are remedial schools. This number seems inordinately small given the statistics on LD prevalence in both developed and developing countries. One possible explanation for the relatively few remedial schools in South Africa is the government's philosophy of Inclusive Education, as laid out in Education White Paper 6 (Department of Education, 2001). Inclusive Education advocates for equal opportunity and equal access to education for learners with special needs. It moves away from the medical model where LD is seen as something "wrong" with the learner, and focusses instead on an interplay of internal and external factors and systems contributing to LD (Nel & Grosser, 2016). Instead of removing learners with special needs from the mainstream classroom and placing them in specialised schools or classrooms, the teacher adapts teaching strategies as well as the classroom environment in order to accommodate the learner's needs.

Although Inclusive Education is a good policy in theory, it is less successful in its application. Many learners, especially learners with LD, slip through the cracks in an overloaded education system and are expected to succeed in classrooms geared towards typically-

achieving learners who do not have an LD diagnosis (Abosi, 2007; Navsaria, Pascoe & Kathard, 2011). Part of the problem is that LD as a concept is still not completely understood, despite nearly six decades of research. Many learners with LD still do not have access to the resources that they need in order to succeed academically. They are instructed and assessed according to a mainstream curriculum, even though the educational difficulties they experience, particularly in the domains of reading and writing, are fundamentally different from those experienced by learners without LD and even learners without LD who struggle academically (Scanlon, 2013).

To gain insight into the specific barriers to learning experienced by learners with LD, many studies have compared the academic abilities of learners with LD to that of their non-LD peers (Bryant, Vaughn, Linan-Thompson, et al., 2000; Fuchs, Fuchs, Mathes, et al., 2000; Kaderavek & Sulzby, 2000; Newcomer, Barenbaum & Nodine, 1988; Williams, 1991). These studies were conducted during a period where there seemed to be a resurgence of investigation into LD and particularly into differences in the academic functioning of learners with and without a diagnosis of LD. The results of these studies highlighted the need for specialised educational approaches for learners with LD. In the years following, researchers shifted focus and concentrated on the development and implementation of specialised programmes to improve the academic performance of learners with LD, specifically in the domains of reading and writing (Caldwell & Leslie, 2010; Kelley & Clausen-Grace, 2010, 2008; Morfidi, Mikropoulos & Rogdaki, 2018; Ward-Lonergan & Duthie, 2013). Recent research has also focussed on developing accurate definitions of LD and determining the causes and co-morbidities of LD (Butterworth & Kovas, 2013; Scanlon, 2013).

In South Africa, LD researchers face a uniquely challenging situation as they attempt to marry the Western definition of LD with the heterogenous (South) African context (Abosi, 2007). Much of LD research in South Africa is aimed at developing policies that will give learners with LD equal access to quality education, and at identifying contributing factors to LD – factors such as the lack of mother tongue education, and extreme poverty (Department of Education, 2001; Mazibuko, Flack & Kvalsvig, 2019; Navsaria, Pascoe & Kathard, 2011; Nel & Grosser, 2016; Zuma & Dempster, 2008). Although equal access to education is an important first step, it is also important to understand how the curriculum and related assessment methods can and should be adjusted to elicit accurate academic results from learners with LD. It is possible that, even with inclusive education, we are putting learners

with LD at a disadvantage by measuring their academic success according to their areas of weakness instead of determining their areas of strength and working accordingly.

The purpose of this study, therefore, was to determine whether it is possible to improve learners with LD's academic performance by allowing them to complete tasks verbally rather than in written form, thereby circumventing poor writing skills. This investigation compared the linguistic complexity and factual accuracy of learners with LD's expository text summaries in the written and verbal modalities.

It was proposed by the researcher that measures of linguistic complexity and factual accuracy in the verbal modality would be superior to those in the written modality as writing is the more cognitively demanding of the two modalities (Carretti, Re & Arfè, 2011). The researcher further proposed that the verbal modality would consequently allow learners with LD to more accurately portray their academic prowess.

LITERATURE REVIEW

LD as a concept was first described more than two centuries ago (Carlson, 2005) and has been the topic of countless research studies undertaken throughout the past few decades. The term "Learning Disability" was coined by Samuel Kirk in the 1960's (Kirk & Bateman, 1962) and has developed to describe difficulties with reading, writing, verbal expression, and executive function, among others, in the absence of an intelligence deficit (Butterworth & Kovas, 2013; LD Online, 2019; Mattison & Mayes, 2010; Morris & Crump, 1982; Scanlon, 2013). Many theories exist as to the cause of LD. The prevailing theory is that LD is a neurological disorder of the central nervous system which manifests primarily as difficulty in the area of academic performance (Ali & Rafi, 2016; Butterworth & Kovas, 2013; Scanlon, 2013).

Academic Performance of Learners with LD

Learners with LD usually have intelligence quotients that measure in the average or even above average range, but their academic potential does not match their academic performance (Ali & Rafi, 2016). This means that they often perform far below what would be expected of learners of the same age and grade level, but the poor performance cannot be attributed to an intellectual or sensory disability (American Psychiatric Association, 2013). Learners with LD experience academic difficulty in three main domains, namely reading, writing, and mathematics (American Psychiatric Association, 2013; LD Online, 2019; Scanlon, 2013), but associated difficulties with executive function and metacognition have also been documented (Berninger, Abbott, Cook, et al., 2017; Klassen, 2002). The unique academic difficulties that learners with LD experience in these areas are discussed below.

Reading

Reading is one of the most well-researched areas in the field of LD, which is not surprising as reading underlies all academic skills. It plays an important role in learners' academic success as they progress through school (Gajria, Jitendra, Sood, et al., 2007; Hermida, 2009; Owusu-Acheaw & Larson, 2014), but also plays a role in holistic development. Reading encourages the development of self-awareness, and helps to shape a learner's beliefs, attitudes and judgments with regards to the world around them (Issa, Aliyu, Akangbe, et al., 2012).

The reading problems that learners with LD experience are deep-rooted and go beyond mere decoding difficulties. It is generally accepted that learners with LD's reading skills are lacking

when compared to their typically achieving non-LD peers, but studies have shown that learners with LD generally perform poorer on reading tasks even when compared to low-achieving non-LD peers (Ali & Rafi, 2016; Fuchs, Fuchs, Mathes, et al., 2000).

Academic grade progression brings with it an increased workload and more independent study, and learners in higher grades are expected to meaningfully interact with expository text. This transition from mainly narrative texts in the lower grades to predominantly expository texts in the higher grades (Westby, Culatta, Lawrence, et al., 2010) is challenging for learners with LD, due to the inherent property differences of these text genres.

Narrative Text

Narrative text, by definition, tells a story and is found in the majority of children's literature. It is usually the first text structure that children are exposed to and can be analysed in terms of schemas. These schemas can be seen as rules that shape the structure of a story and help to establish chronological flow as well as causality (Hayward & Schneider, 2000). The most popular and widely accepted of these schemas, is story grammar (Stein & Glenn, 1975). Even though young learners need instruction to fully understand story grammar (Dymock, 2007), the predictable story structure and the contextual support afforded by this structure, fosters comprehension.

Expository Text

In contrast to narrative text, expository text does not tell a story, but rather aims to instruct the reader. Comprehension of expository text depends on a number of factors, including the task demands, the prior knowledge and linguistic ability that the reader brings to the text, and the content and structure of the text (Catts & Kamhi, 2017). The inclusion of a learner's prior knowledge as an influence on reading comprehension is important, as it suggests that learners' world knowledge can directly influence their academic performance.

Expository text differs from narrative text in a number of ways. Expository text is usually presented as a factual monologue (Westerveld & Moran, 2013) and requires specific instruction if learners are to become proficient academic readers (Kelley & Clausen-Grace, 2008; King, 1992). It does not provide much contextual support and is more difficult to understand due to the many different ways in which it can be structured (Morfidi, Mikropoulos & Rogdaki, 2018). Expository text further requires the reader to look beyond a

simple temporal or causal sequence, and to understand that sentences, paragraphs, and texts follow a certain pattern of organisation. Recognising these organisational patterns is a challenging feat on its own, but comprehension is often further confounded by expository passages comprising multiple structures in one text (Saenz & Fuchs, 2002; Williams, 2005), or by text structure differing within and across academic subject areas (Westby, Culatta, Lawrence, et al., 2010).

Decades ago, Meyer and Freedle (1984) were among the first to investigate the effect that expository text structure had on recall ability and their work is still considered to be foundational in understanding the relationship between structure and comprehension. They proposed that the more structurally organised expository text is, the more it facilitates both immediate and delayed recall. For the purposes of their two studies, both reported on in one paper, they grouped text structures into four main categories: description/collection, which is a list of attributes; causation, which describes cause and effect relationships; problem/solution, which states a problem and provides a propositionally related solution; and comparison, which describes similarities and differences. According to Meyer and Freedle's hypothesis, the description/collection category would provide the least amount of structure for readers, followed by causation and problem/solution, which would provide progressively more structure. The comparison category was deemed to be somewhat different from the previous three categories, as it does not rely on temporal or causal relationships and does not merely list attributes, but rather compares them. As Meyer and Freedle expected, the description/collection category was the least effective of the four text structures to facilitate recall, but surprisingly the problem/solution structure did not fare much better. In contrast, the comparison and causation categories were found to successfully scaffold both immediate and delayed recall. In subsequent studies by various researchers and in various populations, comparison has been confirmed as a text structure that consistently aids comprehension and recall, while the causation structure has been found to be difficult for readers to recognise, understand, and recall (Bacon & Carpenter, 1989; Ghaith & Harkouss, 2003; Richgels, McGee, Lomax, et al., 1987).

Although Meyer and Freedle's (1984) study provided valuable information regarding the effects of different expository text structures on comprehension and recall, the study population in both of their studies consisted of adult learners in university settings. Adult learners who have qualified for tertiary studies are presumed to have a well-established proficiency with expository text, whereas high school learners are still developing this skill.

Furthermore, Meyer and Freedle (1984) presented their stimulus passages as audio recordings, thereby eliminating possible reading difficulties, but not controlling for the effect of poor auditory memory or attention deficits in the listeners. This might have had a confounding influence on their results. Considering these methodological differences, their results may not be as readily generalised to high school level learners, especially those in the LD population.

Despite potential issues with generalisation, from Meyer and Freedle's studies it is evident that text structure can influence comprehension and recall of expository text for better or for worse. Learners who are unaware of or unfamiliar with text structure may likely have diminished mental organisation strategies for approaching text in general. This means that, for them, text is a collection of ideas, often seemingly unrelated to each other, that are difficult to recall meaningfully. Without a proper grasp of text structure, recall is significantly impaired, both in terms of quality and quantity (Ghaith & Harkouss, 2003; Kucer, 2011; Taylor & Samuels, 1983).

Apart from recognising expository text structure, competent readers need to access a specific skillset to successfully navigate text. They make sense of expository text through an automatic process of summarisation, which serves to reduce detailed texts down to the basics both in terms of content and meaning. Kintsch and Van Dijk were the first to document these summarisation strategies and termed them macro-rules (Kintsch & Van Dijk, 1978). The three macro-rules that Kintsch & Van Dijk described are deletion, generalisation, and construction, which describe the discarding of irrelevant information, substituting subordinates with a superordinate, and condensing information into a main idea, respectively. Shortly after Kintsch & Van Dijk's pioneering study, Brown & Day expanded on this idea and put forth six macro-rules that may be employed to summarise expository text: eliminating irrelevant information, eliminating redundant information, substituting lists of items with a single superordinate, substituting lists of actions with a single superordinate, selecting a theme sentence from a paragraph, and creating a theme sentence for a paragraph (Brown & Day, 1983). They found that these macro-rules followed a pattern of development from middle primary school years to late high school years. Even though the research on macro-rules was first conducted more than four decades ago, it is still considered as the foundation for understanding expository text and used in more recent expository text intervention programmes (Elosúa, García-Madruga, Vila, et al., 2013; Westby, Culatta, Lawrence, et al., 2010).

Reading of expository text usually implies that there is a specific goal attached to the reading task, for example memorising text in the context of studying, or reading for comprehension of subject matter. Good readers will change the way in which they process information when engaging in goal-directed reading as opposed to engaging in recreational reading (Tilstra & McMaster, 2013). This change when engaging in goal directed reading, involves higher levels of self-monitoring and an increased number of repetitions and paraphrases. Although poor readers' use of these strategies can improve with instruction, learners with LD have particular difficulty utilising such strategies to identify main ideas and propositions connected to the theme of a passage, and to monitor their understanding as they go along (Vaughn, Gersten & Chard, 2000). These difficulties contribute to problems with reading, which include poor literal and inferential understanding of expository text (Armbruster, Anderson & Ostertag, 1987; Saenz & Fuchs, 2002).

To address the problem of poor reading comprehension and poor self-monitoring, researchers have attempted to implement programmes geared towards improving the reading comprehension of learners with LD. The aim was to facilitate better outcomes in comprehension, production, and reproduction of expository text or discourse. Meyer and Bouck undertook a case study where three learners with LD were given access to Text-to-Speech technology (Meyer & Bouck, 2014). A device would read expository texts aloud to them to mediate decoding difficulty and aid their comprehension of these texts. Qualitatively all three of the learners reported that they understood the passages better than they would have if they had read it themselves, but quantitative measures showed that their expository text comprehension had, in fact, not improved. The results of this case study underline and confirm the fact that the difficulties learners with LD experience when confronted with expository text go beyond a mere decoding problem. It also suggests a lack of insight into actual text comprehension on the part of learners with LD.

Another recent programme called "Concept Mapping" (Morfidi, Mikropoulos & Rogdaki, 2018) instructed learners with LD on how to identify main ideas and concepts in expository text and how to identify links between these main ideas or concepts. This reflects on Brown & Day's macro-rules of selecting or creating theme sentences for paragraphs, which is difficult for learners with LD. Through direct intervention, Concept Mapping was found to considerably improve expository text comprehension in poor readers and to facilitate the recall of main concepts more so than when using traditional teaching methods.

Other studies have posited that explicit instruction on how to approach expository text, what type of information to expect, and how to extract the main idea from the text, renders positive results (Gajria, Jitendra, Sood, et al., 2007; Jitendra, Kay Hoppes & Xin, 2000; Kelley & Clausen-Grace, 2008; Westby, Culatta, Lawrence, et al., 2010; Williams, 2005), but there is little evidence of carryover of skills from reading instruction to novel expository texts (Vaughn, Gersten & Chard, 2000). Thus, despite the relative success of some intervention programmes aimed at reading, implementation of expository text comprehension strategies in the LD population is still largely a matter of trial and error. There is no catch-all solution or strategy and the success of a specific strategy often depends on the task demands and the expected outcomes (Ramsay, Sperling & Dornisch, 2010).

In remedial schools, as in mainstream schools, learners with LD's academic progress is assessed by means of written or verbal responses to expository text that they are presumed to have read and comprehended. Given the reading difficulties discussed above and the unreliable success rates of explicit reading intervention programmes, the impact of poor reading skills on academic progress cannot be ignored. Reading instruction falls outside the scope of this study, but the researcher suggests that the effect of poor reading skills in the LD population is further compounded by poor written and verbal expression, as discussed below.

Writing

Producing written work is more cognitively demanding than producing verbal work (Carretti, Re & Arfè, 2011) and often requires more formal and academic vocabulary than verbal tasks (Gregg & Mather, 2002). Writing also involves mechanical skill in the physical act of writing, which is often tedious and impacts on the form and content of the work being produced (MacArthur & Graham, 1987). Therefore, learners with LD often experience greater difficulty with writing tasks than with verbal tasks.

The research consensus is that the writing performance of learners with LD is not adequate to meet academic demands (Mason & Graham, 2008). The gap between demand and skill level keeps widening throughout the school years so that by the time learners with LD reach adolescence, they already have ingrained negative attitudes towards writing tasks, which are exacerbated by the higher academic demands of the higher grades (Hallenbeck, 2002, 1996).

The writing difficulties experienced by learners with LD involve both the linguistic complexity and the factual accuracy of written work. Although linguistic complexity can be defined in many different ways, it describes the syntactic, lexical, and occasionally the morphological aspects of language (Pallotti, 2015). Thus, linguistic complexity describes measures of language production. In contrast, factual accuracy focusses on language content, specifically on how accurately facts are recalled and relayed. As mentioned, both of these areas are challenging for learners with LD. They struggle to remember punctuation rules and their application, they tend to use words in a concrete and literal way, they struggle to express concepts concisely, overuse general words to lengthen their written compositions, and they struggle to keep the audience's perspective in mind (Gregg & Mather, 2002). Compared to their non-LD peers, learners with LD also produce disorganised written work that is significantly shorter and lower in quality, they have difficulty following spelling, grammar, and syntax rules, and they use simpler vocabulary (Graham, Collins & Rigby-Wills, 2017; Graham & Harris, 1999; Gregg, Coleman, Stennett, et al., 2002).

Furthermore, learners with LD struggle to edit their written work. Graham and Harris (1999) suggest that this is due to learners with LD having difficulty separating out the different rules and conventions involved in the writing process, meaning that they don't know how to approach the editing process or how to go about fixing errors that they recognise. Learners with LD also tend to overemphasise form over content and thus may more readily edit spelling or punctuation than attend to the meaning of the text.

Although these writing difficulties are significant and pervasive, there have been intervention strategies that have proved to be at least moderately successful in elevating the writing skills of learners with LD (Gillespie & Graham, 2014; Graham & Harris, 1999; Mason & Graham, 2008; Reid & Lienemann, 2006). Some researchers claim that with the right instruction and sufficient opportunities to practice and apply acquired skill, learners with LD can improve their writing skills to such an extent that they are as successful in writing tasks as their non-LD peers (Schumaker & Deshler, 2009). The feasibility of large-scale implementation and long-term success of these interventions remain to be seen and vary according to the resources available to learners with LD, the level of awareness and training of their teachers, and individual internal factors that differ from learner to learner. As the field of specific writing instruction geared towards learners with LD develops, a more universal implementation of these intervention strategies and a general improvement in the writing abilities of learners with LD may follow. In the meantime, writing remains a significant academic hurdle in the

LD population, one that often hampers academic work in terms of both quality and quantity. For this reason, verbal expression has also been investigated as academic output modality in order to find ways to circumvent writing difficulties.

Verbal Expression

Compared to the wealth of information available on the writing characteristics of learners with LD, verbal expression is underrepresented in available research (Berninger & Abbott, 2010). This might firstly be due to a lesser academic emphasis on verbal expression. In a survey aimed at ascertaining the kinds of assessments done to diagnose postsecondary students with LD (Carlton & Walkenshaw, 1991) 75% of responding institutions indicated that they assess written expression, while only 66% of responding institutions assessed verbal expression. This lends support to the theory that verbal expression is somewhat overlooked in the LD population. The lack of information specifically on verbal expression might secondly be due to many studies grouping written and verbal expression together as general expression, regardless of modality (Berninger & Abbott, 2010; Berninger & O'Malley May, 2011).

No published studies could be found that focussed specifically on verbal expression in the LD population. Nevertheless, there are studies (Scott & Windsor, 2000; Ward-Lonergan, Liles & Anderson, 1999) that have focussed on verbal expression of children who have a specific language impairment (SLI), or developmental language disorder (DLD), as it has recently been renamed. The term DLD refers to a child who, in the absence of an intellectual disability, has a significant deficit in language ability. In addition, there is a poor prognosis for improvement in the absence of therapeutic intervention (Bishop, 2017). DLD and LD are similar in the sense that the difficulties experienced in both populations are not due to cognitive deficits, and that they experience significant difficulty with verbal expression. Although DLD and LD are not synonymous, some researchers consider DLD to be one component, or manifestation, of LD (Padget, 1998). The results of the studies investigating the verbal expression of learners with DLD are briefly summarised below, in order to draw inferences about the verbal expression of learners with LD.

When comparing the verbal performance of DLD and non-DLD adolescents, Ward-Lonergan, Liles, and Anderson (1999) found that adolescents with DLD produced significantly fewer T-units, subordinate clauses, and subordinate clauses per T-unit when compared to their non-DLD peers. Those with DLD also recalled significantly less stimulus information than the

non-DLD group. Scott and Windsor (2000) expanded on this finding and did within-group analyses of verbal expository text summaries produced by learners with DLD. They found that the verbal summaries produced by learners with DLD tended to be significantly longer in terms of number of words and number of T-units and to contain less grammatical errors than written summaries produced by the same learners.

Summarising the results of these studies, we find that learners with DLD perform poorly on measures of linguistic complexity and factual accuracy when compared to typically developing peers, but when compared to their own written expression, DLD learners show greater productivity and grammatical correctness in the verbal modality. From these results we can infer that verbal expression in the LD population should follow similar trends, although we cannot make definitive statements on the matter until further research is done.

Another study (Carretti, Re & Arfè, 2011) compared written and verbal narratives in children with poor reading comprehension to those produced by children with age-appropriate reading comprehension. As learners with LD usually have difficulty with reading comprehension (Oakhill, Cain & Bryant, 2003; Williams, 2005), these results were deemed relevant. Carretti and colleagues analysed written and verbal expression in terms of several quantitative and qualitative measures and found that modality had no effect on the number of words used, adherence to text structure, or on sentence structure. This is in contrast with the findings by Scott and Windsor (2000) discussed earlier. Carretti and colleagues did, however, find that learners with poor reading comprehension used more additive conjunctions than any other type of conjunction in their verbal narratives. Extrapolating from these results, we can conclude that verbal expression in the LD population might not differ significantly from written expression in terms of linguistic complexity, especially if reading comprehension is poor.

As stated previously, the cognitive and physical demands of a verbal task are less taxing than those of a written task. The ability to produce coherent written and verbal content is, however, a complex process that is strongly reliant on and influenced by executive function.

Executive Function

Executive function describes meta concepts that overarch the cognitive processes necessary for the successful execution of tasks (Cirino & Willcutt, 2017; Singer & Bashir, 1999). It

includes goal setting, organisation, planning, and inhibition, among others, and are closely linked to working memory (Singer & Bashir, 1999). Learners with LD often have significant difficulties in the area of executive function where planning, assessing, and especially revision skills are required (Graham & Harris, 1997; Gregg & Mather, 2002; Williams, 1991).

Executive function refers to a concept that has many definitions, depending on the perspective from which it is approached. The overall consensus is that executive function is involved in every stage of task attack, execution, and completion and is inextricably linked with academic success (Cirino & Willcutt, 2017). It involves the ability to organise one's thoughts and behaviour, to inhibit impulsive thoughts and behaviour, to pay selective attention to important stimuli while ignoring unimportant competing stimuli, setting appropriate goals, and maintaining focus on the task at hand (Singer & Bashir, 1999).

Self-regulation is a process that is closely related to executive function and is sometimes included under the executive function umbrella. It is the process through which a learner's own performance is regulated, monitored and brought back to course if strayed (Singer & Bashir, 1999). It is also constantly adapting to the social and educational context in which the learner finds himself. In other words, it is the process(es) by which a learner judges whether he is still on track with the demands put forth by the task at hand and by the context in which the task is being performed. Self-regulation thus goes hand-in-hand with executive function to ensure task success.

Learners with LD have significant difficulty with both executive function and self-regulation and these difficulties impact on their academic success (Berninger, Abbott, Cook, et al., 2017). They find it particularly difficult to plan a task, to organise their thoughts, to inhibit intrusive, distracting ideas, and to maintain focus, all while monitoring their progress and performance (Singer & Bashir, 1999). All the processes that form part of executive function are integral to and underlie success in both written and verbal production. It is thus evident that the difficulties that learners with LD experience when attempting written or verbal work are compounded by poor executive function and poor self-regulation to such an extent that they may appear intertwined and indistinguishable from one another.

Another concept that is very closely related to executive function, and also problematic in the LD population (Peng & Fuchs, 2014), is working memory. Working memory refers to the process where information is temporarily stored while other cognitive and physical processes

are running. It draws on contextual information from the present as well as information stored in long term memory (Siegel & Ryan, 1989) and is employed to aid with task monitoring and task completion, especially in tasks that involve multiple steps or have multiple layers of complexity (Peng & Fuchs, 2014). In this regard, working memory links to metacognition, which is a process of taking cognitive control of processes that would otherwise happen automatically (Trainin & Swanson, 2005) in order to aid task monitoring and task completion. This means that metacognition, in effect, is the process of thinking about thinking. Where working memory is involved in keeping stored information active, metacognition evaluates the information and determines its usefulness and relevance to the task. Through working memory and metacognition, new information builds on previously acquired information to expand and grow knowledge bases. This scaffolding process is important when it comes to academic learning and especially reading comprehension. When working memory is problematic or ineffective, as in the LD population, this scaffolding system collapses, severely impacting on academic learning and reading comprehension.

Metacognition not only ties in with working memory, it also plays a significant role in self-assessment. Being aware of one's own abilities, how those abilities are applied, and how successfully they are applied are inherently metacognitive processes. Learners with LD have substantial difficulty with accurate self-assessment (Klassen, 2002). In his systematic review of 22 studies, Klassen found that learners with LD tended to significantly over-estimate their abilities, especially relating to writing tasks. The reasons proposed for this include poor metacognitive skills, poor task comprehension, and poor focus on and comprehension of higher order writing processes. These poor self-assessment skills were found to negatively impact on academic preparedness and academic progress.

LD and Academic Expectations

In most cases, learners with LD follow a normal academic curriculum, as described in the Curriculum and Assessment Policy Statement (CAPS). Whether they attend mainstream schools or remedial schools geared specifically towards LD, they must meet the same academic criteria as their non-LD peers while coping with the additional LD-related difficulties with reading, writing, speaking, and executive function. In some cases this academic load can lead to problems with self-esteem and anxiety, which in itself becomes an additional barrier to learning (Sati & Vig, 2017). Even in remedial schools, academic progress relies largely on being able to read and write effectively. Like their non-LD peers, learners

with LD are expected to learn from and interact with expository text and to evidence their subject knowledge through written assessments and examinations, even when there exists a wealth of information documenting the specific and significant difficulties that learners with LD have in these areas.

There are systems in place that attempt to mediate these difficulties to some extent. If learners with LD attend remedial schools, they usually have the benefit of in-house therapeutic services in the form of speech therapy (ST), occupational therapy (OT), and/or reading remediation (remedial) therapy (RT), but, depending on the school, these therapeutic interventions are often only available during the early to middle primary school years. In South Africa, learners with LD can also apply for special accommodations from the Department of Education. These accommodations include additional time, the use of a computer, and the use of a reader and/or scribe during formal assessments and examinations (Le Roux, 2016). Learners do not automatically qualify for these accommodations when they have a diagnosis of LD as strict criteria in terms of level of functioning must be met. As LD is such a broad concept, learners often fall through the institutional cracks and do not qualify for the assistance that they desperately need. For this reason, professionals working in the field of LD have the responsibility to advocate for the learners in their professional care and to help them reach their academic potential.

From available research we know that learners with LD have academic difficulty in both the written and verbal modalities, but research also suggests that these difficulties are more pronounced in the written modality (Carretti, Re & Arfè, 2011; Gregg & Mather, 2002; MacArthur & Graham, 1987; Shen & Troia, 2018). Learners with LD are often held back by the current educational system where they are expected to use skills that they either don't have, or haven't mastered sufficiently, to achieve academic success. They are thus expected to operate out of a place of disability, rather than out of a place of ability. The researcher therefore argues that the current method of written assessment that is used to determine academic knowledge is disadvantaging learners with LD and is preventing them from performing according to their true academic potential. If we want to enable learners with LD to perform according to their academic potential, we need to assess their knowledge in a way that minimises the effects of their barriers to learning. The researcher argues that this can, to a large extent, be accomplished by minimising written assessments in favour of verbal assessments, and by providing therapeutic support in the early academic years to improve reading, writing, verbal expression, and executive function.

THEORETICAL FRAMEWORK

How we view LD and its associated difficulties is largely dependent on the theories of learning and development that we subscribe to. These theories shape our ideas and give substance to our approach to understanding and remediating LD. Theories of learning and development often reflect the mind and culture of the society in which they are developed and can be proved to be incorrect or become irrelevant as society changes and our worldview expands. Despite these inevitable changes, there have been theories that have steadfastly continued to influence the way in which we view learning and development. Two such theories are Urie Bronfenbrenner's bioecological model of human development (Bronfenbrenner & Morris, 2007), and Lev Vygotsky's sociocultural theory of cognitive development (Vygotsky, 1978). New approaches are also being developed to frame the process of learning in a modern and technologically enabled society. One such approach to learning is Heutagogy (Hase & Kenyon, 2000). These three theories of learning and development form the theoretical framework for the present study. Each of the theories is discussed below, followed by a discussion on how the three theories are combined to form an integrated theoretical framework for this study.

Bronfenbrenner's Bioecological Model of Human Development

Urie Bronfenbrenner disagreed with the developmental theories popular in his day. He contested the way in which these theories were formulated, that is, by observing children in laboratory settings and then generalising the findings to other contexts and situations (Keenan, Evans & Crowley, 2016). Bronfenbrenner questioned the way in which a child's environment was largely ignored in these developmental theories. He believed that one could only obtain a holistic picture of a child's development if they were observed in multiple contexts and environments (Bronfenbrenner & Morris, 2007). In response to this, Bronfenbrenner developed the bioecological model of human development. Using this model as a framework, development is seen as a process that is ongoing and ever-changing, and applies to both an individual person and groups of persons (Bronfenbrenner & Morris, 2007).

Bronfenbrenner's model is most often depicted as four concentric circles representing four different systems. The innermost circle is the microsystem, which represents factors that closely and directly influence the individual. These include family, school, religious institutions, the workplace, and peers. The second circle is the mesosystem, which represents

connections and interactions between factors in the microsystem. The third circle is the exosystem and involves social and environmental factors that indirectly influence an individual. These include health care services, media, and local industry. The fourth and final circle is the macrosystem, which represents the prevailing attitudes and philosophies of the community and culture. A fifth system, the chronosystem, is not depicted by a concentric circle, but connects and spans across the four systems to represent the influence of time on development. According to Bronfenbrenner, development is a function of the way in which these systems interact with and influence one another (Bronfenbrenner & Morris, 2007; Keenan, Evans & Crowley, 2016).

In the bioecological model of human development, the individual is placed in the centre of these four concentric circles. This represents the reciprocal influence that the environment and the individual have on each other and implies that both the individual and the environment are active agents in the process of development. Each individual does, however, contribute unique characteristics to his own developmental process. These can be organised into three broad categories, namely forces, resources, and demands (Bronfenbrenner & Morris, 2007).

Force characteristics describe behaviours and attitudes in the individual. These either help or hinder an individual's interaction with the environment and, by implication, an individual's development. Behaviours and attitudes that would help the process of development include the ability to delay gratification, inquisitiveness, and a desire to interact with the environment. In contrast, behaviours and attitudes that would hinder the process of development include impulsiveness, distractibility, apathy, and insecurity.

Resource characteristics describe biopsychological strengths and weaknesses that influence an individual's ability to interact with his environment. Biopsychological strengths include knowledge and experience, which can expand throughout the course of the individual's life, while biopsychological weaknesses include genetic defects, prolonged illness, and physical disabilities.

Finally, demand characteristics describe the individual's capacity to attract or repel social interaction, for example a fussy child versus a calm child, or hyperactivity versus inactivity. The ability to attract positive social interaction is crucial to healthy psychological development (Bronfenbrenner & Morris, 2007).

In summary, Bronfenbrenner's bioecological model of human development emphasises the reciprocal influence that the individual and the environment has on each other in the process of development. It also highlights the unique characteristics that could help or hinder an individual's interaction with the environment and, in so doing, promote or delay development. How Bronfenbrenner's theory of development relates to the present study will be discussed later in this chapter.

Vygotsky's Sociocultural Theory of Cognitive Development

Like Bronfenbrenner, Vygotsky believed that the social environment plays a crucial role in development. At the time when he formulated his sociocultural theory, there were three popular theoretical perspectives that described the relationship between learning and development. The three perspectives were firstly, that learning and development were two completely independent processes; secondly, that learning and development both described the same process; and thirdly, that learning and development were independent but related processes (Vygotsky, 1978). Vygotsky rejected these premises, largely on the basis that they did not take into account the formative impact that a child's culture and social environment have on learning and development (Keenan, Evans & Crowley, 2016). Vygotsky observed that even the earliest academic learning relied on a foundation of earlier learning that happened through observation, imitation, or incidental learning. Based on these observations, he stated that learning and development are processes that are interlinked from birth.

As children enter formal academic environments, the way in which they learn, changes. Here Vygotsky introduced two concepts: the level of actual development and the level of potential development (Vygotsky, 1978). He described the level of actual development as the skills that a learner has already mastered and can perform independently. The level of potential development, in contrast, are the skills which the learner is in the process of acquiring. He has not mastered these skills to a level of independence, but can successfully complete these tasks and grasp related concepts with assistance from a teacher or from peers who have already mastered the skill. When assisting the learner, the teacher or peers do not complete the task for the learner, but instead guide him by asking leading questions, by offering practical examples, or by offering explanations.

The cognitive distance between skills that the learner has already acquired (level of actual development) and the skills that the learner is in the process of acquiring (level of potential

development) Vygotsky termed the zone of proximal development (Vygotsky, 1978). It is here, in the zone of proximal development, that learning takes place. Once a learner reaches independence on a task with which he previously needed assistance, it becomes integrated into his level of actual development. This new level of actual development, achieved through the process of learning, scaffolds a new level of potential development. Thus, learning and development are integrated and interlinked in a reciprocal relationship to each other.

Three implications are clear from Vygotsky's sociocultural theory. The first is that children's academic learning and development are dependent on the intellectual and cognitive stimulation they receive in interaction with more skilled adults and peers. This means that learning is inherently a social process and cannot happen in isolation.

The second implication is that educators should present information that falls within a learner's zone of proximal development. If information is presented below this zone, no learning will take place because the skill has already been acquired. If information is presented above the zone of proximal development, no learning will take place because the learner is developmentally unable to grasp it.

The third implication is that a learner's zone of proximal development should be considered when academic proficiency is being determined, especially with regards to appropriate school placement. This means that learners should be offered structured assistance, as mentioned earlier, so that it can be determined which skills the learner has already mastered, which skills are in the process of being mastered, and which skills fall outside of the learner's current level of functioning (Keenan, Evans & Crowley, 2016; Vygotsky, 1978).

In summary, Vygotsky proposed that the environment and meaningful social interaction play a vital role in early learning and development. He introduced the concept of the zone of proximal development and the importance of guided assistance in learning. Vygotsky's theory changes the way in which we view traditional pedagogy in the sense that it takes into account each learner's individual capacity for learning instead of a one-size-fits-all approach to learning and teaching. The relevance and application of Vygotsky's theory of development will be discussed later in this chapter.

Heutagogy

Expanding further on a move away from traditional pedagogy, Hase & Kenyon (2000) introduced the concept of heutagogy. Heutagogy was born out of frustrations similar to that of Bronfenbrenner and Vygotsky, namely that the current approach to education and learning inadequately relates to the modern environment. Hase and Kenyon proposed that traditional pedagogy had become irrelevant in the face of modern technology which allows learners to independently access a wealth of information – information which was not as readily available to previous generations (Hase, 2009; Hase & Kenyon, 2000).

At its core, heutagogy is a learner-centred approach in which the learner, and not the teacher, determines the content, method, and timing of learning (Blaschke & Hase, 2016; Hase & Kenyon, 2000). Learning is proposed to take place on two levels: firstly, the surface level of acquiring new skills and knowledge, and secondly, the deeper level of new neuronal connections. It is this deeper learning that is especially of interest in heutagogy, as it is proposed that new neuronal connections stimulate new interests and new thought patterns, which in turn drive learning through the process of newly created curiosity (Hase, 2009). As this curiosity is inherently subjective, the learner determines what direction his learning will take and the teacher acts as a learning partner to guide the process.

Metacognition also plays an important role in the learning process, as learners must reflect not only on the content of what has been learnt, but on the manner in which it has been learnt (Blaschke & Hase, 2016). This is vital to learning, as a good grasp of their own learning process helps learners' future learning endeavours to stay on track.

Although heutagogy is more applicable to post-secondary learning (Hase, 2009; Hase & Kenyon, 2000), there are principles that can be applied to learners in primary and secondary schools. These principles, along with principles from Bronfenbrenner's and Vygotsky's theories on development, are discussed below.

An Integrated Framework

Drawing from the bioecological model of human development, the sociocultural theory of cognitive development, and heutagogy, the following integrated theoretical framework served as the foundation for the present study.

Even though all learners in the study population are diagnosed with LD, each individual learner is a product of the interaction between his unique personal characteristics and the environment in which he functions, as described in the bioecological model of human development. This includes each learner's level of cognitive and emotional functioning, LD diagnosis, possible comorbid diagnoses, family dynamic, school environment, societal influences, and general ideologies about life and learning. Each learner also brings to the table previous experiences with learning that include successes and failures, strengths, and insecurities (Bronfenbrenner & Morris, 2007; Keenan, Evans & Crowley, 2016).

Furthermore, the diagnosis of LD brings with it documented difficulties in specific academic areas. Through formal assessments, it is possible to determine each learner's level of skill mastery in these areas, but, as explained by the sociocultural theory of cognitive development, these measured skill levels are not representative of the learner's potential for learning. By modifying the teaching environment and by providing structured support that guides the learner through the learning process in the zone of proximal development (Vygotsky, 1978), it is possible to stimulate learning in such a way that new skills are acquired, and new levels of functioning are achieved.

The learner is not a passive participant in this process, however, as internal motivation, the cultivation of academic curiosity, and the act of reflecting on the process of learning all drive and contribute to future learning and academic success (Hase, 2009; Hase & Kenyon, 2000).

With this integrated theoretical framework in mind, the purpose of this study was to determine whether it is possible to improve learners with LD's academic performance by allowing them to complete tasks verbally rather than in written form, thereby circumventing poor writing skills. The researcher argued that the current method of written assessment that is used to determine academic knowledge, is disadvantaging learners with LD and is preventing them from performing according to their true academic potential. Following on this argument, the following research questions were formulated:

1. Which output modality, written or verbal, elicits the greatest measure of linguistic complexity and factual accuracy in learners with LD's summaries of expository text?
2. How in tune are learners with LD with their own ability to accurately relay factual information in the written and verbal modalities?

3. Does therapeutic intervention in the form ST, OT, and RT in the early school years significantly improve measures of linguistic complexity and factual accuracy in the later school years?

METHODS

This chapter provides a detailed overview of the study that was designed to answer the research questions formulated in the previous chapter.

Aim of the Study

The main aim of this study was to determine whether a change in modality from written output to verbal output would yield more representative results in terms of linguistic complexity and factual accuracy in learners with LD.

Objectives

The following objectives operationalised the present study:

- To compare the linguistic complexity of written and verbal summaries of expository text produced by a group of learners with LD.
- To compare the factual accuracy of written and verbal summaries of expository text produced by a group of learners with LD.
- To determine how accurately the learners can judge their own success in terms of producing factually accurate summaries of expository text.
- To determine the efficacy of learners' editing of their written summaries.
- To compare the linguistic complexity and factual accuracy data from learners with LD who have had prior ST, OT, and/or RT intervention to data from learners who have not.
- To comment on which response modality provides learners with LD with the best opportunity to give an accurate, representative account of their subject knowledge.

Research Design

A quantitative, exploratory, non-experimental correlational study design was used. A quantitative research approach means that obtained data is converted and presented in numeric form (Ingham-Broomfield, 2014). These numeric representations of data variables can then be compared to one another in order to determine statistically significant similarities or differences between variables. The present study was also exploratory in nature. Exploratory research aims to investigate concepts which are not yet well understood, such as the optimal output modality for learners with LD. The goal of exploratory research is to form hypotheses for future investigations (Stebbins, 2001). In addition, the present study was non-

experimental. Non-experimental research is observational research where the researcher describes phenomena without manipulating or adding variables (Radhakrishnan, 2013). There are several kinds of non-experimental research, one of which is correlational studies. Correlational studies aim to determine whether two or more variables in a single population are related. It can also be used to measure the same variable across two different populations (Leedy & Omrod, 2005). This design was deemed appropriate for the present study as the main aim was to determine whether a correlation exists between written and verbal summary output in a specific LD population, where the population is not being manipulated as part of the study design.

Participants

Sampling Strategy

A purposive sampling strategy was selected. Purposive sampling is a non-probability sampling technique where the researcher selects participants based on their characteristics. It is assumed that selecting participants in this way will lead to more information being collected specifically relevant to the topic of study (Etikan, Musa & Alkassim, 2016). Several methods of purposive sampling exist. The homogenous sampling method was selected for the present study. Using this method, the relationship between a common characteristic of the population, in this case LD, and variables under investigation, in this case, verbal and written output modalities, could be investigated.

Description of Participants

Twenty-Nine grade 10 learners were selected from a remedial school in Gauteng, South Africa. Grade 10 learners were selected, as learners at this grade are expected to have an adequate grasp of expository text and its structure (Brown & Day, 1983; Welie, Schoonen, Kuiken, et al., 2017).

At the time of data collection, 29 learners were enrolled in grade 10 at the school. All 29 learners were invited to participate in the study if they met the inclusion criteria. Eligibility to participate in the study was determined after informed assent/consent was obtained from both learners and parents, as permission was required to access personal and confidential records. For learners to be included in the study as participants, they had to meet the following criteria:

1. Their measured intelligence quotient (IQ) was required to fall between 90 points and 110 points, which is considered to be within normal limits;
2. They had to speak either Afrikaans or English as a first language;
3. They needed to have a formal diagnosis of LD as indicated in psychology reports or they needed to have been identified as a learner with special educational needs (LSEN), specifically LD, by the Department of Education;
4. Learners with any comorbid diagnosis would not be allowed to participate, with the exception of Attention-Deficit/Hyperactivity Disorder (American Psychiatric Association, 2013). Learners who had a diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) would be considered for participation if they were taking prescription medication to aid their concentration;
5. Learners needed to be able to complete regular academic assessments without the use of a reader and/or scribe.

A sixth criterion was included in the planning stages of this research project, which stated that learners needed to score within five years of their chronological age on measures of both reading rate and reading comprehension as measured by the Neale Analysis of Reading Ability (NARA), Revised British Edition (Neale, 1989) or an informal Afrikaans equivalent of this assessment. All grade 10 learners enrolled at the school undergo reading assessments at the beginning of their grade 10 year, performed by in-house remedial therapists. When these results were examined by the researcher to determine participant eligibility, only two potential participants met this criterion.

It was then discussed and decided by the researcher and research supervisor to not include measures of reading rate and reading comprehension as part of the inclusion criteria. The rationale for this decision was twofold. Firstly, adhering to this criterion would greatly diminish the already small potential sample size; and secondly, reading difficulties are well-documented in LD populations (Carretti, Re & Arfè, 2011; Fuchs, Fuchs, Mathes, et al., 2000; Vaughn, Gersten & Chard, 2000). Since the learners included in the present study do not benefit from the use of readers or scribes during academic assessments, including them despite their poor performance on the NARA might render more accurate data as to the true performance levels of the average LD learner on the types of tasks measured in this study.

Out of the 29 grade 10 learners, 17 volunteered to participate in the study. Ten out of the 17 learners, three females and seven males, met the inclusion criteria (age range 15:3 to 17:10,

mean age 16:3). Two of these learners spoke English as a first language and the remaining eight learners spoke Afrikaans as a first language. Furthermore, eight of these learners had received ST, OT, and RT as part of their school curriculum up to and including grade five, and two had not.

Two of the 10 learners who met the inclusion criteria were randomly selected for the pilot study. Both of these learners, one male and one female (ages 16:5 and 16:10 respectively), spoke Afrikaans as their first language and had received ST, OT, and RT as part of their school curriculum up to and including grade five. The remaining eight learners who met the inclusion criteria were selected as participants in the main study (see Table 4.1 for participant details). Learners were informed of their eligibility to participate in the study individually, face-to-face, so that clarity could be provided if needed.

Of those learners who volunteered to participate, but did not meet the inclusion criteria, two did not have parental consent, two made use of a reader and/or scribe during academic assessments, two had a diagnosis of ADHD, but were not taking any prescription medication to aid concentration, and one had a measured IQ that fell below the normal limit.

Table 4.1: Participant particulars and reading assessment results as measured on NARA, Revised British Edition (Neale, 1989) or informal Afrikaans translation

Participant	Gender	Home Language	Previous Therapy*	Chronological Age	Reading Rate	Reading Comprehension
1	M	English	Yes	15:3	13:0	10:1
2	M	Afrikaans	Yes	16:2	13:0	10:10
3	M	Afrikaans	Yes	15:10	10:1	11:10
4	M	Afrikaans	No	16:10	10:1	8:7
5	M	Afrikaans	No	17:10	13:0	10:10
6	F	Afrikaans	Yes	16:2	12:4	11:4
7	F	English	Yes	16:3	13:0	11:6
8	M	Afrikaans	Yes	15:4	9:0	10:11
Mean Age				**16:3**	**11:8**	**11:0**

* Previous Therapy denotes speech-, occupational-, and remedial therapy as part of the school curriculum up to and including Grade 5.

Context

The school from which participants were selected is a remedial school in Meyerton, a suburb of Johannesburg. The school has a large feeder area which includes not only Meyerton, but also many surrounding towns. It has a fee structure targeting middle-class socio-economic communities of learners with learning difficulties and provides primary and secondary education in both English and Afrikaans.

At the time of data collection, approximately 460 learners were enrolled at the school from grade R to grade 12. Eligibility for admission to the school is according to strict criteria, determined by the Gauteng Department of Education (GDE). These include a diagnosis of LD, an average or above average IQ, and social as well as academic skills sufficient to allow the learner to function and progress in a remedial school system where a mainstream curriculum, namely CAPS, is being followed.

The school aims to provide quality education tailored to the needs of learners with LD. This is done by limiting class sizes to 16 learners in the primary grades and 18 learners in the high school grades. The school also has six speech-language therapists, six occupational therapists, and five remedial therapists on staff who provide therapy services to learners. All learners from grade one to grade five receive two to three weekly sessions each of ST, OT, and RT, depending on the need for intervention. Therapeutic intervention happens in small groups of two to three learners, and functions on the basis of a pull-out system. Assessments to determine therapy progress are done at the end of each year, and the results of these assessments are used to determine therapy goals for the next academic year.

Ethical Considerations

Ethical clearance was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, protocol number M181142. Permission was also granted by the GDE to conduct research in a school setting (see Appendix A1 for ethical clearance certificate and Appendix A2 for permission from GDE). Specific ethical principles as per the World Medical Association Declaration of Helsinki (World Medical Association, 2013) and the Belmont Report on ethical treatment of research participants (The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979) were applied.

Summarised, the following ethical principles were upheld in the present study: The principles of respect for persons (dignity and autonomy), beneficence and non-maleficence were upheld by obtaining informed consent from primary caregivers and informed assent from participants. It was clearly communicated that participation is voluntary and that no negative consequences would result from refusal to participate. It was also stated that the results of the study would not be counted towards participants' academic performance. Participants and caregivers would be free to ask for clarification should anything be unclear, and would be able to withdraw from the study at any point should they no longer wish to participate; with no negative consequences. Identifying information on consent forms would not be linked to data collected from participants, so that confidentiality would be maintained. All participant data would be stored securely, in a password protected computer. The results of the research would be presented to relevant role players, such as the GDE and the school principal, in order to inform decision making regarding assessment procedures of learners with LD. This process will be fulfilled following the completion of the study, at a prearranged time.

Measures

Two passages from the prescribed grade 10 life orientation textbook (Rooth, Seshoka, Steenkamp, et al., 2011) were selected to serve as stimulus texts for the written and verbal summaries (see Appendix B1 and Appendix B2). The life orientation subject area was selected as this is a compulsory subject for all grade 10 learners and the English and Afrikaans textbooks correlate directly. The selected passages had not yet been addressed in the academic year and thus were unfamiliar to the learners.

Passages were of equal length and consisted of six paragraphs. Each paragraph contained one main idea and several subordinate ideas. Informational organisation was similar for both passages with the first paragraph containing general introductory information, the second to fourth paragraphs contributing the bulk of the main facts related to the topic, the fifth paragraph containing supplementary information in bullet form, and the last paragraph containing the conclusion and personal applications. The way in which the information was structured would guide the learners' understanding of the topic by progressively adding more information in each subsequent paragraph up until the conclusion paragraph at the end.

Written Summary

The passage selected as stimulus for the written summary was entitled "Careers and Career Choices" (see Appendix B1). The passage discussed different job sectors in South Africa as well as careers that are associated with each job sector. The main text structure (Meyer & Freedle, 1984) was that of description/collection, but it also contained embedded comparisons and elements of problem/solution. The Coleman-Liau readability index (Coleman & Liau, 1975) was used to grade these passages in terms of reading level, and scored the passage to be on a grade 9 reading level. This index is based on North American grade levels, as there are no indices standardised specifically for the South African population. The Coleman-Liau index focusses on the number of characters per word, instead of the number of syllables per word used by most other indices, to determine readability. This was considered relevant when selecting a readability index, as decoding long words is a well-researched area of difficulty for learners with LD (Archer, Gleason & Vachon, 2003).

The Coleman-Liau index was used in an unadapted form and thus was not culturally representative of the South African LD population. The results, therefore, need to be interpreted qualitatively. It was not of importance to the study to establish an exact reading level for the stimulus passages. By using this index, the researcher wished to determine if the two stimulus passages were generally comparable in terms of reading level, and to ensure that the reading level of the passages did not measure substantially higher or lower than the expected grade 10 reading level.

A possible reason for the index scoring the passages below grade level, is that the reading level of South African students is below that of students from the United States (Mullis, Martin, Foy, et al., 2012; Rule & Land, 2017). This means that text aimed at grade 10 learners in South Africa, might correlate to text aimed at lower grade levels in the United States. This applies to the passage selected for the written summary as well as the passage selected for the verbal summary. It was decided to use the stimulus passages despite the lower grade level scores, as they were taken from a grade 10 textbook which is representative of the academic text that South African grade 10 learners interact with daily.

Verbal Summary

The stimulus passage for the verbal summary was entitled "Poverty" (see Appendix B2) and discussed the prevalence and manifestation of poverty in South Africa. The main text

structure was that of description/collection, but the passage contained embedded elements of comparison and problem/solution. The Coleman-Liau readability index scored the passage to be on a grade 8 reading level.

Self-Assessment Rubric

Self-assessment rubrics were created for both the written and verbal summaries (see Appendix C1 and Appendix C2). The rubrics measured participants' perceived performance in five categories (see Table 4.2). Each of the five areas could be scored by selecting one of four options, namely "Always", "Mostly", "Sometimes", or "Hardly Ever". Percentage ranges in 25 per cent increments were assigned to each descriptor, with "Always" scoring the highest (76 – 100%) and "Hardly Ever" scoring the lowest (0 – 25%). The descriptors were used to make percentage ranges more tangible for participants, while the percentage ranges served as a reference point to use for comparison during data analysis.

Table 4.2: Self-assessment criteria for written and verbal summaries

Category	Description
Main Idea	I wrote down a main idea in each paragraph/I mentioned all the main ideas.
Supporting Facts	I wrote/mentioned extra facts to support the main idea.
Clarity	I wrote/spoke in a way that is easy to understand.
Information	I wrote down/mentioned all the important information.
Unnecessary Information	I didn't write down/mention any unimportant information.

Procedures

Pre-Testing of Materials and Pilot Study

Pre-testing of materials and the pilot study were conducted, simultaneously. Pre-testing of materials is necessary to identify problem areas and to ensure that the materials elicit data relevant for the study, while a pilot study assesses the research process to highlight possible procedural problems (Ruel, Wagner & Gillespie, 2016).

As mentioned earlier in this chapter, two of the learners who met the inclusion criteria were randomly selected to participate in the pre-test and pilot study, and the remaining eight participants would participate in the main study. Although the research protocol called for 10% of participants to be selected for the pilot study, two participants instead of only one was

selected in order to obtain a more reliable response to the instructions and measures. The participants both spoke Afrikaans as a first language.

For the purposes of the pilot study, participants completed both the written and verbal summary tasks on the same day. Both summary tasks took place in a quiet office where participants would not be distracted by external noise. The data obtained during the pilot study and pre-testing of materials was not included in the data of the main study.

Pre-test and Pilot Study: Written Summary

The following verbal instructions were given to the participants before the written summary: "I am going to give you a passage to read. You will have 15 minutes to read the passage carefully. If you finish reading the passage before the 15 minutes of reading time are up, I want you to reread the passage. At the end of the 15 minutes I will collect the passage and I will ask you to write a summary of what you have read. Divide your written summary into paragraphs and remember to include all the important information that you have read. You will have 15 minutes in which to write your summary. When you are done, please re-read your written summary and edit your work."

After the instructions were given, both participants in the pre-test and pilot study expressed concern about their reading skills. The researcher reassured them that the study does not aim to investigate reading skill. At the end of the 15 minutes of reading time, the instructions pertaining to the written part of the task were repeated. This was done in order to ensure that the participants understood what was expected of them. Both participants utilised the full 15 minutes of reading time and finished their written summary within the allotted 15 minutes of writing time. One of the participants neglected to edit his work.

When the 15 minutes of writing time had expired, the answer sheets were collected, and participants were asked to complete a self-assessment rubric (see Table 4.2 and Appendix C1). The aim of the self-assessment rubric was to gauge participants' perception of their own performance and how it compared to actual performance, specifically regarding the factual accuracy of their summaries.

The fact that both the participants in the pilot study finished their written summaries within the allotted 15 minutes was an important procedural factor to consider, as all the participants

selected for participation in the pilot study and main study qualified for 10 to 15 minutes of additional time during formal assessments, based on the GDE accommodation criteria (Le Roux, 2016) as well as participants' individual NARA assessments. Sessions were, however, limited to 30 minutes – 15 minutes of reading time and 15 minutes of writing time – in order to accommodate participants who had logistic difficulties and could not attend sessions that would last longer than 30 minutes. This was of some concern to the researcher, but when both participants in the pilot study completed their summaries within the allotted time frame, it was decided that the 15 minutes of reading and writing time respectively would be adequate.

Pre-Test and Pilot Study: Verbal Summary

After completion of the written summaries, participants in the pre-test and pilot study were given a 15-minute break before commencing the verbal summary task. For this task, learners were seen individually, and recordings were done using the Voice Memos application on an Apple iPhone 7. The instructions for the verbal summary task were as follows: "I am going to give you a passage to read. You will have 15 minutes to read the passage carefully. If you finish reading the passage before the 15 minutes are up, I want you to reread the passage. After the 15 minutes of reading time, I will collect the passage and I will ask you to tell me about what you have read. I will record what you say on this phone so that I can remember it, later. I will not mention your name on the recording. When you speak, remember to include all the important information that you have read. You will have to talk for at least 5 minutes, but not longer than 10 minutes."

Both participants utilised the full 15 minutes of reading time. After the 15 minutes of reading time had expired, the instructions pertaining to the verbal part of the task were repeated. Again, this was done to ensure that the participant understood what the researcher expected of them. Both learners gave verbal summaries of less than two minutes in duration. With prompting, they managed to pass the two-minute mark. Prompting was limited to, "Do you remember anything else about what you have read?" and, "Is there anything else you would like to tell me about the passage?" After completion of the verbal summary, learners were again asked to complete a self-assessment rubric (see Table 4.2 and Appendix C2).

Amendments

Following the pilot and pre-testing phase of the study, the materials were deemed adequate in terms of eliciting relevant and sufficient data. Some amendments were, however, made to the

study's procedures: firstly, the instructions for the written summary were amended to include a reassurance that the aim of the task was not to measure reading proficiency. Secondly, it was decided to state that participants could make notes on and highlight sections of the stimulus text. This was to afford participants as much interaction with the text as they needed to have, so to facilitate maximum comprehension and recall. It was also decided to institute a five-minute warning when 10 minutes of reading and writing time had elapsed in order to help learners manage their time and give them ample time to conclude their work and edit it. Finally, the time limits for the verbal summary were changed to a minimum of two minutes and a maximum of five minutes of talking time.

Main Study

Written Summary

The written summary task of the main study was conducted in a group session. Participants were given a few minutes to get comfortable and then the instructions for the written summary were given. Instructions were given in both Afrikaans and English and were identical to the instructions provided in the pilot study, with the inclusion of the following: "I am aware that reading is difficult for some of you, but please don't worry. I am not trying to measure how well you can read. You are welcome to make notes on the passage or to highlight some sections if you feel that it will help you to remember what you read more clearly." After the instructions were given, each participant was given a copy of the stimulus text "Careers and Career Choices" and they were then given 15 minutes of silent reading time. Some participants finished reading before the 15 minutes expired and were encouraged to reread the passage. These participants did not attempt to reread the passage without encouragement from the researcher.

After the 15 minutes of reading time, the stimulus texts were collected, and each participant was given an answer sheet on which to write their summaries. The instructions pertaining to the written part of the task were repeated, giving the participants 15 minutes to write their summaries. A five-minute warning was given after 10 minutes of writing time to indicate to participants that they should start ending off their summaries, so that they could edit their work. Two participants were already done writing by this time and two participants expressed concern that they would not be able to write everything they still wanted to write within the remaining time. Generic reassurances, such as, "It's okay, do the best you can" were given to help participants remain calm and focussed. At the end of the 15 minutes of writing time, the

written summaries were collected, and each participant completed a self-assessment rubric (see Table 4.2 and Appendix C1). The rubric, which contained questions to gauge participants' insight into their own performance, was briefly explained to the participants for it to be completed as accurately as possible.

Verbal Summary

The verbal summary tasks were conducted individually and, on a day subsequent to the written reading task. At the start of the session, the task was explained to the participant. The instructions were identical to those used for the verbal summary task during the pilot study, apart from the time adjustments of a minimum talking time of two minutes and a maximum of five minutes. After the instructions were given, the participant was given a copy of the stimulus text "Poverty" and was allotted 15 minutes of silent reading time. Many of the participants finished reading before the 15 minutes expired, and were encouraged to reread the text. If a participant chose not to reread the text or reread the text and still had time left over, they had to wait out the remaining time until the 15 minutes of reading time expired. At the end of the 15 minutes of reading time, the stimulus text was collected and the part of the instructions pertaining to the verbal summary was repeated.

Each participant's verbal summary was recorded using the Voice Memos application on an Apple iPhone 7. The application has a built-in timer to monitor recording time. If participants spoke for less than two minutes, they were prompted to expand their verbal summary. Prompts were limited to, "Do you remember anything else about what you have read?" and, "Is there anything else you would like to tell me about the passage?" No participant exceeded the five-minute limit. Following the verbal summary, each participant was given a self-assessment rubric to complete which was similar to the rubric used for the written summaries (see Table 4.2 and Appendix C2).

Data Analysis

For ease of analysis, all written and verbal summaries were transcribed verbatim to a digital format. Data from both the written and verbal summaries was analysed in two broad categories, namely linguistic complexity, and factual accuracy. Within the category of linguistic complexity, data was further analysed in terms of T-units, type-token ratio (TTR),

and complexity index (Schneider, Dubé & Hayward, 2005). Within the category of factual accuracy, data was analysed in terms of factual accuracy percentage, and editing.

Linguistic Complexity

T-units

T-units, or minimal terminal units, are syntactic structures that contain a main clause and one or more subordinate clause or non-clausal structure (Bardovi-Harlig, 1992; Owens, 2013). Written and verbal summaries were analysed for T-units in two ways.

Firstly, the number of T-units for each summary was calculated. This was done by determining the borders between subsequent main clauses. These borders could coincide with sentence borders, but often a written or spoken sentence contained more than one T-unit, for example "*I went to the shop with my mother* [T-unit 1] and *I bought a green jersey* [T-unit 2]". After the T-unit borders were successfully identified, the number of T-units were tallied and recorded.

Secondly, the number of words per T-unit was calculated for each summary. For older children and adolescents, calculating the number of words per T-unit is considered a more appropriate measure of syntactic complexity than the mean length of utterance, which is often used when analysing the syntactic complexity of younger children's language samples (Owens, 2013). The mean number of words per T-unit was calculated for each summary by dividing the total number of words by the total number of T-units.

Conjunctions at the beginning of independent clauses, for example, "*And* I went to the park", were omitted and not included in the word count. Unattached subordinate clauses and false starts, such as "*There…* There are many poor people in the world", were similarly omitted. Numbers were counted as single words in written summaries, as all participants wrote numbers numerically, for example, "24", instead of writing out the number, "twenty-four". In order to maintain consistency and avoid confounding, numbers which were mentioned during the verbal summaries were also counted as single words. Likewise, numbers followed by a percentage sign, for example, "24%", in the written summaries were counted as single words, and thus numbers followed by the words "per cent" in the verbal summaries were also counted as one word for the reasons stated above.

TTR

The TTR is a measure of semantic diversity and is calculated by dividing the number of unique words in a sample by the total number of words for that sample. The resulting value falls between zero and one. A higher TTR indicates greater lexical diversity, while a lower value could indicate a poor semantic repertoire. Normative data exist for young children up until the age of approximately nine years (Owens, 2013). Even though the mean age of participants in the current study far exceeds nine years, it was not deemed problematic as the results were used for the purpose of comparison and not as a diagnostic means.

When calculating the TTR, all complete words in the sample were included in the calculation, including conjunctions at the start of sentences, and false starts. Numbers and percentages were counted as single words in both the written and verbal summaries for the reasons stated previously.

Complexity Index

The complexity index is described by Schneider, Dubé, and Hayward (2005). It is a measure of structural complexity and breaks language samples up into C-units, or communication units. A C-unit is like a T-unit, with the exception that it allows for the inclusion of incomplete sentences, for example, “Gave me a fright”. False starts or interrupted sentences do not count as C-units.

In order to calculate the complexity index, each written and verbal summary was divided into C-units. Each C-unit was further divided into an independent clause and its attached subordinate clause(s). Admissible incomplete sentences were counted as single independent clauses, according to the rules of the complexity index, and any subordinate clause in an incomplete sentence was ignored. Conjoined clauses where the subject of the second clause was omitted, were counted as one independent clause, for example, “She got up and *opened the cupboard*”. Auxiliary and main verbs in the same clause were also counted as a single independent clause, for example, “He *should have been chasing* the dog”.

To calculate the complexity index, the number of independent and subordinate clauses were added together, and then divided by the number of independent clauses. A higher value designated a greater level of structural complexity.

Factual Accuracy

Factual Accuracy Percentage (FAP)

Both stimulus texts were analysed and coded for main ideas and subordinate ideas (see Appendix B1 and Appendix B2). Each text consisted of six paragraphs and each of the six paragraphs contained one main idea and several subordinate ideas. The first sentence of each paragraph in both texts contained the main idea, apart from the first and last paragraphs of the "Careers and Career Choices" text where the main idea was contained in the second sentence of the paragraph (see Appendix B1).

In order to calculate a FAP, main ideas were allotted two marks and subordinate ideas were allotted one mark. Each text contained six main ideas (12 marks) and 18 subordinate ideas (18 marks), totalling 30 marks. Written and verbal summaries were then compared to the stimulus texts and scored, accordingly. Verbatim quotes were not required in the summaries, but information was required to be accurate and clearly resemble a main or subordinate idea from the stimulus text in order to receive a mark allocation. Additional or incorrect information was disregarded.

The FAP was calculated in three ways. A global factual accuracy percentage (gFAP) was calculated by dividing the total marks received for each summary by 30, which is the maximum possible marks. Since it was improbable that a participant would remember all the subordinate facts, and since participants were asked to write a summary of the stimulus text, a main idea factual accuracy percentage (mFAP) was also calculated. This was done by dividing the number of main ideas mentioned in each summary by six, which is the maximum number of main ideas per text. Lastly, a self-assessed factual accuracy percentage (sFAP) was determined based on question four in the participants' self-assessment rubrics, namely "I wrote down/mentioned all the important information from the text". This process is described in more detail in the section on statistical analysis. Each participant's written and verbal gFAP's were then compared to their written and verbal sFAP's. This was done in order to determine if there were discrepancies between participants' self-assessment of how accurately they were able to relay the information that they had read, and how they truly fared.

Editing

Participants were asked to re-read and edit their summaries after they had finished writing them. The edited version of the summary was compared to the unedited version of the summary in order to determine if editing would change the FAP in any way and to annotate which kinds of edits participants made, for example correcting spelling or grammar.

Statistical Analysis

Raw results obtained from the linguistic complexity and factual accuracy measures for the written summaries were matched and compared to those obtained from the verbal summaries using paired sample *t*-tests. Paired sample *t*-tests are used to compare two separate sets of data obtained from the same participants in order to determine if there is a statistically significant difference between the measured observations (Leedy & Omrod, 2005). It is generally accepted that, for paired sample *t*-tests to be valid, the dependent variable should be continuous, normally distributed and free from outliers. Observations should also be independent of each other (Lani, 2017). The data obtained from the observations in this study met all the above criteria, except for normal data distribution. Small sample sizes affect the normality of data distribution (Krithikadatta, 2014). As the present study consisted of only eight participants, the data set was too small to accurately determine normality of data distribution. This, however, does not automatically preclude the use of *t*-tests, as the *t*-test was originally developed to deal with small sample sizes (Box, 1987). Furthermore, recent simulations with very small sample sizes ($n < 5$) have shown that the paired sample *t*-test can be used reliably with adequate statistical power to analyse small data sets (De Winter, 2013).

The use of a non-parametric equivalent of the paired sample *t*-test was considered by the researcher. However, given that non-parametric tests generally have weaker statistical power than their parametric equivalents, and even more so when faced with small sample sizes, (Dwivedi, Mallawaarachchi & Alvarado, 2017), it was decided that there is enough evidence that the use of paired sample *t*-tests would still be appropriate, with the acknowledgement that a small sample size weakens statistical power whether parametric or non-parametric tests are used.

Within the category of linguistic complexity, raw results for the number of T-units, words per T-unit, TTR, and complexity index were analysed in the same way. For each measure, means were calculated for both the written and verbal summaries and these means were used to

perform the paired sample *t*-tests. The confidence interval was set at 95% with a p-value of 0.05. This method of analysis was also employed to statistically compare the measures for the gFAP, mFAP and sFAP in the factual accuracy category.

The sFAP was determined based on participants' completion of question four in the self-assessment rubrics. As the self-assessment rubric provided a percentage range, a single point of reference for each participant had to be selected for the statistical analysis. This point of reference was either the lowest percentage point in the range or the highest percentage point in the range, depending on whether a participant's gFAP was respectively lower or higher than their sFAP range. For example, if a participant's gFAP was 26%, but on the self-assessment rubric they selected the percentage range of 51-75%, 51% would be selected as reference point for their sFAP. Similarly, if in the above example their gFAP was 80%, 75% would be selected as reference point for their sFAP. If a participant's gFAP corresponded with the percentage range that they had selected on the self-assessment rubric, their gFAP was used as reference point for the sFAP. This method of selecting reference points for the self-assessment rubrics was used so that a mean sFAP could be calculated, which would reflect the minimum amount of discrepancy between participants' gFAP and sFAP.

Each of the measures within the categories of linguistic complexity and factual accuracy were then statistically analysed to determine if participants who had previously received ST, OT, and RT as part of their school curriculum performed better than those who did not receive these therapies. This was done by performing *t*-tests assuming unequal variances, as six participants had previously received the therapies mentioned above and only two participants had not. For these analyses, written summaries and verbal summaries were analysed separately, as the aim was to determine the difference in performance between participants and not the differences between modalities.

Reliability and Validity

Inter-rater reliability was achieved by having a second rater, who was also a trained speech therapist, code the stimulus passages for main ideas and subordinate ideas. Inter-rater agreement was 95 per cent for the written summary stimulus text, "Careers and Career Choices", and 100 per cent for the verbal summary stimulus text, "Poverty". The second rater was also asked to analyse written and verbal data from one randomly selected participant. Spearman's correlations between observations obtained from the researcher and second rater

were $r_s = 1$ ($p \leq 0.05$) for both the written and verbal summaries, indicating a very high level of agreement. This very strong correlation might be influenced by the small number of observations in each category (n = 6).

Validity measures were divided into content validity and construct validity. Content validity was achieved by selecting stimulus material that was both relevant to the participants as well as representative of their academic curriculum (Roberts, Priest & Traynor, 2006). Construct validity was achieved by conducting a pilot study and pre-testing materials to ensure that the main study yields relevant results. The researcher also planned and designed the present study drawing from the methodologies of similar studies that yielded significant results in the field (Brown & Day, 1983; Scott & Windsor, 2000; Ward-Lonergan, Liles & Anderson, 1999). In addition, the instructions were kept consistent, ensuring that all participants received the same information.

RESULTS

The results presented in this chapter are in line with the objectives of the present study, namely, to compare the written and verbal expository text summaries of learners with LD in terms of linguistic complexity and factual accuracy. To determine the accuracy of learners with LD's self-assessment of their factual accuracy performance and to determine the efficacy of their editing skills. To compare results from learners who have received previous ST, OT, and RT to the results of those learners who had not received these therapies. Finally, to comment on the response modality that best reflects learners with LD's actual subject knowledge.

Data was analysed in two broad categories: linguistic complexity and factual accuracy. In the linguistic complexity category, the number of T-units, words per T-unit, TTR and complexity index were investigated. In the factual accuracy category, the gFAP, mFAP, and sFAP were investigated.

Data obtained from the linguistic complexity and factual accuracy measures were statistically analysed using paired sample *t*-tests. The null hypothesis for the *t*-tests (H_0: $\mu_1 = \mu_2$) stated that there is no statistically significant difference between the means for the two measured conditions, i.e. written and verbal. The two-tailed critical value for this sample was calculated to be 2.36. A two-tailed approach was selected, as the researcher was interested in differences between means in both a positive and negative direction. The confidence interval was set at 95%, $\alpha = 0.05$. In addition to the above, *t*-tests assuming unequal variances were used to compare data obtained from participants who had received ST, OT, and RT as part of their school curriculum to data obtained from participants who had not. The confidence interval was set at 95%, $\alpha = 0.05$.

Overall Findings

Within the linguistic complexity category, no statistically significant differences between written and verbal responses were found for the number of T-units, words per T-unit, or complexity index. There was, however, a statistically significant difference in TTR between the two modalities with participants displaying greater lexical diversity in the written modality. Within the factual accuracy category, the sFAP was the only measure that rendered statistically significant results. These results are presented in greater detail below.

Linguistic Complexity

Within the category of linguistic complexity, the number of T-units, words per T-unit, TTR, and complexity index were investigated. Results obtained from written summaries were compared to results obtained from verbal summaries. See Table 5.1 for means and standard deviations obtained for each of these measures, and Table 5.2 for *t*-statistics and p-values for each measure.

Table 5.1: Means and standard deviations (SD) of linguistic complexity measures for written and verbal summaries

Measure	Written		Verbal	
	Mean	SD	Mean	SD
Number of T-units	9.13	3.48	12.88	4.29
Words per T-unit	11.80	2.40	12.00	3.10
TTR	0.62	0.06	0.48	0.08
Complexity Index	1.67	0.41	1.56	0.25

Table 5.2: *t*-statistics and p-values for measures of linguistic complexity

Measure	*t*-statistic (Two-tail critical value = 2.36)	p-value ($\alpha = 0.05$)
Number of T-units	1.52	0.17
Words per T-unit	0.13	0.90
TTR	4.81	0.002
Complexity Index	0.66	0.53

Number of T-units

Written summaries contained a mean of 9.13 T-units, while verbal summaries contained a mean of 12.88 T-units (See Table 5.1). Even though qualitatively verbal summaries contained more T-units than written summaries, a paired sample t-test found that there was no statistically significant difference in the number of T-units for written (M=9.13, SD=3.48) and verbal (M=12.88, SD=4.29) modalities; t(7)=1.52, p=0.17 (see table 5.2), thus the null hypothesis was accepted.

Given the amount of stimulus information and the amount of time participants had in which to write and speak, the mean number of T-units was low for both written and verbal summaries.

This finding is consistent with other studies (Graham, Collins & Rigby-Wills, 2017; Houck & Billingsley, 1989; Scott & Windsor, 2000) which found that written output of learners with LD tends to be shorter than that of their non-LD peers.

Words per T-unit

The mean words per T-unit for written and verbal summaries were very similar, with written T-units containing 11.8 words on average, compared to 12 words for verbal T-units (see Table 5.1). Considering the close correlation of the two means, it was not surprising that there was no statistically significant difference in the number of words per T-unit for written (M=11.80, SD=2.40) and verbal (M=12.00, SD=3.10) modalities; t(7)=-0.13, p=0.90 (see Table 5.2). The null hypothesis for this measure was accepted.

These results suggested that modality did not significantly influence sentence length. This finding is consistent with normative data (Loban, 1976; Owens, 2013) which suggests that the number of words per T-unit does not show great statistical variability between the written and verbal modalities, even in non-LD populations.

Data from the present study also indicated that the mean number of words per T-unit for the written modality fell within the normative range presented by both Loban (1976) and Owens (2013), while the mean for the verbal modality was greater than the norm. This means that participants in this study produced longer verbal T-units than is the norm for non-LD learners of the same grade level. This observation is similar to Carretti, Re, and Arfè's (2011) observation that verbal output of learners with poor reading comprehension tends to be longer than that of learners with age-appropriate reading comprehension.

TTR

As seen in Table 5.1 and Table 5.2, there was a significant difference in the TTR for written (M=0.62, SD=0.06) and verbal (M=0.48, SD=0.08) modalities; t(7)=4.81, p=0.002. This difference indicated greater semantic diversity in the written modality than in the verbal modality, and rejection of the null hypothesis. Furthermore, the standard deviation for each modality was very small, which indicated data points which were closely dispersed around the mean and confirmed the significance of the difference in means.

Many studies have investigated the TTR, or Number of Different Words (NDW) – a measure related to TTR – in either the written or verbal modality within the LD population. Very few published studies, however, have directly or indirectly compared the TTR or NDW between the written and verbal modalities in this population. Data extrapolated from two such studies (Carretti, Motta & Re, 2014; Scott & Windsor, 2000) suggests that the NDW for written and verbal modalities are usually very closely correlated. The results from the present study thus differed from results of the limited amount of available research on this topic. Possible explanations for this finding include the inherent structure provided by writing tasks and the influence of executive function. These concepts are further discussed in the next chapter.

Complexity Index

Qualitatively, the complexity index mean for the written modality was slightly higher than the mean for the verbal modality (see Table 5.1). Despite this slight difference, the null hypothesis was accepted as there was no significant statistical difference in the complexity index means for written (M=1.67, SD=0.41) and verbal (M=1.56, SD=0.25) modalities; $t(7)=0.66$, $p=0.53$ (Table 5.2). Even though the inter-modality difference in means was not statistically significant, the qualitatively higher complexity index in the written modality is in accordance with developmental norms which state that written language complexity overtakes oral language complexity in high school years (Owens, 2013).

When compared to normative data on sentence complexity and subordination (Loban, 1976), the means for both the written and verbal modalities were higher than that of non-LD learners at the same grade level. According to Loban, means for sentence complexity peak in the early high school years after which they stabilise and even decline as learners become more proficient in producing more compact and concise sentences. The need for dependent clauses to add additional information thus diminishes and the complexity index declines, accordingly. Inferring from the data obtained in the present study, this stabilisation and decline did not happen as readily in the LD population.

Furthermore, the standard deviation for the mean of the written modality was much larger than that of the verbal modality (see Table 5.1), indicating more consistent performance in terms of complexity index for the verbal modality. This means that the verbal modality was more reliable in eliciting syntactically complex sentences that contain subordinate clauses than was the written modality. This finding is in contrast with Crystal (2005) who states that,

although verbal language is complex, the more formal nature of writing lends itself towards more complex sentence structures. Crystal further proposes that speech, being more informal, contains more rephrases and false starts, and relies on real-time processing, which makes complex planning more difficult.

Factual Accuracy

Within the category of factual accuracy, data was analysed in terms of gFAP, mFAP, and sFAP, as well as the discrepancy between gFAP and sFAP. Means and standard deviations for factual accuracy are presented in Table 5.3, while *t*-statistics and p-values are presented in Table 5.4.

Table 5.3: Means (in %) and standard deviations (SD) of factual accuracy measures for written and verbal summaries

Measure	Written		Verbal	
	Mean	SD	Mean	SD
gFAP	31.67	18.34	30.00	9.76
mFAP	37.50	24.80	33.33	8.91
sFAP	56.04	13.55	49.21	14.29
gFAP - sFAP discrepancy	24.37	26.41	19.22	14.41

Table 5.4: *t*-statistics and p-values for measures of factual accuracy

Measure	*t*-statistic (Two-tail critical value = 2.36)	p-value ($\alpha = 0.05$)
gFAP	0.45	0.67
mFAP	0.55	0.60
sFAP	0.76	0.47
gFAP – sFAP discrepancy	0.65	0.53

Global Factual Accuracy Percentage (gFAP)

There was no statistically significant difference in the gFAP means for the written (M=31.67, SD=18.34) and verbal (M=30.00, SD=9.76) modalities; t(7)=0.45, p=0.67 (see Table 5.3 and Table 5.4) and thus the null hypothesis was accepted. Even though the means for the two modalities were closely correlated, the standard deviation for the written modality was nearly

double that of the verbal modality. This signified a wider distribution of data points around the mean for the written modality and implies much greater variability in individual performance for the written modality than for the verbal modality. This finding is discussed in combination with the findings for the mFAP measure below.

Main Idea Factual Accuracy Percentage (mFAP)

As shown in Table 5.3 and Table 5.4, the mFAP mean for the written modality was higher than the mean for the verbal modality, but the difference was not statistically significant and thus the null hypothesis was accepted [written M=37.50, SD=24.80, and verbal M=33.33, SD=8.91; t(7)=0.55, p=0.60]. Data points for the verbal mFAP contained two outliers (see Figure 5.1). It was decided to include these two outliers in the sample, as these were true recorded data points and were not the result of measurement error. Additionally, inclusion of these two data points had a minimal effect on the mean and thus would not bias results.

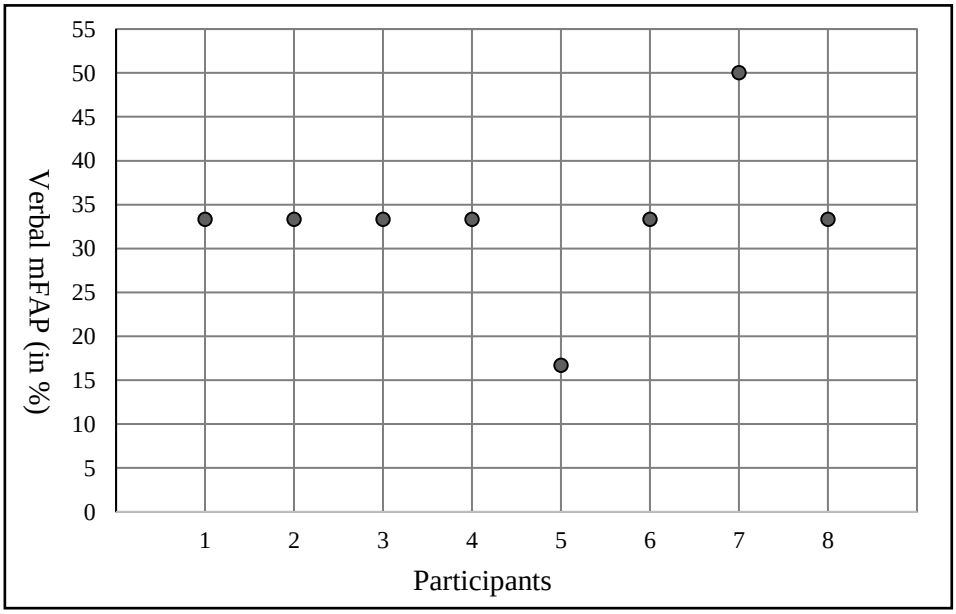

Figure 5.1: Verbal mFAP data point distribution to show outliers

Means for both the gFAP and mFAP in both modalities were very low, indicating that participants only remembered approximately one third of the total number of facts as well as a third of the main ideas presented in both the stimulus passages. In their research synthesis, Vaughn and colleagues found that learners with LD read without knowing what information to earmark as important, and that they also don't check their own comprehension as they go along (Vaughn, Gersten & Chard, 2000). This is a probable explanation of participants' poor performance on measures of gFAP and mFAP in the present study and was also evidenced in

the lack of structural organisation in participants' summaries. Main and subordinate ideas were presented in the order in which participants remembered them, not according to an informational structure.

As observed for the gFAP measure, there was a vast difference in the mFAP standard deviations for the two modalities, with the standard deviation for the written modality being nearly three times that of the verbal modality. This indicates that, like with the gFAP measure, the data points for the written modality had a much wider distribution around the mean than those for the verbal modality. This could indicate that the physical task demands of written work, which are absent in verbal tasks, impacted on the relaying of facts in the written modality. Similar to the results of the present study with older learners, Cragg and Nation found that among 9 to eleven-year-old learners with reading comprehension difficulties, modality does not significantly influence recall (Cragg & Nation, 2006). Unlike the results of this study, however, they did not find a discrepancy in SD between the written and verbal modalities. It is possible that this discrepancy comes into play in older learners and/or learners diagnosed with LD.

Self-Assessed Factual Accuracy Percentage (sFAP)

The sFAP mean for the written modality was higher than the mean for the verbal modality, indicating that participants felt that they had performed better on the written summary task than on the verbal summary task (see Table 5.3). This observed difference was, however, not statistically significant [written M=56.04, SD=13.55, and verbal M=49.21, SD=14.29; t(7)=0.76, p=0.47, see Table 5.4].

What was of greater interest and of more importance than comparing the two sFAP means, was investigating how accurately participants were able to assess their own performance in terms of gFAP. Within-modality measures showed that there was a statistically significant discrepancy between participants' gFAP and sFAP for each modality (see Table 5.5) which indicates that participants displayed very poor insight into their own performance and consistently overestimated their achievement by a significant amount. This finding is in line with previous research by Klassen (2002) and Vaughn, Gersten, and Chard (2000) which found that learners with LD rarely show accurate judgement concerning their academic capabilities.

Table 5.5: *t*-statistics and p-values for within-modality gFAP-sFAP discrepancy

Modality	*t*-statistic (Two-tail critical value = 2.36)	p-value ($\alpha = 0.05$)
Written	2.61	0.03
Verbal	3.77	0.007

Despite the statistical significance of the within-modality means of gFAP-sFAP discrepancies (see Table 5.5), there was no statistically significant difference in the gFAP-sFAP discrepancy means between modalities [written (M=24.37, SD=26.41) and verbal (M=19.22, SD=14.41); t(7)=0.65, p=0.53, see Table 5.3 and Table 5.4]. This means that participants were not able to better gauge their performance in one modality over another, but that they showed equally poor judgement of their own achievement for both modalities.

Editing

One of the objectives of this study was to compare the gFAP of unedited written summaries to that of edited written summaries. This could, however, not be done as no participant made content edits to their written summaries. Thus, the pre- and post-edit gFAP's for written summaries were identical. Table 5.6 lists the types of corrections participants made to their written summaries.

Table 5.6: Edits to written summaries

Type of Correction	Count
Rephrasing	0
Factual amendments	0
Spelling	13
Capitalisation	1
Punctuation	3
Word insertion	3
Word deletion	2

From Table 5.6 it is evident that participants in the present study made attempts at editing their work, but this editing consisted of correcting spelling and grammatical mistakes. None of the participants attempted to improve the quality or clarity of the content through editing. When examining the edited written summaries, some participants seemed to haphazardly edit certain spelling or grammatical mistakes, while leaving other obvious mistakes unedited. The

impression was given that editing was done solely because the researcher requested them to edit their work and not because participants felt a need to check their summaries for accuracy or correctness. This points to a very superficial interaction with their written work and indicates that participants did not engage in terms of content when they reread their work. This finding also highlights the need for explicit curriculum focus on editing skills, as learners with LD do not seem to recognise the importance of editing. Previous studies show that editing is one part of the writing process that requires explicit instruction in the LD population (Scott & Vitale, 2003). It is often completely avoided by learners with writing difficulties, partly due to the fact that they don't know how to approach the editing process (Sturm, Rankin, Beukelman, et al., 1997). The results of the present study are in line with these previous findings.

Therapy versus No Therapy

In order to determine if participants who had received previous ST, OT, and RT as part of their school curriculum performed better on measures of linguistic complexity and factual accuracy than those who had not, *t*-tests assuming unequal variances were performed. Unequal variances were assumed since six of the participants had received the above-mentioned therapies, while only two participants had not. This investigation examined differences between two participant groups (therapy versus no therapy) and not between modalities. Results for group analyses within the written and verbal modalities are presented in Table 5.7 and Table 5.8.

Although the standard deviations for measures differed greatly between groups (see Table 5.7), this was not deemed relevant as the no-therapy group contained only two participants. There were also no statistically significant differences between the therapy and the no-therapy groups for any of the measures of linguistic complexity or factual accuracy (see Table 5.8).

Examining standard deviations within groups, it was evident that the number of T-units, gFAP, and mFAP were the measures that produced the most varied results, especially in the written modality. The particularly large standard deviations within the no-therapy group for the written gFAP and mFAP (Table 5.7) indicate that the results obtained from the two participants in this group were diverse.

Table 5.7: Means and standard deviations (SD) of therapy vs. no therapy conditions for written and verbal modalities

Measure	Therapy		No Therapy	
	Mean	SD	Mean	SD
Written				
Number of T-units	8.83	3.19	10.00	5.66
Words per T-unit	12.21	2.67	10.57	0.81
TTR	0.62	0.06	0.64	0.08
Complexity Index	1.69	0.48	1.62	0.08
gFAP	30.56	16.66	35.01	30.64
mFAP	36.11	24.53	41.67	35.36
Verbal				
Number of T-units	13.83	4.62	10.00	0.00
Words per T-unit	11.49	3.40	13.55	1.63
TTR	0.47	0.09	0.52	0.01
Complexity Index	1.50	0.20	1.73	0.38
gFAP	30.56	10.20	28.34	11.79
mFAP	32.78	11.63	25.00	11.78

Table 5.8: Statistical analysis of therapy vs. no therapy conditions for written and verbal modalities

Measure	*t*-statistic (unequal variances)	Critical value (two-tailed)	p-value ($\alpha = 0.05$)
Written			
Number of T-units	0.37	2.45	0.72
Words per T-unit	1.33	2.45	0.23
TTR	0.31	12.71	0.81
Complexity Index	0.37	2.45	0.72
gFAP	0.20	12.71	0.88
mFAP	0.21	12.71	0.87
Verbal			
Number of T-units	0.83	12.71	0.56
Words per T-unit	1.45	2.78	0.32
TTR	1.17	2.57	0.24
Complexity Index	0.83	12.71	0.56
gFAP	0.24	4.30	0.83
mFAP	0.81	4.30	0.50

Although neither participant in the no-therapy group performed outstandingly well on the gFAP and mFAP measures, one participant performed much better than the other. Since the group contained only two participants, this accounted for the larger standard deviation. In the therapy group, there were participants who performed better and participants who performed worse than both participants in the no-therapy group, but since the therapy group contained six participants, this mediated and narrowed down the standard deviation. The fact that there were participants who performed relatively well, as well as participants who performed relatively poorly in both the therapy and the no-therapy group, confirms the result that there was no statistically significant difference between groups.

Summary of Results

When considering the objectives of the present study, the results presented in this section indicated that learners with LD did not perform significantly better in either the written or verbal modalities on measures of linguistic complexity or factual accuracy. The only linguistic complexity measure that produced a statistically significant result was the TTR, indicating that greater semantic diversity was elicited in the written modality when compared to the verbal modality.

Factual accuracy results further indicated that learners with LD were poor judges of their own performance in terms of factual accuracy and that they tended to overestimate their achievement. There was no statistically significant difference between modalities, indicating that participants were poor judges of their own achievement when writing as well as when speaking.

Editing emerged as a significant problem area for learners with LD, in line with current research knowledge. Participants' editing of their written summaries proved to be superficial with no content edits being made.

The results of the present study further indicated that previous ST, OT, and RT did not seem to influence later performance on measures of linguistic complexity and factual accuracy. These results may have been biased by the non-therapy group containing only two participants.

Finally, the researcher hoped to comment on the output modality that best afforded learners with LD an opportunity to portray their true subject knowledge. The results indicated that neither the written nor verbal modality stands out above the other in this regard, and that the difficulties that characterise LD are equally present in the written as well as the verbal modality.

Concepts gleaned from these results are discussed further in the next chapter.

DISCUSSION

In this study, the researcher wanted to determine which output modality, written or verbal, would allow learners with LD to portray their academic knowledge and skill in the most accurate and representative way. This was done by investigating learners with LD's performance on a written and verbal summary task through measures of linguistic complexity and factual accuracy. Their ability to assess their own performance, the efficacy of editing, and the effect of previous ST, OT and RT on performance was also investigated. The research hypothesis stated that learners with LD would perform better on measures of linguistic complexity and factual accuracy in the verbal modality, as this modality eliminates the well-researched difficulties (Carretti, Re & Arfè, 2011; Hallenbeck, 2002; National Joint Committee on Learning Disabilities, 2008) that learners with LD experience with written tasks.

The results indicated that there were no significant inter-modality differences for the number of T-units used, the number of words used per T-unit, or the complexity index. The only linguistic complexity measure that showed a significant inter-modality difference was the TTR, indicating greater lexical diversity in the written modality. Furthermore, no significant inter-modality difference was found for measures of gFAP, mFAP, sFAP, or inter-modailty gFAP-sFAP discrepancy. There were, however, significant within-modality differences in the gFAP-sFAP discrepancies, indicating that learners with LD consistently over-estimated their gFAP performance, and were poor judges of their own achievement in this regard. Several concepts related to and extrapolated from these findings are discussed below.

Expository Text

One of the key concepts that underlie all others in this study, is learners with LD's interaction with expository text. As stated in the literature review, the gradual academic transition from narrative text to expository text is difficult even for non-LD learners (Morfidi, Mikropoulos & Rogdaki, 2018), and thus it is exponentially so for learners with LD. We know that having a diagnosis of LD means that a learner will likely have difficulty in the areas of reading, writing, and executive function (Butterworth & Kovas, 2013; Gregg & Mather, 2002; LD Online, 2019; Scanlon, 2013). How these areas of difficulty affect interaction with expository text is important to understand if we want to improve the academic functioning of learners with LD.

The results of the present study indicated that the expository text problem does indeed run deeper than mere word decoding and writing mechanics. Learners seemed to lack a mental schema that would help them organise information during reading of expository text. This was evident in their structurally disorganised written and verbal summaries. Even the earliest research on expository text indicates that a good grasp of expository text structure is a crucial factor in expository text comprehension (Brown & Day, 1983; Kintsch & Van Dijk, 1978; Meyer & Freedle, 1984) and its importance has been confirmed in more recent studies as well (Saenz & Fuchs, 2002; Westby, Culatta, Lawrence, et al., 2010; Williams, 2005). The participants in the present study were learners in grade 10. This means that they had completed most of their school career and were starting to prepare for the final school exit exam at the end of their grade 12 year. Yet, in at least 10 years of formal schooling, they had not mastered expository text, and the likelihood of doing so before reaching their final grade 12 exam would be minimal. We know from previous studies that specific instruction in approaching expository text has proven to be at least moderately successful (Jitendra, Burgess & Gajria, 2011; Kelley & Clausen-Grace, 2008; Morfidi, Mikropoulos & Rogdaki, 2018; Westby, Culatta, Lawrence, et al., 2010). Considering how a proper grasp of expository text might potentially have affected not only the results of this study, but also participants' general academic proficiency, it would be advisable to implement intensive programmes geared specifically towards learners with LD and their interaction with expository text. These kinds of programmes need to be implemented in the early school years so that proficiency with expository text can grow and be consolidated by the final high school years, giving learners with LD a better chance at academic success.

Whereas expository text is an unchangeable academic constant, the modality of interaction is more flexible. It is a variable that can be manipulated to improve linguistic complexity and/or factual accuracy, depending on the task demands and expectations, but each modality brings with it its own set of strengths and weaknesses. The concepts extrapolated from the written and verbal modalities are discussed below.

Modality

Written

Given the difficulties that learners with LD experience with written work (Carretti, Re & Arfè, 2011; Gregg & Mather, 2002; Mason & Graham, 2008), it was surprising that a change

in output modality from written to verbal did not result in significant performance improvements. It was expected that when the constraints of the writing task were removed, learners with LD would be able to produce verbal content that is more representative of their academic potential, but this was not evident in the present study. Instead, writing emerged as an interesting phenomenon that hampered certain production measures, while improving others.

The results suggested that the task demands inherent to writing were responsible for greater variability in factual recall. This means that the effort of constructing written work negatively impacted on the quality of some of the participants' work. At the same time, the structural support offered by the act of writing gave other participants the opportunity to organise their thoughts and to present ideas in an ordered fashion. Participants could reread what they had written in order to build and expand on their ideas without repeating information already presented. The structural support offered by the written task was also suggested to contribute to the greater semantic diversity in the written modality, as the lack of support in the verbal modality led to participants repeating pieces of verbal information. This positive aspect of the inherent structure of written tasks was unexpected. It contradicted the researcher's assumption about written work in the LD population and highlighted an aspect of written work in this population that is not often mentioned in literature. A contributing factor to these findings might be the maturation of complex written language over oral language at this age (Owens, 2013). However, since no statistically significant inter-modality difference was observed with regards to sentence complexity, the influence of such maturation on the results of the present study is likely to be minimal.

Verbal

As previously mentioned, it was expected that the verbal modality would see an improvement over the written modality on all measures. Instead, it rendered results equal or inferior to that of the written modality. Verbal summaries tended to elicit more repetition, with vague, wordy descriptions and stated information being repeated either verbatim or paraphrased. This repetition seemed to be used as a coping strategy to compensate for poor vocabulary, poor working memory, and poor organisation – concepts which are discussed further on in this chapter. Despite the numerous repetitions and wordy descriptions, verbal summaries were not significantly longer than written summaries – a finding which is in contrast with that of Scott & Windsor (2000). Since information was often repeated or rephrased, verbal summaries

qualitatively contained fewer relevant facts than written summaries (see Table 5.3), but this difference was not significant. Learners with LD seemed to have trouble coping with the lack of structure in the verbal modality, having to rely more strongly on executive function. The impact of executive function on the results of the present study is discussed below.

Executive Function

Executive function refers to metacognitive processes that are necessary for the successful execution of tasks. It includes the processes of organisation, planning, inhibition, and selective attention, among others, and is closely linked with self-regulation, working memory, and general academic functioning (Cirino & Willcutt, 2017; Singer & Bashir, 1999). Research shows that learners with LD have significant difficulties with executive function. These difficulties compound learners with LD's existing difficulty with navigating the interchange between the cognitive and language domains (Berninger, Abbott, Cook, et al., 2017).

In the present study, executive function was not primarily investigated, but was observed. The effects of poor executive function were evident in learners' performance. Poor planning skills resulted in poor time management during both the reading and production phases of the summaries, while poor organisation of thought led to poor structural organisation of written and verbal summaries. Furthermore, diminished ability to inhibit impulsive thoughts and behaviour resulted in poor topic maintenance, wordy descriptions, and frequent self-interruptions during verbal summaries. This is consistent with data from other studies that investigated the influence of executive function on verbal output (Berninger, Abbott, Cook, et al., 2017; Carretti, Motta & Re, 2014).

Executive function difficulties affected the structure as well as the content of written and verbal summaries. Poor selective attention skills led to learners not being able to distinguish between main ideas and subordinate ideas. Combined with poor organisational skills, this resulted in disorganised summaries with numerous instances of irrelevant information being mentioned, while important information was omitted. This result was not completely unexpected, as research shows that learners with LD struggle to determine what information is important to the overall meaning of a passage and have difficulty developing arguments in a clear, logical way (National Joint Committee on Learning Disabilities, 2008; Vaughn, Gersten & Chard, 2000).

Not knowing what constituted main ideas and what constituted supporting facts spilled over into the learners' editing skills. It was expected that they would edit their summaries to ensure that only relevant information was being relayed, but instead their editing proved to be superficial and ineffective, with no content edits being made. This observation is in line with other research findings on the editing skills of learners with LD (Matsumura, Patthey-Chavez, Valdés, et al., 2002). Editing is addressed as part of the school curriculum from the time when learners start to write essays, usually around grade four. They are taught to edit punctuation, spelling and content, yet by grade 10 these learners with LD had not mastered the skill of proper editing. This is further evidence for executive function being at the root of editing problems in this population, rather than a lack of grammatical skill.

Another executive function-related factor that influenced the omission of important information, was poor working memory. Working memory refers to information being temporarily stored for later retrieval while other cognitive processes are running (Peng & Fuchs, 2014). As the information is stored in short-term memory, it relies on the other cognitive processes running smoothly to not interfere with the retrieval of stored information. As discussed above, these cognitive processes do not run smoothly in the LD population and more mental energy must be devoted to them, to the detriment of working memory. Problems with working memory were especially evident in the verbal modality, where learners often repeated stated facts, either verbatim or paraphrased. It is proposed that these repetitions were due to learners being unable to recall the relevant information and then repeating information as fillers while they processed (Nyman, Taskinen, Grönroos, et al., 2010; Peng & Fuchs, 2014; Siegel & Ryan, 1989). These repetitions affected not only the content, but also the semantic diversity of the summaries.

While working memory plays an important role in storing and retrieving short term information, it is also involved in the process of ensuring that task demands are met (Peng & Fuchs, 2014). This is done by keeping the goals of the task in mind and ensuring that they are adhered to. This process links closely with self-regulation, which is the process of constantly monitoring thoughts and actions to keep them focussed on the task (Singer & Bashir, 1999). Learners in the present study struggled to adhere to the task demands concerning content and were unable to detect that they had digressed. This was evident from their self-assessments, in which their perceived performance far outweighed their actual performance.

The executive function difficulties observed among learners with LD in the present study are in accordance with previous research (Berninger, Abbott, Cook, et al., 2017; Cirino & Willcutt, 2017; Peng & Fuchs, 2014). It is important for teachers and clinicians to be aware of these difficulties, as executive function affects all academic tasks. Some of these areas of difficulty can be mediated externally, for example helping learners to plan a task, and doing regular time checks to help with time management. For other areas of executive function, such as selective attention or working memory, the locus of control is solely internal and specific intervention is required to facilitate improvement. This would require the learner to be conscious and aware of his cognitive processes, a concept known as metacognition.

Metacognition

Metacognition refers to being aware of one's own cognitive processes and abilities, and how those processes and abilities are applied. As it is closely linked with executive function, it is not surprising that learners with LD have difficulty with metacognition (Klassen, 2002; Klassen & Lynch, 2007). In the present study learners did not apply metacognitive skills successfully, as was evident in the results of the factual accuracy measures. From the small number of facts that learners were able to recall and relay in both the written and verbal summaries, it was clear that learners did not employ these skills to monitor their own comprehension. Using metacognitive skills, learners become aware of the fact that they did not understand what they have read, and this prompts a reread of a sentence, paragraph, or passage in order to improve comprehension. In summary then, metacognition allows a learner to take a step back from the mechanics of a task and to think about how they are completing the task, and how successful the process is (Klassen, 2002; Trainin & Swanson, 2005). This should allow them to adjust course and make corrections if it is deemed necessary. This process was severely lacking among the learners with LD who participated in the present study. Apart from their poor performance on factual accuracy measures, the lack of appropriate metacognitive strategies was especially evident in their assessment of their own performance. As previously mentioned, these learners grossly overestimated their level of achievement, indicating that they were not applying self-monitoring strategies throughout the task.

Executive function and metacognition have a significant impact on the academic performance of learners with LD, but it is important to remember that LD is a complex concept and that a learner with LD brings more to the table than just a diagnosis. We have to keep in mind that

the academic functioning of a learner with LD is influenced not only by his internal makeup and academic instruction, but also by the environment and systems he is exposed to (Bronfenbrenner & Morris, 2007). Two of these factors that likely played a role in the results of the present study, are vocabulary and world knowledge.

Vocabulary and World Knowledge

The school system expects learners to read to learn (Gajria, Jitendra, Sood, et al., 2007). However, the results of this study indicate that learners with LD have great difficulty doing just that – reading to learn. Extrapolating from the bioecological model of human development (Bronfenbrenner & Morris, 2007) and the sociocultural theory of cognitive development (Vygotsky, 1978), a learner interprets academic knowledge according to the environment, experiences, and people he comes into contact with. This serves as a knowledge base which scaffolds the learning of new information. From this model we can extrapolate that learners can only understand a text to the extent that the vocabulary of the text and the concepts described in the text are familiar to them. It is, however, not impossible to learn new vocabulary and concepts through well-organised texts or through external sources, such as dictionaries, but the unfamiliar vocabulary and information needs to be presented within the learner's zone of proximal development (Vygotsky, 1978). If the jump in vocabulary or concepts is too big, comprehension will be adversely affected, and no learning will take place.

In this study, learners with LD had clear difficulties with recalling and relaying facts that they had read. As previously discussed, difficulty understanding expository text, poor executive function, and poor metacognition contributed to this finding. The researcher proposes that poor world knowledge and poor vocabulary likely had a compounding negative impact on this measure as well. In this study, the stimulus texts that learners read were taken from one of their grade 10 textbooks and covered the topics of different job sectors, and the causes and impact of poverty in South Africa. The content was unfamiliar to the learners as they had not yet discussed these texts in class. It is, however, not only in class discussions that learners learn new information, but a significant amount of learning takes place at home and in the community. As the learners who participated in this study were all from middle-class neighbourhoods, they might not have had any experiential exposure to the topics discussed in the stimulus texts, such as poverty and might not have had a reference to draw from. Thus, how learners are socialised also affects world knowledge.

In addition to covering less familiar topics, the texts contained jargon related to the different topics, which means that some of the vocabulary in the texts was likely new to the learners. As reading comprehension relies not only on decoding skills, but also on vocabulary and world knowledge (Bronfenbrenner & Morris, 2007; Catts & Kamhi, 2017), unfamiliar words and concepts contained in the stimulus texts might have negatively affected LD learner's comprehension of the text, and by extension, their ability to accurately relay what they had read, as measured by the factual accuracy percentage.

Another measure in the present study that was likely to be influenced by vocabulary, was the complexity index. Learners with LD who do not have adequate vocabulary to express themselves in a succinct manner, make use of verbose descriptions and/or complex, embedded sentences to bring their message across. This results in an increased complexity index. Taking the syntactic complexity results at face value, it might seem that learners with LD had superior abilities in this area, as their use of subordinate clauses exceeded that of their non-LD peers in number (Loban, 1976). It is, however, important to consider the fact that the complexity index should stabilise or even decline in the high school years (Loban, 1976) due to learners being able to express themselves in more accurate and succinct ways. A high or rising complexity index is evidence that this process is not taking place. Counter-intuitively, when normative data is considered, a high complexity index at this grade level should be seen as evidence of a potentially limited vocabulary, or of significant difficulties with executive function. It is important for educators and clinicians not to misinterpret an abnormally high complexity index as evidence of superior skill, as such a misinterpretation might cause learners to be excluded from much needed remediation programmes.

Learners with LD are in a precarious position. Since they have intelligence quotients in the average and above average range (Ali & Rafi, 2016), they have a strong capacity to learn, but they have very specific barriers to learning which hamper this process. As teachers and clinicians, we acknowledge that not all children learn in the same way, yet the educational system in which we operate, expects a great degree of homogeneity in the way we teach and assess learners. Ideally, we would like to influence policy and effect change so that all learners are educated in a way that best suits their educational needs, but this is not our current reality. Thus, we must find a way to circumvent the barriers to learning that learners with LD experience, while still complying with what the educational system requires. One way of doing this, is through critically evaluating the aims of a task and making changes that

are minor in execution, but potentially make a big difference in the academic performance of learners with LD.

Task Aims

From available research we know that learners with LD have tremendous difficulty with reading, writing, and executive function, and that the way in which academic tasks and assessments are set up, plays to the academic weaknesses of these learners instead of to their strengths. Yet, it is possible to mediate these difficulties by adjusting task demands to help learners reach academic milestones, without compromising the quality or integrity of their education. Some suggested task demand adjustments are in the areas of output volume, time pressure, and reading. Each of these areas are discussed below.

Output Volume

Considering the results of the present study, the volume of both written and verbal output of learners with LD was less than expected given the amount of stimulus information they had to work from. This correlates with data from previous studies (Berninger, Abbott, Cook, et al., 2017; Graham, Collins & Rigby-Wills, 2017; Houck & Billingsley, 1989; Scott & Windsor, 2000) and means that learners with LD likely will not perform well on tasks that have volume as one of its main goals, such as an essay with a minimum number of words or a speech with a minimum time allotment. Drawing from the results of the verbal TTR, we see that increased volume does not necessarily equate to increased quality, as information is often repeated. It has also been established that learners with LD have executive function difficulties, which complicate their ability to plan and execute tasks and to stay on track with the demands of a task. The greater the volume of work that a task demands, the greater the possibility that these executive function difficulties will negatively impact or derail the task. Possible ways to mediate the problem of volume, is to perform multiple smaller assessments instead of one large assessment. It can also be facilitated by not penalising learners with LD for not meeting the minimum volume requirements, or by reducing the minimum volume requirements, which are usually based on mainstream criteria for non-LD learners.

Data analysis also showed that, although long and complex sentences can be successfully elicited in either modality, the verbal modality is more consistent in its ability to elicit complex sentence structures. The verbal modality is, however, also more prone to eliciting

verbosity and circumlocution. This highlights the need for clinicians and educators to critically assess the aims of a task and to structure it according to what these aims are. Tasks that aim to assess language form in terms of syntactic complexity will elicit more consistent results in the verbal modality, while tasks that aim to assess language content might be more successfully completed in the written modality.

Time Pressure

Another aspect to consider when looking at the aims of a task, is time pressure. The reading and writing difficulties that learners with LD experience, together with difficulty focussing their attention and organising their thoughts, all lead to slow work speed. Academic assessments are often timed according to something as arbitrary as the length of a school period. Learners who are not able to finish a task within an allotted time period, or who carelessly complete a task just to finish in time, are likely to get results which are not representative of their true ability. In the present study, all the participants qualified for additional time ranging from five to 15 minutes per hour during formal assessments and examinations, as determined by the GDE. Additional time was not allotted, however, as the pilot study indicated that the 15 minutes of reading time and 15 minutes of writing time/5 minutes of speaking time would be enough. There were, however, learners who did not manage to finish their written summaries within the time limit. Had additional time been granted, their individual results might have improved. Removing time pressure might be one way in which we can help learners with LD to render work that is more representative of their academic capabilities, although there is research that suggests that the quality of high school learners' written work does not improve with additional time (Crawford, Helwig & Tindal, 2004). This means that time pressure must be considered in combination with other factors when considering how best to help learners with LD overcome their specific barriers to learning.

Reading

An additional significant barrier to learning that learners with LD experience, is poor reading skills. The importance of reading for academic progression has been well established (Gajria, Jitendra, Sood, et al., 2007; Hermida, 2009; Owusu-Acheaw & Larson, 2014) and the reading problems that learners with LD experience have been documented equally well (Ali & Rafi, 2016; Fuchs, Fuchs, Mathes, et al., 2000). Reading is an important and inevitable part of any formal education, but there are ways to help learners with LD overcome this barrier. Having

study material available in audio format, and reading questions aloud to learners during assessments are just two ways in which this can be done. Although Meyer and Bouck's (2014) case study rendered results that indicated that having passages read to them does not significantly improve learners with LD's comprehension, there might still be value in this. However, if expository passages are read to learners, they should not be passive listeners in the process, as executive function difficulties might make it hard for them to stay focussed on the task and to retain the necessary information. Instead, learners can actively follow along as text is being read to them, thereby eliminating decoding difficulties at the least.

In the present study, stimulus texts were not read to the learners. The reason for this was that none of these learners had a personal reader during formal assessments. They were reliant on their own abilities to make sense of academic information and to respond accordingly. The researcher wanted to gain insight into how learners fared with this process, and how it reflected in their written and verbal output. Since reading was not directly investigated in this study, its effects on the results cannot be specifically commented on. We do know that all learners who participated in this study had poor reading comprehension (see Table 4.1). Thus, an educated assumption can be made that this poor comprehension, in combination with all the other factors discussed in this chapter, contributed especially to the poor factual accuracy results observed in this study.

As noted earlier, LD is a complex and lifelong diagnosis. Some ways in which academic difficulties associated with LD can be mediated, have been discussed in terms of task adjustments. Another avenue of assisting learners with LD is through focussed therapeutic intervention.

Therapeutic Intervention

Learners with LD who attend remedial schools usually have access to in-house therapy services. Six of the learners who participated in the current study had access to ST, OT, and RT up until and including their grade 5 year, while two participants were admitted to the school after their grade 5 year and thus did not have in-house access to these therapies. Comparing the results obtained from learners who had received ST, OT, and RT to results obtained from learners who did not, no significant differences were found. Results indicated that both the therapy and the no-therapy group contained participants who performed relatively well, as well as participants who performed relatively poorly. From these results it

could be extrapolated that therapeutic intervention in the early primary school years does not have a significant effect on academic performance in the later high school years. These results are not be reliable, however, as the no-therapy group contained only two members and these members varied greatly in their performance level. In addition, data from other studies suggest the contrary.

A relatively recent research review of the effects of early therapeutic intervention on later academic achievement (Dexter, Hughes & Farmer, 2008) found that early intervention can improve academic achievement. Although the population and measures of the reviewed studies differed from the present study, it emphasised the value of therapeutic intervention. Other researchers who have implemented remediation programmes targeted at specific areas of difficulty experienced by learners with LD have also reported favourable outcomes (Gillespie & Graham, 2014; Graham & Harris, 1997; Kelley & Clausen-Grace, 2008, 2010; Mason, Meadan, Hedin, et al., 2006; Mason & Graham, 2008; Morfidi, Mikropoulos & Rogdaki, 2018; Schumaker & Deshler, 2003; Williams, 2005). Thus, despite the results of the present study that found no effect of therapeutic intervention on later academic achievement, overwhelming evidence to the contrary does exist.

The research evidence that early therapeutic intervention is critical for the academic success of learners with LD, warrants greater resource allocation to remedial schools and other institutions that offer support to these learners. These include human resources in the form of remedial teachers and therapists, as well as specialised programmes and materials geared specifically towards improving the academic functioning of learners with LD.

CONCLUSION

Summary of Findings

From the results of the study it is evident that neither the written nor the verbal modality is statistically superior to the other in allowing learners with LD to portray their academic knowledge in an accurate and representative way. It is also evident that the difficulties that learners with LD experience in the domains of linguistic complexity and factual accuracy are not as strongly influenced by modality, as stated in the research hypothesis. Instead, these difficulties seem to be part and parcel of the LD diagnosis, regardless of modality. The results nevertheless contributed greatly to the understanding of learners with LD's performance on measures of linguistic complexity and factual accuracy in the written and verbal modalities.

Implications of this Study

The implications of this study are that learners in remedial schools are still not optimally assisted in reaching their academic potential, and that a change in assessment modality from written to verbal is not enough to facilitate more representative academic achievement. Furthermore, this study has demonstrated the inability of learners with LD to monitor and assess their own task accuracy and success. This, in turn, highlights the need for explicit instruction in this area and emphasises the important role that executive function plays in academic success. A third implication of this study is that learners with LD can be supported in reaching their academic potential if teachers and clinicians are willing to critically assess the aims of a task, and to find alternative or adaptive strategies to help learners with LD reach these aims.

Limitations of this Study

One main limitation of this study is the small sample size. Although the findings presented here give valuable insight and contribute to understanding learners with LD and their written and verbal performance, results cannot be generalised to the broader LD population. The small sample size also affected the investigation into the effectiveness of therapeutic intervention for learners with LD, as the no-therapy group contained only two members.

Furthermore, participants in the present study were from similar socio-economic backgrounds and attended a remedial school that offers more learning support than a main-stream school.

The results obtained in this study might not be applicable to learners with LD who are from other socio-economic backgrounds or who attend main-stream schools where they are not able to access learning support programmes. The findings, even though not statistically significant across areas, contribute to the clinician's and the teacher's understanding of the concepts highlighted in the discussion.

Another limitation of the study is that all participants had significant delays in reading rate and reading comprehension. Investigating reading ability was not an objective of this study, but reading ability influenced all investigated measures in some way. Although reading difficulties are widely associated with LD, it is difficult to say how much of the measured results are due to reading difficulties alone and how much is due to LD.

Finally, the fact that additional time was not allotted to participants even though they qualify for additional time according to GDE criteria, might have negatively impacted on results, especially related to factual accuracy percentage.

Direction for Future Research

Although the present study was small, it provided a starting point for future research and contributed to the LD knowledge base. More research is needed in the field of LD, specifically in comparing written and verbal output of learners with LD. Future research should aim to have a larger sample size and include participants from more diverse backgrounds in order to obtain more representative results. Future research should also further investigate the effect of ST, OT, and RT on academic achievement, both in the primary school years as well as continuing into the high school years. A final direction for future research, is to investigate how a critical assessment of the aims of academic tasks, and task adjustments according to these assessments, will affect the academic functioning of learners with LD.

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Appendix A

Appendix A1: Ethical Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Ms Landi Fourie

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M181142

NAME: (Principal Investigator)	Ms Landi Fourie
DEPARTMENT:	Child Health: Neurodevelopment Destinata School
PROJECT TITLE:	The linguistic complexity and factual accuracy of written and verbal summaries of expository text by Grade 10 learners with learning disabilities (LD)
DATE CONSIDERED:	30/11/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Sharon Moonsamy
APPROVED BY:	CB Penny Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	03/04/2019

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **November** and will therefore be due in the month of **November** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date 15/5/2019

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix A2: Gauteng Department of Education (GDE) Research Approval Letter

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	**25 February 2019**
Validity of Research Approval:	**04 February 2019 – 30 September 2019** **2018/411**
Name of Researcher:	**Fourie L**
Address of Researcher:	**13 Van Gogh Mews**
	Van der Westhuizen Street
	Heidelberg, 1441
Telephone Number:	**083 4460 657**
Email address:	**fourie.landi@gmail.com**
Research Topic:	**The linguistic complexity and factual accuracy of written and verbal summaries of expository text by Grade 10 learners with learning disabilities (LD)**
Type of qualification	**MSc(Med) Child Health: Neurodevelopment**
Number and type of schools:	**One LSEN School**
District/s/HO	**Sedibeng East**

Re: Approval in Respect of Request to Conduct Research

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

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

25/02/2019

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

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

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

Kind regards

25/02/2019

Mr Gumani Enos Mukatuni
Acting CES: Education Research and Knowledge Management

DATE: 25/02/2019

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

Appendix B

Appendix B1: Coded Stimulus Passage for Written Summary

(Rooth, Seshoka, Steenkamp, et al., 2011, pp.210-211)

Careers and Career Choices

1. In Grade 10 you should be thinking about what you would like to do and where you would like to work after you have finished school. **You can look at future careers in terms of economic sectors, work settings, types of activities and skills.** {There are many different opportunities within career fields.} {One way to help you decide about a career to follow is to look at different sectors of South Africa's economy.}

2. **Primary Sector jobs involve taking raw materials from nature and making them into basic foods and products.** {Examples of raw materials include mielies, wood, coal, iron, diamonds, fish and gold.} {A coal miner, people who catch fish, and a farmer are examples of people who work in this sector.}

3. **In the secondary sector people take materials and make them into goods that can be sold.** {Builders, metal workers, car manufacturers, brewers, shipbuilders, engineers and paint and chemical manufacturers are examples of people who work in this sector.}

4. **People who work in the tertiary sector provide services to people and businesses.** {They include teachers, bankers, dry cleaners, sales assistants, estate agents, movie makers, people who run restaurants, tour guides, lawyers, doctors, actors and truck drivers.} {This sector is different from the primary and secondary economic sectors} in that {it does not produce goods and/or does not make anything, but it supports the primary and the secondary economic sectors.}

5. **The conditions in which you work will be different depending on your job.** For example:

- {The conditions in a modern office are usually pleasant.} {There could be air conditioning and smart furniture.} {You may work from 8 until 4:30 in the afternoon.}
- {Working in an office is very different from working in a factory}, which may be {noisy and dirty, and you may have to stand all day.}
- {If you are a doctor, you may work for many hours without being able to sleep.}
- {You could be a geologist whose job is to find new places where there is gold.} {You could go to faraway places that are freezing cold, or down deep mines that are very hot.}

6. {Integrate or combine your knowledge of the different aspects of yourself and your knowledge of careers.} **The more you know about yourself, the easier it will be to choose a career that is right for you.** {Of course, the more you know about the world of work, the easier it will be to link your knowledge of yourself with a career.}

Table B1.1: Coding key for written summary

Item	**Mark Allocation**	**Identifier**
Main Idea (M)	2 marks	Printed in bold
Subordinate idea (S)	1 mark	Enclosed in { }

Table B1.2: Mark allocation per paragraph for written summary

Paragraph	**Number of Main Ideas (M) and Subordinates (S)**	**Total Possible Marks**
1	M = 1, S = 2	4
2	M = 1, S = 2	4
3	M = 1, S = 1	3
4	M = 1, S = 3	5
5	M = 1, S = 8	10
6	M = 1, S = 2	4
Total Mark Allocation		**30**

Appendix B2: Coded Stimulus Passage for Verbal Summary

(Rooth, Seshoka, Steenkamp, et al., 2011, p.217)

Poverty

1. **Poverty means that you are too poor to pay for your basic needs.** {It affects how your basic needs are met.} {People who are poor don't have enough money to take care of their health, to buy enough food for their families or to live in comfortable houses.} {Poverty is closely linked to poor health, lack of food, lack of basic resources and services, lack of access to a healthy and safe environment, and fewer educational opportunities.}

2. **Poverty leads to people not having access to basic resources such as housing.** {In South Africa, 1.875 million households still live in shacks. This is 15% of all households.} Despite the progress in the provision of houses, {the quality of housing remains a major challenge: 46% of households live in houses with no more than three rooms, and 17% of households live in one-room dwellings.}

3. **Not having work is one of the main causes of poverty.** {Unemployment affects all age groups.} {The majority of jobless young people live in poor households where older family members are also likely to be unemployed.} {Almost two-thirds of South Africa's young people aged 15 to 24, as well as 60% of people aged 25 to 34, live in households that spend less than R1200 a month.}

4. **When people are poor, they do not have enough money to buy food**. {This means they go hungry.} {While South Africa may be food secure as a country, large numbers of households within the country are food insecure.}

5. **Many people living in impoverished areas in South Africa do not have the same access to water that other South Africans have.**

- {Some people have little access to water;} {others have to fetch water in rivers or from boreholes}, {while some have to share one tap with many other people.}
- {When one tap is share by many people and used for drinking water and washing at the same time, water can get polluted.}
- {Free basic water is a basic amount of 6000 litres of water per month per household, provided by local municipalities.}
- {The amount of free water depends on the municipality in your area. If you use more than the free supply, you have to pay for extra water.}

6. **Overcome personal poverty by working as hard as you can at school.** {This will allow you to go into higher education and follow a career that will look after your financial needs.} {Keep studying: never give up}.

Table B2.1: Coding key for verbal summary

Item	Mark Allocation	Identifier
Main Idea (M)	2 marks	Printed in bold
Subordinate idea (S)	1 mark	Enclosed in { }

Table B2.2: Mark allocation per paragraph for verbal summary

Paragraph	Number of Main Ideas (M) and Subordinates (S)	Total Possible Marks
1	M = 1, S = 3	5
2	M = 1, S = 2	4
3	M = 1, S = 3	5
4	M = 1, S = 2	4
5	M = 1, S = 6	8
6	M = 1, S = 2	4
Total Mark Allocation		**30**

Appendix C

Appendix C1: Self-Assessment Rubric for Written Summary

	Always (76 - 100%)	**Mostly** (51 - 75%)	**Sometimes** (26 - 50%)	**Hardly ever** (0 - 25%)
1. Main Idea: I wrote down a main idea in each paragraph.				
2. Supporting Facts: I wrote extra facts to support the main idea.				
3. Clarity: I wrote in a way that's easy to understand.				
4. Information: I wrote down all the important information.				
5. Unnecessary Information: I didn't write down any unimportant information.				

Appendix C2: Self-Assessment Rubric for Verbal Summary

	Always (76 - 100%)	**Mostly** (51 - 75%)	**Sometimes** (26 - 50%)	**Hardly ever** (0 - 25%)
1. Main Ideas: I discussed all the main ideas.				
2. Supporting Facts: I named facts to support the main ideas.				
3. Clarity: I organised my answer in a way that was easy for the listener to understand.				
4. Information: I covered all the important information in my discussion.				
5. Unnecessary Information: I didn't discuss any unimportant information.				

Appendix D

Appendix D1: Plagiarism Declaration



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Landi Fourie (Student number: 1934893) am a student registered for the degree of Master of Science in Medicine in the academic year 2020.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: _____ Date: 18/08/2020

Appendix D2: Turnitin Report

1934893:Landi_Fourie_1934893_MSc_(Med)_Research_Report.docx

by Landi Fourie

Submission date: 19-Mar-2020 07:00PM (UTC+0200)
Submission ID: 1278214055
File name: f2610935797b_Landi_Fourie_1934893_MSc__Med__Research_Report.docx (2.91M)
Word count: 28944
Character count: 160436

Smoonsamy

1934893:Landi_Fourie_1934893_MSc_(Med)_Research_Report..

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