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Dyslexia and English as a Foreign Language in Norwegian Elementary Education:

A Mixed Methods Intervention Study

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Abstract

The current study is situated in the field of English didactics. It is also a special educational study, because it investigates the effect of specific ways of teaching learners with dyslexia, a literacy-related neurodevelopmental specific learning difficulty. This study was performed in a Norwegian elementary school, as a single group intervention study that targeted spelling difficulties, because this is the most resilient difficulty amongst the range of difficulties that dyslexic learners experience. The main objective of the study was to investigate the impact that multisensory techniques have on spelling skills for Norwegian dyslexic 5th to 6th grade students. A secondary objective entailed examining the emotional and motivational effect that the multisensory spelling intervention had on the participating EFL students.

The participants of the study included a special education teacher, five dyslexic students from 5th and 6th grade and an individual with AD/HD. The intervention was designed by the current researcher and executed by the special education teacher at the school. To answer the research questions quantitative data in the form of spelling tests was administered prior to and after the intervention in a mixed methods pre-test/post-test design. This was done to observe any development in spelling skills after the intervention. During the intervention, qualitative observation notes were recorded. The students also responded to a questionnaire after the intervention. Finally, the special education teacher was interviewed approximately a month after the post-test was administered.

The research findings revealed that the intervention was successful. The group overall exhibited a 6.2 statistically significant difference in mean scores between the pre- and post-test. Quite interestingly, the individual scores were quite dispersed. One of the dyslexic 5th grade students displayed a 180% increase. Another dyslexic 5th grade student surpassed the mean of her non-dyslexic classmates. Three of the five dyslexic learners exhibited comorbidities, which appeared to have an impact on the effectiveness of the intervention. This is in line with prior research. Although some students did not progress as significantly as others, all students reported gains in their motivation and improvements in attitude towards learning English. Finally, the special education teacher corroborated the quantitative findings and also reported gains in motivation for each student. Although the sample size is small and by no means a representation of the entire population of dyslexic students, the results are consistent with prior

findings of other related studies. Thus, the results are valid and support a further inquiry into the effectiveness of specific English didactics on the language proficiency for dyslexic EFL learners.

Keywords: *EFL, English language didactics, special education, dyslexia, spelling difficulties, intervention, multisensory learning approach, phonological awareness, comorbidity, specific learning difficulties, attention deficit hyperactivity disorder, specific language impairment, Tourette syndrome*

Foreword

When I finished my teacher education, I applied for both jobs and the master program at OsloMet. I did not plan to do both, but here I am. It has been an exhausting journey. At several occasions I doubted whether I could finish the project while working as much as I did. In retrospect I am very happy that I chose to work on this thesis, because the topic is quite special and personal to me. My cousin inspired me to do this study. As a dyslexic, she had her fair share of challenges in her early school years. Recently, she finished a bachelor in TV production, which she followed up with a master's degree in movie production, both in England. It is simply appropriate that a special thanks is given to you for inspiring me and for your contributions prior to and during the study. You are an inspiration!

Firstly, the most important person during this entire project was my advisor, Prof. Dina Tsagari. Thank you for your immense support and guidance, as well as for lending your expertise in the field. I would not have made it through this without you.

Secondly, special thanks go to the special education teacher, Loretta, and all the students who participated, at the school where I conducted my research. I am also grateful to the parents who consented and believed in this project. My study would not have been possible without any of you. I will forever be grateful to you.

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Thank you to my friend Terese for all the wonderful writing sessions we had together while working with our respective theses. You have been a colossal support. Finally, thank you to Jacqueline, Emilie, Kimberley and Maria, for providing feedback and helping me correct errors.

I would like to end with a quote to everyone who, like me, needs a bit of encouragement sometimes: "So, when you feel like hope is gone, look inside you and be strong, and you'll finally see the truth: that a hero lies in you" (Mariah Carey, 1993).

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Illustration Overview

1. Introduction

The current study investigates the effect of specific English language teaching didactics. As it addresses educational needs of students in a group often referred to as the special educational needs group (SEN group), the present thesis is also a special educational study (Kormos & Smith, 2012). Tsagari (2019) maintains that these special educational needs are not products of social or economic conditions, limited motivation or inefficient teaching method. Yet, such specific learning difficulties (SpLDs) can affect learning negatively. Furthermore, the number of students with SpLDs is on the rise (Tsagari, 2019). One of the most common SpLDs is dyslexia. The Norwegian Dyslexia Association states that approximately 5% of the Norwegian population is officially diagnosed with dyslexia (Dysleksi Norge, n.d.). In short, dyslexia manifests through reading and writing difficulties (Kormos & Smith, 2012). (See Section 2.1 for a detailed discussion on the definition of dyslexia and Section 2.4 for symptoms of dyslexia.) There are also students who exhibit correlations of dyslexia and other learning difficulties and could therefore have additional behavioral patterns (see Section 2.5).

As an educated English as a foreign language (EFL) teacher, teaching English to students with SpLDs has been challenging. This is because a significant number of my students appeared to require extra support because of their SpLDs. In particular, it seemed especially complicated to accommodate dyslexic learners in EFL. It is commonly acknowledged that learning EFL presents Norwegian dyslexic students with an overwhelming task (Helland, 2012). Moreover, the Education Act § 1-3 states that the education shall be adjusted to the individual student's abilities (Opplæringslova, 1998). The fact that every students' needs are to be accommodated generates substantial implications for teachers in general. Because the number of students with SpLDs has increased, the need for special arrangements, or accommodations in teaching and assessment, has been elevated (Tsagari, 2019). The need for accommodating is of particular concern to teachers of EFL, because inclusion and accommodation in EFL settings is crucial for the language development of dyslexic students (Kormos & Smith, 2012).

Recent research has shown that an alarming number of teachers and pre-service teachers of EFL seem to be insecure in their ability to accommodate language activities for their dyslexic students (Nijakowska, Tsagari & Spanoudis, 2018). EFL teachers exhibit and express a need for training and support in EFL teaching for dyslexic students (Kormos & Nijakowska, 2017). Moreover, it is expected that Norwegian EFL teacher students are capable of identifying

reading and writing difficulties and adapt their teaching for dyslexic students (National Council for Teacher Education, 2016). Yet, previous research conducted on the effect of various educational methods for Norwegian dyslexic learners of EFL is quite sparse (Helland, 2012).

For this reason, my study will mainly focus on English language didactics and dyslexia, taking into consideration the effect of EFL approaches for dyslexic learners. One of the approaches that are advocated for is the multisensory structured learning approach (MSL). (See Section 2.9.) The current study primarily targets the ability to spell English words, as this is considered especially challenging for dyslexic learners (Nijakowska, 2010). A secondary focus is on the effect that specific English didactics have on emotional and motivational aspects for the dyslexic students of the current study.

To examine these two aspects, I have formulated the following research questions:

1. How does teaching EFL through MSL impact spelling for Norwegian dyslexic students in 5th and 6th grade?
2. What implications does this MSL spelling intervention have on motivational and emotional aspects of dyslexia for Norwegian dyslexic students who are learning EFL?

As shown in the literature review (see Section 2.11), only one prior Norwegian study has investigated the effect of dyslexia friendly practices. The quantitative study was basically aimed at discovering the effect of dyslexia friendly schools certified by the Norwegian Dyslexia Association. This was executed by testing the students once to compare them with age-matched control groups at non-certified schools (Stagelund, 2016). In comparison, the current study was carried out as a mixed method, single-group intervention study to answer the abovementioned research questions. The intervention targeted spelling skills and was developed in accordance with prior research and explicit theory (see Section 4 for a presentation of the intervention). The population was defined as Norwegian dyslexic students in 5th to 7th grade, because these students are in a critical phase of their lives (Høien & Lundberg, 2012). Yet, at the school where this study was conducted there were no students in 7th grade who were officially diagnosed with dyslexia. Therefore, the sample of the study are Norwegian dyslexic students in 5th and 6th grade.

The data collection is triangulated. It includes pre- and post- spelling tests, observation notes from each lesson, student questionnaires, which were administered after the post-test to capture

the students' point of view. Lastly, an interview with the special education teacher was also conducted after the post-test was administered. Collectively, the data provides a diverse body of evidence (see Section 3 for a discussion of the research design and Section 5 for a presentation of the data).

Furthermore, the current study provides a comprehensive discussion of the field of dyslexia. It also offers specific didactic suggestions regarding accommodation and several of the activities from the intervention are appended. Thus, this study contributes to the field of both EFL and dyslexia. My goal for this study is to help provide other EFL teachers with essential knowledge and teaching tools to assist their students with dyslexia in the EFL classroom. Moreover, more studies of this kind would be very appreciated in the Norwegian educational system to help children with SpLDs, since there are only a few studies. Therefore, my study could be a pilot study for future large-scale studies.

The thesis is structured as follows:

In Section 2, I discuss the definition of dyslexia and provide a comprehensive description of the historical background, causes and symptoms of dyslexia, as well as dyslexia and comorbidity, dyslexia and EFL, and treatment of dyslexia. Then, a final review is undertaken on other relevant studies in this category. In Section 3, the research design is described, and my methodological choices are justified. The participants are also presented in Section 3 and the validity and reliability of the present study are discussed. In Section 4, the implementation of the intervention is briefly presented. Appendix I provides further elaboration of the intervention through the lesson plans and activities. Section 5 provides a presentation of the data collection. First, quantitative scores on the pre- and post-test are presented, then a selection of test items that showcase substantial development in spelling are highlighted for each student. Subsequently, observational data from each lesson are presented, followed by findings from the semi-structured interview with the special education teacher. Then, the findings of the student questionnaire are presented at the end of the section. In Section 6, the findings are discussed in light of the literature and studies that were presented in Section 2. Lastly, Section 7 is the conclusion, where I summarize the thesis, as well as provide recommendations for further research.

2. Literature Review

2.1 Defining Dyslexia

The term “dyslexia” originates from Greek and means “difficulty with words” (Helland, 2012). As reported by Montgomery (2017, p. 1-2), dyslexia presents itself as “an unexpected difficulty in learning to read and write by the methods normally used in the classroom”. What is made implicit in this statement is that dyslexia can be remedied through appropriate teaching methods. Additionally, dyslexia is not confined to any orthography or writing system. Dyslexia has been observed in writing systems with ideographs, such as Chinese, in addition to alphabetic systems (Montgomery, 2017). Because dyslexia is observed in different writing systems, it is a universal condition independent of the language one speaks.

Nijakowska (2010) states that a distinction is often made between "developmental" and "acquired dyslexia". In acquired disorders, the individual already possesses the abilities prior to acquiring the impairments due to a disease or a brain injury. Whereas in developmental disorders, one does not possess the abilities beforehand. Developmental disorders are characterized by modified and slower rates as well as change patterns. The umbrella term “developmental disorders” can be divided into two main groups, namely “specific” and “general” disorders (Nijakowska, 2010). In a Norwegian terminology, general disorders or difficulties are often associated with a low level of intelligence. General learning difficulties are associated with a group of students who are in a grey area between intellectually disabled and individuals with no impairments, whereas specific disorders are disorders with restricted difficulties (Eckhoff, 1997, p. 17-18). Specific disorders that affect restricted abilities that are necessary for educational purposes, are often referred to as specific learning difficulties. As such, dyslexia is a specific learning difficulty mainly associated with difficulties regarding reading and writing skills, or more specifically spelling (Nijakowska, 2010). Because the focus of this study is on dyslexia and EFL development of children aged 10-12 specifically, the term "dyslexia" refers to the specific learning difficulty "developmental dyslexia".

Dyslexia is a complex condition. It is reflected through its numerous definitions and the lack of consensus of what dyslexia is and entails. The various definitions focus on different aspects of dyslexia (Helland, 2012), but overall, "dyslexia" is the most commonly accepted term for specific difficulties in learning to read and write (Nijakowska, 2010).

Developmental dyslexia has traditionally been defined by a discrepancy between the person's intelligence and reading ability (Høien & Lundberg, 2012). This has contributed to a definition that excludes less intelligent individuals, but Lyster (2004) argues that the exclusion is not warranted, because it is not supported by research. In fact, students with specific learning difficulties such as dyslexia, typically perform below their abilities and competence in subjects (Wilson, Lie, & Hausstätter, 2010). In 1994, The Orton Dyslexia Society Research Community (ODSRC) put forward a definition that Lyster (2004) refers to as inclusionary. It states that:

> *Dyslexia is one of several distinct learning disabilities. It is a specific language-based disorder of constitutional origin characterized by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties in single word decoding are often unexpected in relation to age and other cognitive and academic abilities; they are not the result of generalized developmental delay or sensory impairment. Dyslexia is manifest by variable difficulty with different forms of language, often including, in addition to problems reading, a conspicuous problem with acquiring proficiency in writing and spelling* (Lyon, 1995, as cited in Lyster, 2004, p. 228).

The ODSRC definition regards dyslexia as one of several distinct learning disabilities and views dyslexia as a language difficulty. On a behavioral level, the symptoms involve difficulties with decoding and recognition of words. In the definition, the difficulties are related to phonological impairments. It is also highlighted that dyslexia will affect reading comprehension as well as writing and spelling (Lyster, 2004). This kind of definition focuses more on behavioral aspects, rather than the discrepancy between intelligence and basic literacy skills.

Still, the most agreed upon definition of dyslexia is a revised version by The International Dyslexia Association, previously the ODSRC (Torgesen, Wagner, Rashotte, Herron & Lindamood, 2010). The revised definition describes dyslexia as:

> *"a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can*

impede growth of vocabulary and background knowledge" (International Dyslexia Association, 2002).

In the revised version of their definition, The International Dyslexia Association characterized dyslexia as neurobiological in its origin (International Dyslexia Association, 2002). The revised definition has become the most widely agreed upon working definition of dyslexia (Torgesen, Wagner, Rashotte, Herron & Lindamood, 2010).

An alternative approach to defining dyslexia is provided by Crombie (2002), from the field of pedagogy, (as cited in Schneider & Crombie, 2003). The author states that dyslexic individuals experience literacy related difficulties, "which results in them requiring a set of accommodations to be made to enable them to demonstrate their abilities" (Crombie, 2002, as cited in Schneider & Crombie, 2003, pp. x). Crombie's definition did not list symptoms, nor was it discrepant. According to Reid (2009, p. 8), it is a beneficial definition since it is positive and focuses on teaching and learning rather than symptoms.

A proper definition of dyslexia is required to reflect research evidence and be useful in identification and assessment. It should also provide a basis for treatment (Phillips & Kelly, 2016, p. 6). Furthermore, according to Kormos & Smith (2012), any definition of developmental dyslexia must incorporate four levels, including the behavioral, cognitive, biological as well as environmental level. On a behavioral level, there is a consensus that dyslexia manifests in reading problems. However, a poor result on a reading test is not adequate for diagnosing an individual with dyslexia. It is suggested by Nijakowska (2010) that reading difficulties may be reduced over time, but spelling difficulties persist. Accordingly, defining dyslexia exclusively as a reading impairment on a behavioral level is inadequate. Kormos & Smith (2012) state that such a definition would lead to the perception that dyslexia is something one grows out of, which is certainly not the case. Other symptoms of dyslexia, such as spelling deficits and working memory deficits, should also be accounted for in any definition. The authors further argued that on a cognitive level, explanations for literacy problems are required and these explanations must differentiate dyslexia from general learning difficulties and other specific learning difficulties. Furthermore, the biological level needs to address neurological and/or genetic causes. Finally, environmental factors need to be considered (Kormos & Smith, 2012).

Nijakowska (2010, p. 8) argues that dyslexia should be defined as "a neurodevelopmental disorder, implying the existence of a complex causal chain embracing biological, cognitive and behavioural factors, present since birth and characterized by a set of behavioural symptoms subject to change over time." This definition incorporates both cognitive, biological and behavioral aspects of dyslexia, which is in line with Kormos & Smith's aforementioned statement. Defining dyslexia is evidently complicated. However, based on previous definitions and the guideline by Kormos & Smith, Nijakowska's definition will be utilized as the definition of dyslexia in this paper.

2.2 Historical Overview of Dyslexia

Initially, dyslexia was referred to as "word blindness" (Helland, 2012, p. 93). The term "word blindness" was used as a synonym to "dyslexia" until the 1960's (Kormos & Smith, 2012).

Helland (2012) states that various disciplines have been involved in the research of dyslexia. Yet, doctors and ophthalmologists were most prominent at the beginning. The term "word blindness" was first mentioned in research at the end of the 19th century. In 1885, the German doctor, Dr. Berkhan, published research based on German children in a special educational class in Germany. 20 of the 44 children showed impaired spelling skills. Their written language included words that were either changed or spelled incorrectly. At approximately the same time, the German ophthalmologist, Rudolf Berlin, examined patients with literacy difficulties with no visual impairments. Berlin assumed that his patients had a difficulty, which according to him was related to their left hemisphere. He was the first to explicitly use the German term "dyslexie" (Helland, 2012, p. 94). The British physician, Pringle Morgan, was the first researcher in the field of developmental dyslexia (Kormos & Smith, 2012). Morgan described an instance of a 14 years old boy who experienced reading difficulties unexpectedly. Despite extensive training, he struggled with writing even one syllable words (Lyster, 2004). The British eye surgeon, James Hinshelwood, was the first who attempted to describe symptoms of dyslexia (Kormos & Smith, 2012). Morgan and Hinshelwood, both British doctors, suggested that "word blindness" was congenital. They associated it with malfunctions in the left hemisphere and the interaction between the two hemispheres of the brain (Helland, 2012, p. 95).

At the beginning of the 20th century a neurologist from the USA, Dr. Samuel Torrey Orton, had observed that children reversed letters, read them or wrote them in a wrong order. Dr. Orton

claimed that there was a correlation between difficulties in reading and the lack of a dominance of the left hemisphere, because he had seen some of the symptoms in patients with injuries in their left hemispheres, (Helland, 2012). Furthermore, he claimed that children with "specific reading disabilities" struggle with several language matters and have family members with language impairments. He also alleged that a majority of individuals with a specific reading disability were boys (Lyster, 2004). Orton wanted to develop a method for learning to read and write that incorporated both the right and the left hemisphere. This resulted in the establishment of a school based on a "multisensory method". He worked with psychologist Anna Gillingham to develop "the Orton-Gillingham method". The method consists of six principles; multisensory instruction, frequent and intensive practices, direct and explicit instructions, systematically structured language teaching, a phonological approach and diagnostic education. A diagnostic teaching entails that teachers need to test their students regularly in order to discover their understanding of correct spellings, as well as the orthographic rules (Helland, 2012).

From the 1950's, psychologists, sociologists and pedagogues, all influenced by cognitive learning theory, studied dyslexia. As opposed to the biological view of dyslexia, they discussed whether the environment of individuals with dyslexia, through teaching methods, could influence their abilities and difficulties (Helland, 2012).

Prior to the 1960's, children who could not read or write as expected according to their age, were viewed as either retarded or considered unable to learn (Helland, 2012). This opinion is reflected in Gjessing's (1977) study at a Norwegian school, where a teacher had given up on a male learner because of his academic failures. Furthermore, as stated by Lyster (2004), research conducted between 1970 and 1990 revealed a correlation between language difficulties in younger years and reading development and dyslexia. Despite this consensus, a significant number of researchers have affirmed that these language difficulties are often so specific on a behavioral level that they are not apparent until the child is expected to learn reading and writing.

In England, in the 1960's, the neurologist Macdonald Critchley used the term "specific developmental dyslexia" for congenital reading and writing difficulties. In 1968, The World Federation of Neurology (WFN) defined dyslexia as a congenital difficulty where the symptom is reading difficulties which occurred despite of their intellectual abilities (Helland, 2012). Since the 1980's, dyslexia research has been conducted in educational psychology, linguistics,

developmental and cognitive psychology, neurolinguistics, neuropsychology and genetics (Kormos & Smith, 2012).

Several researchers have also attempted subgrouping dyslexia. Helland (2012) asserts that Johnson and Myklebust made a distinction between visual and auditive dyslexia. Boder built on this distinction and divided dyslexia into three subgroups including: dysphonetic, dyseidetic, and a combination of the aforementioned. In Norway, the first person to research dyslexia systematically was Hans Jørgen Gjessing, around the 1970's. He worked at the Institute for Prelogical Psychology at the Faculty of Psychology in the University of Bergen. He defined dyslexia in a manner similar to the WFN definition. Gjessing (1977) also divided dyslexia into auditive dyslexia and visual dyslexia. This notion has been criticized by Lyster (2004, p. 219), who underlines the uncertainty whether dyslexia can be divided into subgroups. Yet, as the first Norwegian researcher to focus on dyslexia, Gjessing has been highly influential for the Norwegian research on dyslexia. He also helped establish mapping tools and support techniques that special education teachers are still employing while working with students with literacy related difficulties.

Gjessing (1977) investigated a school in a rural area with only two classes. When asked whether there were any students with learning difficulties, "Erik" in 4th grade was suggested by his former teacher. His current teacher expressed that there was nothing to do for Erik, since he could not read. Both teachers described him as an alphabet. Written works by Erik were limited to duplicating or copying words, with no apparent errors. However, a dictation task showed that he had severe comprehension problems. Furthermore, an alphabet dictation showed that although he could name all the letters, his processing was quite slow. Sound-letter mapping seemed difficult for Erik. Distinguishing between k/g, d/t, and b/p, which are pronounced similarly in Norwegian, seemed demanding. On a test for 1st grade composed of 40 words; Erik could only write 7 words. He also struggled severely with reading two or even one syllable high frequency words. With guidance from Gjessing, Erik's former teacher taught Erik. He received intensive individual teaching 20 minutes three times per week from November through the rest of 4th grade. Gjessing concludes that Erik's reading improved relatively fast, but his writing developed slower (Gjessing, 1977). Although Gjessing does not provide any information on the didactics, his findings are interesting. They illustrate how encoding remains a more demanding task than decoding. Quite interestingly, Gjessing's findings also indicate that through proper assistance, dyslexic students can improve their literacy considerably.

2.3 Causes of Dyslexia

As evident in Section 2.2, dyslexia has been researched extensively for over a century, but the cause of dyslexia is still debated (Lachmann, 2018). Vision and hearing impairments do not cause dyslexia. Yet, these impairments could influence dyslexia negatively. Therefore, it is still of crucial importance that both vision and hearing are tested (Helland, 2012).

Furthermore, it has been debated whether or not gender could be a cause of dyslexia. As reported by Helland (2012) schools identify four times as many dyslexic boys as girls and studies that have contributed to the overrepresentation of boys have enlisted their participants from clinical referred populations. In contrast, longitudinal studies with an epidemiological population seem to provide evidence that gender should be disregarded as a cause of dyslexia. Researchers point to the fact that boys are more likely to attract attention than girls, thus, a number of dyslexic girls could go unnoticed.

Overall, dyslexia is considered a multifactorial difficulty, because there is no sole factor that could explain dyslexia alone (Helland, 2012). Thus, some of the possible causes of dyslexia will be reviewed below.

2.3.1 Biological Level

On a biological level, longitudinal studies have established a connection between heredity and dyslexia (Helland, 2012 p. 123, 126). Hulme & Snowling (2017) assert that twin and family studies have provided compelling findings that substantiate the hypothesis that dyslexia is hereditary. They claim that "parents with dyslexia not only share genes with their offspring, but also plausibly may provide a different home literacy environment to that found in homes where parents do not experience literacy difficulties" (Hulme & Snowling, 2017). Thus, children of dyslexic parents are considered at-risk of developing dyslexia. In these instances, early assessment and appropriate intervention of pre-literacy skills could help reduce or even prevent future academic struggles (Nijakowska, 2010, p. 35-36). Furthermore, genetic research has made advancements in identifying genes that could possibly explain the cause of dyslexia (Kormos & Smith, 2012).

Moreover, dyslexia is associated with a deficit in the left hemisphere. The left hemisphere of the brain is, among other things, associated with the processing of numbers, written and oral language, as well as logical reasoning. Whereas the right hemisphere is, among other things, associated with imagination, and experiences regarding music and visual art. For most language learners the left hemisphere tends to be dominant for language. fMRI (functional magnetic resonance imaging) brain studies of dyslexic groups and control groups have shown differences between their processing of language related activities (Helland, 2012, p. 127-129). Waldie, Wilson, Roberts & Moreau (2017) found that dyslexic readers exhibited activity in their right hemisphere when approaching phonological tasks that are normally associated with the left hemisphere for non-dyslexic readers. Their findings indicate that the right hemisphere does not solely play a compensatory role in dyslexia. However, the authors conclude that more research needs to be done within the field. Although evidence points to abnormal functioning of the left hemisphere for dyslexic individuals, Nijakowska (2010, p. 36) rightfully underlines that "it would be premature to evaluate causal status of these findings." Therefore, the cause of dyslexia cannot with certainty be ascribed to abnormalities in brain function, because it is not sustained by extensive research yet.

2.3.2 Cognitive Level

According to Helland (2012, p. 135, 139-140) neurocognitive studies show how visuo-spatial construction, in other words cognitive processing of the visual grapheme, word or sentence, has proven difficult for some dyslexic individuals. Also, phonemes and graphemes are stored in the short-term memory before they are recognized for reading or recalled for writing purposes. If the short-term memory and working memory have impairments, the reading and writing abilities are likely to be affected. Additionally, omittance or reversal of letters and slow processing are common characteristics amongst the dyslexic population. This could explain why reading and spelling becomes difficult.

2.3.2.1 Phonological Deficit Hypothesis

The most prominent cognitive theory of underlying causes of dyslexia is the Phonological Deficit Hypothesis (Kormos & Smith, 2012, p. 33). The Phonological Deficit Hypothesis relates dyslexia to "an underlying phonological processing difficulty, namely, impaired phonological awareness" (Kormos, 2014, p. 36). Phonological awareness consists of syllabic and phonemic knowledge. Syllabic knowledge is the ability to segment words into syllables

and manipulate syllables. Phonemic knowledge is the ability segment a word into its individual sounds, distinguish between sounds and manipulate them. Impaired phonological awareness affect reading at word level, but could affect text comprehension (Kormos, 2014, p. 36). Phonological awareness is necessary for the development of reading and writing abilities, but evidently dyslexic learners struggle with this aspect. More specifically, dyslexic individuals often struggle with segmenting and manipulating phonemes (Høien & Lundberg, 2012, p. 250). There are cognitive studies that support the theory that phonological processing is affected by dyslexia, as dyslexic learners display more difficulties with phonological awareness than students without dyslexia (Ferraz, dos Santos Gonçalves, Freire, Mattar, Lamônica, Maximino, & Crenitte, 2018, p. 60). As such, there seems to be agreement that phonological deficit likely is an underlying cause of dyslexia.

2.3.2.2 Double-Deficit Hypothesis

Another hypothetical cause of dyslexia is referred to as the "Double-Deficit Hypothesis". In addition to phonological processing difficulties, the Double-Deficit Hypothesis also considers naming-speed deficits significant in the cognitive explanation of causes for dyslexia (Kormos & Smith, p. 35-36). Proponents of the Double-deficit Hypothesis maintain that phonological core deficit and naming speed impairment are the two underlying sources of dyslexic difficulties (Nijakowska, 2010, p. 35). According to Kormos & Smith (2012, p. 35-36), naming speed is related to the speed of processing or the speed of word naming. The authors elaborate by stating that research has demonstrated that dyslexic children score considerably slower regarding word naming tasks than non-dyslexic individuals. There are researchers who believe that dyslexic children can be divided into three groups; those who experience reading difficulties because of phonological processing difficulties, those who have naming speed difficulties and those who are affected by both difficulties. However, studies have shown that dyslexic individuals have impairments in both phonological processing and naming speed. Thus, the notion of these dyslexia subtypes does not seem to be supported by empirical evidence.

2.3.4 Environmental Factors

Environmental factors should also be considered in an explanation of underlying causes of dyslexia. A home environment with limited literacy activities could intensify the severity of their difficulties. Parents who are dyslexic could experience difficulties in providing necessary

support in literacy and academics, which could cause difficulties for their at-risk children (Kormos & Smith, 2012, p. 37).

In sum, the Norwegian Dyslexia Association states that dyslexia is a result of a complex interaction between heredity and environment present since utero (Dysleksi Norge, n.d.). The Norwegian Dyslexia Association's statement underlines that both biological and environmental factors are probable causes of dyslexia. It is also evident that both phonological deficits and naming speed impairments contribute to the difficulties that are associated with the disorder.

2.4 Symptoms of Dyslexia

On a behavioral level, the core difficulties of dyslexia are literacy related. In other words, dyslexic students experience reading and writing difficulties (Nijakowska, 2010). Tasks involving phonics, accuracy, sequencing and memory are demanding (Reid, 2013). In early years, children with dyslexia learn to read in slower rates than their peers. For dyslexic students, reading and writing does not become automated. In 5th to 7th grade, these struggles continue. As a consequence, dyslexic elementary students are likely to struggle with their homework. From junior high to high school, their reading skills are likely to improve, but writing will remain difficult. For Norwegian dyslexic learners, the difficulties are often intensified while working with English writing (Helland, 2012).

Reid (2013) describes dyslexia as a "hidden disability" because the dyslexic individual might not exhibit any symptoms until literacy or information processing is required. School children who are dyslexic conceal or compensate for their difficulties by either avoidance of reading aloud and/or limiting their writing. These children are often misunderstood. They are frequently referred to as lazy or unmotivated. In contrast, Reid maintains that they are not lazy, because "usually children with dyslexia extend more effort than others because of their difficulty and may often become tired very easily as a result of this effort." (Reid, 2013, p. 6).

Some children with dyslexia have difficulties with reading printed words and the letters could appear blurred. Words could also appear merged or be omitted (Reid, 2013). However, dyslexia is rarely exclusively confined to literacy impairments. Hence, it is crucial that teachers are aware of other challenges dyslexic learners could experience regarding academic performance and their private life (Kormos & Smith, 2012). In addition to literacy related difficulties, motor

skills can be impaired (Gooch, Hulme, Nash & Snowling, 2014). Dyslexic individuals are also likely to possess short-term and working memory impairments (Nijakowska, 2010). Dyslexia can also affect processing speed, time management, co-ordination and automaticity (Reid, 2009, p. 4). The condition could also pose difficulties in numeracy and mathematics (Montgomery, 2017, p. 71). Additionally, Daloiso (2017, p. 26-28) suggests that dyslexia also has psychological consequences. Poor self-esteem can be a result of dyslexia, because learners with dyslexia blame themselves for their failures. Also, classroom activities that require phonological processing, memory and processing speed can cause anxiety.

However, dyslexia is also associated with cognitive peculiarities, according to Cancer, Manzoli & Antonietti (2016). They maintain that in certain instances these peculiarities can actually be useful and productive. Daloiso (2017) states that dyslexic learners have a tendency to use their right hemisphere more than their left hemisphere. As the right hemisphere is associated with creativity, imagination, visualization and learning through experience, dyslexic students are often creative. It has also been demonstrated that dyslexic individuals often exhibit a greater creativity than non-dyslexic individuals (Cancer et al. 2016). As a result, their creativity can be a strength that teachers should take into account.

2.5 Dyslexia and Comorbidity

In Section 2.4 the behavioral markers that are commonly found in dyslexic learners were presented. However, dyslexia can be comorbid with other neurodevelopmental disorders. Comorbidity denotes that several conditions are co-occurring (Høien & Lundberg, 2012, p. 177). Comorbidity is frequently observed with other neurodevelopmental disorders in dyslexic individuals. Specific language impairment (SLI) and attention deficit hyperactivity disorder (AD/HD) are the most commonly observed disorders in comorbidity with dyslexia (Hulme & Snowling, 2017). Dyslexia has also been found in co-occurrence with Tourette Syndrome (TS) (Cravedi, Deniau, Giannitelli, Hartmann & Cohen, 2017). It is actually estimated that approximately 40% of children with one neurodevelopmental disorder also exhibit symptoms of an additional diagnosis (Gooch et al, 2014). Correspondingly, three out of the five dyslexic participants within the present study exhibit comorbidity of dyslexia and other disorders.

Kormos & Smith (2012, p. 35) argue that since dyslexia co-occurs with other learning difficulties, such as SLI and ADHD, one could assert that dyslexia is a manifestation of another

learning difficulty that is not confined to just reading or spelling. Snowling & Hulme (2011) suggest that comorbid conditions might alter the behavioral aspect of dyslexia. As such, the authors argue that children with comorbid conditions might require specific interventions for each of their difficulties. In the following paragraphs, the disorders that could affect learning and were found comorbid with dyslexia in students within this study will be presented.

2.5.1 Dyslexia and AD/HD

Along with dyslexia, AD/HD is also one of the two most common disorders that children are diagnosed with. Moreover, it is one of the most frequently comorbid disorders (Germanò, Gagliano & Curatolo, 2010). There are terminological issues with respect to the AD/HD diagnosis, as attention deficit disorder (ADD) is considered a part of the AD/HD diagnosis (Engh, 2014). Traditionally, ADHD and ADD were considered separate conditions. Children with the latter diagnosis typically were not characterized as hyperactive. In more recent terminology, the previously distinct disorders are combined in the AD/HD diagnosis. In other words, the disorder includes children who suffer from both attention and hyperactivity deficits, as well as children who suffer from either one of them (Brown, 1995). AD/HD could therefore be viewed as a continuum rather than a specific disorder characterized by typical behavioral markers.

Much like children with AD/HD, dyslexic children can struggle with impulse control, attention and concentration, as well as hyperactivity. Also, like dyslexic individuals, individuals with AD/HD struggle with their working memory and executive functions which control the abilities to carry out cognitive operations, such as planning and executing activities (Engh, 2014). The attention deficits could affect key academic skills (Gooch et al, 2014). Furthermore, Capodeci, Lachina, & Cornoldi (2018) insist that children with AD/HD are likely to struggle with expressive writing and spelling. Much like dyslexia, AD/HD can also considerably affect learning (Kormos & Smith, 2012, p. 48). Thereupon, it should be noted that AD/HD and dyslexia have certain common behavioral markers and are likely to affect learning.

2.5.2 Dyslexia and Specific Language Impairment

SLI is frequently comorbid with dyslexia and distinguishing between the two conditions poses a complex task (Kormos & Smith, 2012, p. 42). Although differentiation of the two diagnoses seems complicated, dyslexia and SLI have traditionally been considered separate conditions

(Bishop & Snowling, 2004). SLI has been linked to a limited oral language, specifically difficulties with speaking, comprehension of language, and being understood. Children with SLI also have a slower progression in their language development than their peers (Helland, 2012). Producing complex and grammatically correct utterances could also pose an obstacle. SLI is also related to a limited vocabulary (Kormos & Smith, 2012, p. 42). Dyslexia on the other hand, has been linked to reading and writing difficulties and not oral language (see Section 2.4).

Contrary to the sharp divide, research has shown that there are behavioral similarities between dyslexia and SLI (Bishop & Snowling, 2004). For example, individuals with SLI also struggle with phonological processing much like dyslexic individuals. The difficulties experienced in reading and spelling for dyslexic students are commonly also experienced among SLI affect students (Kormos & Smith, 2012, p. 42). Much like dyslexic children, children with SLI have been observed to have poor verbal working memory, which contributes to the complexity of distinguishing between the two conditions. The severity of their cognitive deficits cannot distinguish the disorders either (Alloway, Tewolde, Skipper & Hijar, 2017). However, there is still a need for the differentiation between dyslexia and SLI (Bishop & Snowling, 2004). Quite interestingly, some SLI children who were diagnosed at a young age have overcome their difficulties (Kormos & Smith, 2012, p. 42). This is certainly not the case with dyslexic children, as dyslexia is considered a lifelong difficulty (Nijakowska, 2010). Further supporting Bishop & Snowling's statement is the fact that dyslexic children, as opposed to children diagnosed with SLI, tend to exhibit age-appropriate grammatical morphology competence and do not exhibit severely affected global speech perception problems (Kormos & Smith, 2012, p. 42).

2.5.3 Dyslexia and Tourette Syndrome

Another neurodevelopmental disorder that can co-occur with dyslexia is the Tourette Syndrome. TS was named after the Frenchman who, in 1885, first described the condition (Befring, E, 2004). Brambilla (2016) defines TS as a neurodevelopmental disease that essentially causes multiple motor and vocal tics. Tics are brief and sudden movements or sounds that frequently occur in inappropriate contexts (Cravedi, Deniau, Giannitelli, Hartmann & Cohen, 2017). The tics can be suppressed to some extent through concentration, but this is exhausting and demanding in terms of concentration and energy (Kvilhaug, 2014). Brambilla (2016) argues that tic suppression leads to an intensification of the urge to carry out the tics. A

further result of withholding tics could be panic attacks. The tics could also cause concentration issues (Kvilhaug, 2014). This could in turn affect learning outcome.

Although not extensively investigated in scientific literature, TS often correlates with learning difficulties (Brambilla, 2016; Cravedi et al., 2017). Cravedi et al. (2017) reviewed research that was conducted on Tourette Syndrome and comorbidity. They found that comorbidity between TS and dyslexia has been frequently observed. As reported by Brambilla (2016), TS can also be linked to anxiety, obsessive compulsive disorder, but most frequently ADHD. Reading, writing and mathematical difficulties are also present at a higher percentage in TS individuals, than in non-TS individuals. These difficulties have also been described as intrinsic to dyslexia (see Section 2.4).

2.6 Diagnosing

In Norway, it is the Pedagogical-Psychological service (Pedagogisk-psykologisk tjeneste), abbreviated as "PPT", that officially diagnoses students (Buli-Holmberg & Ekeberg, 2016). Teachers refer learners to PPT for assessment and diagnosing (Helland & Kaasa, 2005). If the person is not of legal age, the parents have to give their consent, before the person can be referred to PPT. The referral needs to include an explanation of why the person is referred to PPT (Helland, 2012). When dyslexia is suspected the individual is assessed by speech and language therapists as well as trained specialist teachers. Their first language reading skills are tested through various tests including single word and non-word reading, context oral reading, and silent reading to measure their speed and comprehension. Their writing skills are assessed through spelling tasks. Phonological awareness is also tested. In some instances, IQ tests are viable, however, they are not needed to assess reading and writing difficulties (Helland & Kaasa, 2005). As a result of the focus being on assessing their Norwegian skills, English, although taught as the first foreign language in Norway, is not considered when diagnosing students for dyslexia.

2.7 Dyslexia and English as a Second or Foreign Language

The ability to communicate in a foreign language cannot be underestimated. Being able to communicate successfully in another language is equally as essential as basic literacy and numeracy skills in a multitude of contexts (Kormos, 2014, p. 35). The ability to communicate in English is especially advantageous. The position of the English language is quite unique. It

functions as the world language and as a lingua franca between speakers of different first languages (Seidlhofer, 2004; Seidlhofer 2005). Furthermore, English is the most widely taught foreign language (Crystal, 2012).

In Norway, English has a particularly special position. It is taught from 1st grade, as the second language that native Norwegian speakers are exposed to at school (Helland & Morken, 2015). English has traditionally been referred to as a foreign language, but some researchers claim that it is a second language (Simensen, 2014). Helland & Kaasa (2005), evidently refers to English as a second language in Norway, since they titled their research paper "Dyslexia in English as a second language". The opinion that English is a second language in Norway is often justified by the substantial position that the language has within academics and business situations (Simensen, 2014). A further justification builds on the fact that English language entertainment such as movies or TV-series are not dubbed (Simensen, 2014; Helland & Morken, 2015). English language movies, TV-series, games and music could affect the English development of Norwegian children (Dahl & Vulchanova, 2014). Because of this relatively high exposure to English in everyday life outside of school, Helland & Morken (2015) point out that it is hard to determine whether school curriculum contributes more to Norwegian children's English language learning than mass media does or not. Moreover, English and "Foreign languages" have separate subject curriculums in the national curriculum. Hence, the differentiation between English and foreign languages in the Norwegian school system is further illustrated (Ministry of Education, 2006; Ministry of Education, 2013a). However, English is mainly referred to as a foreign language (Simensen, 2014; Undheim, 2009). Finally, Norwegian and Sami are formally and legally considered the only official languages of Norway (Ministry of Culture, 2007). Despite the English language's special position, because English is not considered an official language by authorities in Norway, I will refer to it as a foreign language.

While English has a special position in Norway and children are often exposed to English, there are plenty of obstacles that Norwegian learners experience while learning EFL, according to Helland (2012, p. 169). The English language is an extremely complicated orthography to learn. Becoming literate in the English orthography for native (L1) learners of English seems to take longer time than for L1 learners of other orthographies. Also, it seems that L1 learners of English vary vastly more in their reading and writing abilities than L1 learners of other languages (Helland, 2012, p. 169). In English-speaking countries, approximately 10% of the population are diagnosed with dyslexia, whereas approximately 5% of the Norwegian

population is diagnosed with dyslexia (Brunswick, 2010, as cited in Daloiso, 2017; Dysleksi Norge, n.d.).

The discrepancy of literacy development between L1 learners of English and L1 learners of other orthographies supports the orthographic depth hypothesis. Nijakowska (2010) explains that proponents of the orthographic depth hypothesis suggest that differences in literacy development across languages are due to the nature of the orthography. It is implied that it is easier learning to read in a transparent orthography where graphemes correspond with phonemes. As such, English is classified as an opaque, or deep orthography, where the graphemes quite frequently do not correspond with their phonemes. Seymour, Aro & Erskine (2003) tested the orthographic depth hypothesis by examining letter knowledge, familiar word reading and simple non-word reading in English and 12 other European languages, including Norwegian. The majority of the children who were tested became fluent in basic reading before the end of year 1. However, L1 learners of English seemed to struggle the most when compared to L1 learners of the 12 other European languages. The rate in which L1 learners of English become fluent in basic reading was found to be more than twice as slow as learners of other orthographies. The findings of their study suggest that the orthographic depth hypothesis could explain why English is particularly difficult to learn.

Although reading English is regarded as difficult, a possibly more difficult task for dyslexic learners of the opaque orthography is to spell words correctly. Montgomery (2006, p. 6-7) maintains that committing spelling patterns to paper or a screen is a more demanding task than recognizing the letters when they are presented visually. In English, there are 44 phonemes (Montgomery, 2006, p. 7-8). However, these phonemes can be represented in various ways. As reported by Nijakowska, 2010, p. 134), the grapheme-phoneme relations are complex. A single sound can be represented by different letters or letter combinations in different words and a given letter or combination of letters might also represent more than one sound. The deep orthography spellings are inconsistent as there is a greater number of exceptions and irregular words. For example, the sound /i:/ can be spelled as either an “e” as in the word “me”, “ee” as in “queen”, or “ea” as in “sea”, and the letter C can represent the sound /k/ as in “cat” or /s/ as in ceiling (Lyster, 2012, p. 36). Thus, spelling the words correctly for English language learners can be demanding.

English is clearly a complex language. As maintained by Helland and Kaasa (2005) there is a substantial amount of irregularities in morphology and several ways of writing a single phoneme in English. The irregular nature of the English orthography is considered quite challenging for dyslexic Norwegians who learn EFL. The reason for this is that Norwegian, although not characterized by an especially transparent orthography, is semi-transparent. In other words, graphemes often correspond with phonemes. Hence, English, with its deep orthography becomes an obstacle. Furthermore, dyslexia can manifest differently in accordance with the characteristics of a language. Dyslexic L1 learners of English, will demonstrate extremely slow and impaired reading, spelling and phonological processing. Whereas L1 learners of a more transparent orthography, such as Norwegian, may exhibit fewer dyslexic symptoms. Daloiso (2017, p. 18-19) agrees that for dyslexic learners, their difficulties are likely to be amplified when learning English as a foreign language. Dyslexic learners experience difficulties with segmenting sounds in spoken language and because the English orthography has an extensive list of rules with many exceptions and irregularities, learning English seems especially strenuous for these learners (Kormos, 2014).

Norwegian dyslexic students have also been observed to apply their L1 phonology when spelling English words (Helland & Kaasa, 2005). For Norwegian dyslexic learners, the fact that Norwegian words are seldom spelled with the letters C, Q, W, X and Z could be confusing in regard to English spelling patterns. These letters are considered foreign letters, as they are only present in loan words, such as: “celle” (cell), “quiz”, “weekend”, “taxi” and “zoologi”. In most cases these letters are replaced with other letters in loan words (Kristoffersen, 2000, p. 341). Thus, Norwegian learners of EFL are mostly unfamiliar with words that are spelled with these letters.

Also, as opposed to the English alphabet with its 26 letters, the Norwegian alphabet has 29 letters which could cause confusion for Norwegian dyslexic learners (Helland & Kaasa, 2005). The additional letters of the Norwegian letters are the vowels *æ*, *ø* and *å* (Kristoffersen, 2000, p. 341). However, the phoneme /æ/, as in /hæv/ (have), is the same as the phoneme that the letter *æ* represents. Also, the sound /ɔ/ in /dɔn/ (dawn) is one of the two sounds that are represented by the letter *å* in Norwegian (Simonsen, 2018). In addition, the /ɜ:/ vowel sound, as in /bɜ:rd/ (bird), represents a similar sound to the one that the letter *ø* represents. According to Nilsen (2010, p. 111) many Norwegian learners of EFL substitute the /ɜ:/ sound for the /ø/ sound. Although the letter *ø* is not present in English orthography, the sounds are very similar,

which causes confusion for Norwegian learners. Also, Norwegian dyslexic learners are trained to attend to regular grapheme/phoneme correspondence and to sequence phonemes. Because of the irregular nature of the English orthography, this is highly likely an obstacle for Norwegian dyslexic learners (Helland & Kaasa, 2005).

Dyslexic students are at risk of developing foreign language anxiety because they struggle with language. The English language's complexity could also contribute to this anxiety. Kormos (2017) affirms that in additional language acquisition, anxiety can transpire because communicating in the language could conjure negative feelings. The foreign language anxiety might negatively affect their self-esteem. Students with dyslexia are likely to experience foreign language anxiety. They often demonstrate a higher level of foreign language anxiety than their peers with no SpLDs. Also, anxiety could affect the individual's working memory negatively, which dyslexic individuals already struggle with. Subsequently, foreign or second language anxiety can interfere with learning.

Furthermore, a student's motivation level can contribute to or inhibit learning. Kormos (2017) states that motivation can explain why students tend to select activities and explain their investment of effort in the activity. Dyslexic learners tend to approach English language activities with a low expectation of success. The motivation of learning EFL often declines as a result of their struggles in acquisition. Students in the study conducted by Csizér, Kormos & Sarkadi (as cited in Kormos, 2017, p. 86) expressed that their attitude towards English was initially positive, however, their motivation decreased due to their dyslexia and subsequent failure. Also, students expressed that learning languages such as Spanish, Italian or Russian as a third language proved less difficult than English as a second language and as a result their attitude towards the L3 was more positive.

Even though the difficulty of learning EFL is clearly stated, it should be noted that being educated in an additional language is not a disadvantage for dyslexic students. Siegel (2016) suggests that learning an additional language, in this case English as an additional language (EAL), might even reduce reading and spelling difficulties for these learners. She points out that many bilingual EAL typical readers are in fact better at reading and spelling than typical readers of English as an L1. As learning English is especially advantageous, taking away the opportunity to learn EFL for dyslexic learners should not be and is rarely an option because English is a compulsory subject in the Norwegian school curriculum. However, to learn EFL

properly, dyslexic learners might need proper intervention and accommodated teaching (Kormos & Smith, 2012). They also have a legal right to accommodations in education (See Section 1). This generates implications for Norwegian teachers of EFL, as well as teachers of EFL in general, as the teacher has to be able to accommodate properly.

2.8 Treatment of Dyslexia

Treating dyslexia is complicated, since there is no sole method or remedial program that could be considered a solution for all dyslexic learners' difficulties. What works for one dyslexic learner could be less effective or even ineffective for other dyslexic learners (Nijakowska, 2010). In addition, dyslexic learners who exhibit comorbidities might need specific interventions for each of their disorders (see Section 2.5). Symptoms are also likely to differ with age, achievement, cognitive development, motivation (Nijakowska, 2010; Helland, 2012). As a result, each program or intervention should ideally be adapted to the needs of each individual (Snowling & Hulme, 2011).

In general, dyslexic learners struggle to exhibit sufficient alphabetic knowledge in emergent writing and often fail to demonstrate phoneme awareness in reading and phoneme segmentation skills in spelling (Montgomery, 2006). It is argued that the phonological weakness in dyslexic learners is a likely cause for their reading and writing difficulties (see Section 2.3). What is more, without proper instruction, these children will suffer academic problems because of their difficulties (Torgesen et al., 2010). To develop their phonological awareness and thus their literacy and subsequently academic achievement, dyslexic learners require specific interventions (Nijakowska, 2010). It is important that the relationship between phoneme and grapheme must be made explicit in any intervention (Montgomery, 2006).

The remediations for dyslexia often include phonological interventions because these have proven successful for reading accuracy and spelling development across orthographies (Ferraz, et al, 2018; Helland, 2012; Nijakowska, 2010; Torgesen et al., 2010; Lim & Oei, 2015). Interventions that include phonological training have displayed lasting positive effects (Ferraz, et al, 2018; Helland, 2012; Nijakowska, 2010). What is more, multiple intervention studies have presented evidence that interventions consisting of a multisensory teaching activity can be beneficial for dyslexic learners' reading and writing skills (See Sections 2.9 and 2.11; Nijakowska, 2010).

Moreover, various sources stress the importance of Information and Communication Technology (ICT) for dyslexic students, because technology can be beneficial for learning outcomes and motivation towards learning EFL for students with SpLDs (Schneider & Crombie, 2003; Kormos & Smith, 2012; Helland, 2012; Pfenninger, 2016). ICT can in addition be useful for students as follow-up work and especially while practicing spelling (Philips & Kelly, 2016). Some software or apps are support as in spellcheckers, whereas other software or apps provide practice for reading speed or orthography practice (Lyster, 2012, p. 92). Crombie (2013) elaborates that technology provides an opportunity to make EFL learning more motivating for dyslexic students through the use of the supporting learning tools. Also, as pointed out by Lyster (2012, p. 93), ICT provides an opportunity for more intensive practice as well as more repetition. In instances where the teacher is unable to provide the students with the amount of overlearning that they require, ICT can be beneficial for dyslexic learners. A Norwegian handbook for teachers of EFL who are teaching Norwegian dyslexic students (Dysleksi Norge, 2017) strongly suggests using iPads. More specifically the app "Book Creator" is said to be beneficial in different ways. Book Creator has a font specifically designed for dyslexic learners titled OpenDyslexic. It is suggested that the app could be a substitute for notebooks as well as a more multimodal notebook.

Furthermore, it is imperative that the lessons are carefully designed. It is suggested by Daloiso (2017, p. 78) that dyslexic students struggle with unstructured lessons because it is difficult for them to jump from activity to activity. Hence, lessons need to be well-structured. To make lessons appear more structured to dyslexic learners, there should be a preview of the main learning goals as well as the steps of the lessons. In addition, the number of different activities should be limited, to ensure that students with SpLDs are not overwhelmed (Daloiso, (2017, p. 74). There should be room for overlearning, since learners with learning difficulties often need more time and practice to learn (Høien & Lundberg, 2012, p. 251). It is also of significance to consider the type of tasks that students are faced with. Daloiso (2017, p. 150) argues for picture-word matching tasks, since they are accessible for learners because they integrate visual and verbal information.

2.8.1 Accommodating Dyslexic learners in EFL

As apparent in Section 2.7, English is typically a particularly difficult subject for dyslexic students. SpLDs, such as dyslexia, affect not only the oral and literacy skills development, but

also the processes of language learning for individuals affected by the difficulties (Kormos, 2014). As a result, it is of fundamental importance that they are met with an accepting attitude (Helland, 2012). Furthermore, Daloiso (2017) declares that an inclusive learning environment is essential in supporting dyslexic students in English language learning. Dyslexic learners often have fragile motivation, so the learning environment is required to be supportive. Methodology, activities, materials and teaching strategies must be chosen wisely to accommodate. Daloiso further emphasizes the importance of making the learning material more accessible. According to Kormos (2014) it is vital that foreign and second language teachers are familiar with teaching techniques and interventions that are helpful for learners with SpLDs. When accommodated and supported properly, the anxiety towards English can be reduced (Kormos, 2017, p. 77-81). Consequently, the EFL teacher has to be able to accommodate properly to enhance learning for dyslexic learners.

An inclusive learning environment cannot be underestimated, but it is also of importance that the dyslexic learners receive extra support. Kormos (2017, p. 118) underlines the necessity of additional support outside the class, as well as specific intervention programs, for the progress of these students. According to Høien & Lundberg (2012, p. 251), the amount of time that is spent on learning is of significance for dyslexic learners. The authors elaborate that dyslexic students are often ineffective during lessons, because they might wait for help from the teacher for long time periods. Dyslexic learners are in need of direct teaching and require the opportunity for overlearning, but it is difficult to fulfill these needs in the mainstream classroom. Thus, dyslexic students often require special education outside their classroom.

There are several factors that need to be carefully considered if extra support is offered. According to Helland (2012), it should be provided at the right time, the right place and with the right person. Firstly, if the support is given during a subject that the student enjoys or masters, such as gymnastics or arts and crafts, then being separated from their class might feel more as a punishment rather than support. This could render the effect of the extra support minimal. Secondly, choosing the right place entails that the support is given at a suitable, preferably a regular, serene place. This is important because dyslexic students typically have impaired working memory and difficulties with concentration. Thus, they require a peaceful environment with few distraction factors. Finally, the teacher must be qualified and a good relation between the teacher and the student is imperative (Helland, 2012).

Evidently, an explicit focus on sounds and letters is necessary for dyslexic learners, but Daloiso (2017, p. 50) maintains that this aspect of language teaching is often neglected in the EFL classroom. When teaching English as L1, teachers rely heavily on phonics and spelling activities in their lessons to develop literacy skills. However, teachers of EFL often neglect this approach to teaching English. In EFL classrooms, the Communicative Language Teaching (CLT) approach is widely employed (Nijakowska, 2010). The CLT method focuses more on communication and involves minimal focus on systematic teaching of the relationship between pronunciation and spelling. A specific focus on sounds and letters is necessary. The CLT method is implicit and focuses more on communication rather than explicit instruction, which dyslexic learners require. The CLT approach could provoke adversities that the learner does not encounter in their L1, such as listening comprehension difficulties, because it is an implicit way of teaching (Daloiso, 2017, p. 50). Therefore, EFL teachers should apply this approach with caution.

Dyslexic learners can benefit from direct instruction on pronunciation of sounds and their correspondence to letters and spelling rules (Kormos & Smith, 2012). As reported by Daloiso (2017, p. 100-121), phonological skills are the first skills we master in our L1, yet one of the last ones that we develop in EFL, due to a limited focus on phonological skills. The ability to rapidly name objects, colors or letters, is considered important to the fluency of oral and written language. Still, because dyslexia is associated with poor phonological processing, the most successful approach to teaching EFL to dyslexic learners is structured programs that focus on phonological and orthographical work. Phonological awareness-based interventions seems to be especially successful, because specific practice on English sounds is favorable. As such, a focus on minimal pairs has proven effective. Minimal pairs vary only by a single sound, which changes their meaning, for example the words “chat” and “cat”. Orthographical work is also an important focus point, in particular, a specific focus on spelling patterns. Developing phonological and orthographical awareness improves reading and writing skills, and pronunciation. It also contributes to vocabulary acquisition.

Spelling is the most complex and challenging task for dyslexic students. According to Montgomery (2006, p. 7), the act of spelling is defined as an association of alphabetic symbols, called graphemes, with speech sounds, called phonemes. This association is referred to as sound-symbol correspondence, or sound-letter correspondence. The act of spelling “requires the recall of spellings from the memory in exactly the correct order or the construction of such

spellings if they are not already stored in the word memory store or lexicon." (Montgomery, 2006, p. 7). It is stressed that dyslexic learners struggle with both memory and sound-letter mapping (Kormos & Smith, 2012). Thereupon, it is important to teach spelling explicitly through multisensory tasks and encourage work in pairs (Daloiso, 2017).

Writing requires a variety of skills (Daloiso, 2017, p. 145). For one, it is required that the students are able to retrieve a word from memory as well as remember how to spell it correctly (Montgomery, 2006, p. 6). As reported by Daloiso (2017, p. 145) it is also important to be able to map phonemes to their corresponding graphemes. Additionally, being able to activate motor skills for writing is also essential. Students with dyslexia experience limitations regarding their technical skills. However, their limitations with technical skills could also affect their strategic skills. Such skills are being able to plan a text, to process a text, review texts and evaluate their own writing. The author suggests that students with dyslexia should be supported in both aspects. A way to support these learners could be providing templates for writing or working with mind maps. The Norwegian Dyslexia Association suggests using mind map apps, such as iThoughts, on tablets (Dysleksi Norge, 2017).

The layout of the learning materials is also important to consider. There should be a large space between the letters. Fonts that are suggested as beneficial are Arial, Tahoma and Verdana. Visual supports such as images, graphs and charts or tables are also beneficial. If possible, sight and hearing, through videos, is also a great strategy to reinforce comprehension (Daloiso, 2017, p. 84-90).

As presented in this section, there are many ways to ensure accommodation and inclusion. For one, it is important to focus explicitly on phonological awareness. There should also be room for overlearning, which could be ensured through special education lessons outside the classroom. ICT and computer-assisted practice is also beneficial, because the students are given the opportunity for practicing more on their own. In the subsequent section, a specific approach will be presented, namely the multisensory learning approach. The MSL approach is often advocated for and will therefore be devoted a presentation and discussion.

2.9 Multisensory Learning Approach

The Multisensory Learning Approach is built around the research by Dr. Orton at the beginning of the 20th century (see Section 2.2 for an elaboration on Dr. Orton). The techniques of MSL are meant to compensate for impairments in auditive or visual sensory channels through stimulation of other senses (Høien and Lundberg, 2012, p. 252). Many researchers emphasize the importance of teaching EFL through an explicit and multisensory method for students with dyslexia (Schneider & Crombie, 2003; Nijakowska, 2010; Kormos & Smith, 2012; Philips & Kelly, 2016; Daloiso, 2017). The emphasis on the MSL approach stands in strong opposition to the widely employed implicit CLT approach. For dyslexic learners, teaching must be direct and should involve several senses, such as the tactile, kinesthetic, auditory and visual senses, at once (Nijakowska, 2010). The kinesthetic sensory channel refers to movements, while the tactile sensory channel refers to touch. Tracing letters can be especially beneficial, as both the kinesthetic and tactile sensory channels are stimulated at once (Høien and Lundberg, 2012, p. 252). Whilst learning new vocabulary items, the students can repeat the word after the teacher, draw pictures associated with the word, and act out the word. This would include the auditory, visual and kinesthetic senses into the lesson (Kormos & Smith, 2012).

Words are stored in the lexicon with phonologic, articulatory, orthographic, semantic and motoric identities. For students with dyslexia the phonologic and orthographic identities of vocabulary items are unspecified. Using MSL to teach EFL establishes kinesthetic, tactile and articulatory identities for words (Høien & Lundberg, 2012, p. 252-253). Phillips & Kelly (2016, p. 28) state that employing many senses at once will aid the automaticity and speed of retrieval, because each of the senses store the information in specific locations in the brain. The MSL approach also establishes links between these locations. As a result, MSL can help transfer information from the short-memory to the long-term memory.

According to Daloiso (2017, p. 75), because an increased number of pathways is stimulated, incorporating MSL increases the odds that students with learning difficulties remembering. For example, an idiomatic expression, which is only presented through the auditory channel, is not likely to be remembered. However, if the expression is heard, said aloud and associated with an image it is more likely to be remembered. Also, if words that are taken out of context, much like word lists or glossary, are presented through multiple sensory channels as well as hands-on experiences, their learning is likely to improve. In a whole class setting, it is important for the EFL teacher to analyze how multisensory the learning activities are. If the activities only

activate one or two sensory channels, they can be supported. Drawings, photographs and videos can involve sight, touch and hearing. Using objects realia can ensure that sight, hearing, touch and even taste could be involved. Furthermore, using colors is excellent for involving learners with dyslexia. Finally, movement is suggested because it could stimulate sight, hearing and touch. The activities that involve the most senses are activities that enable the students to move, manipulate and create objects. Such a method is based on the Total Physical Response (TPR) method (Daloiso, 2017 p. 81-82). Richard & Rodgers (2014, p. 277-278) explain that the TPR method accentuates intensity and repetition, because it is considered important. Through the TPR method, verbal rehearsals and motor activity can be combined. This increases the possibility of the student recalling the learning objective.

2.10 Summary

It is clear that dyslexia is a universal issue regardless of one's orthography. It is also present since birth and is considered a lifelong disorder, as it does not seem possible to overcome dyslexia completely. At a behavioral level, dyslexic students experience a range of difficulties that could inhibit learning development (see Section 2.4). Because of the behavioral aspect, dyslexic learners require accommodation and support to develop their English language skills. To compensate for impairments in visual or auditory processing, a multisensory approach is often advocated for. It is also maintained that phonological awareness is reduced in dyslexic individuals and should therefore be a main focus in any accommodation. There are also several behavioral markers that dyslexia and other neurodevelopmental disorders have in common, which could complicate the differentiation these neurodevelopmental disorders. As apparent in Section 2.5, it is also quite common for dyslexic children to exhibit comorbidities. These comorbidities can alter the behavioral aspect of dyslexia, which in turn renders intervention more difficult. Therefore, individuals with comorbid disorders could require specific interventions for each of their disorders.

In the subsequent section, relevant studies on foreign language learning and dyslexia will be reviewed. The first three studies are conducted on multisensory and phonological training in regard to spelling. The first study of these three is an intervention study conducted by Nijakowska (2010) on EFL acquisition and dyslexic learners in Poland. The subsequent study was conducted by Lim & Oei (2015) on English in Singapore, where the language is considered a public and official language and is spoken as a first language by approximately 37% of the

population (Lundbo & Thuesen, 2019). The third study was conducted in the US by Schlesinger & Grey (2017), on phonological awareness and multisensory intervention for dyslexic L1 learners of English. The next two studies concern the effect of computer-assisted training, both for L1 and EFL learners. Subsequently, three Norwegian studies regarding EFL is presented. The first study is conducted by Helland & Kaasa (2005) and concerns the difference between dyslexic learners and non-dyslexic learners in EFL proficiency. Thereafter, findings of Stagelund's (2016) thesis regarding differences in the EFL proficiency of dyslexic learners who are attending certified "dyslexia friendly schools" and non-certified schools are presented. Then, Szaszkiewicz's (2013) results from interviews with dyslexic learners is discussed, before two articles regarding EFL teachers and their perception of their preparedness to accommodate dyslexic learners in the EFL classroom is discussed. Finally, I will summarize the findings.

2.11 Research Studies

Dyslexia is clearly one of the most extensively researched specific learning difficulties. Nonetheless, the topic of foreign languages and dyslexia is not as thoroughly researched as L1 and dyslexia (Nijakowska, 2010). Terminological issues within research on dyslexia and foreign language learning have affected the amount of research done and the focus of the research in question. In a lot of studies, the term "reading difficulties" is used. The use of this term has led to more research being done on reading than writing, which is problematic (Helland, 2012). Also, as the focus has been on reading in intervention research, teachers have focused their interventions on reading difficulties (Montgomery, 2017). As a result, writing and, more specifically, spelling is often overlooked in intervention research. For the sake of this literature review, interventions regarding spelling were the most interesting. Studies that are significantly important to this thesis, are so called "evidence-based effect studies". These studies seek to prove the effect of a given teaching method (Helland, 2012). However, research papers regarding EFL teachers' preparedness to accommodate will also be presented.

Nijakowska (2010, pp. 134-144) conducted a small-scale intervention study in Poland. The intent was to examine whether dyslexic EFL students could improve their reading and spelling skills on a word level, from the direct Multisensory Language Teaching (MSL) method, through what Nijakowska calls a "systematic study of selected grapheme-phoneme relations, spelling patterns and rules" (Nijakowska, 2010, pp. 134). Nijakowska's study (2010, pp. 134-144) included an experimental group who received the intervention, a dyslexic control group and a

non-dyslexic control group. The effect of the intervention was measured through reading and spelling pre- and post-tests. Nijakowska tested the students prior to the intervention, then immediately after the end of the intervention and finally two weeks after the intervention. The author's assessments showed that spelling caused more difficulties for dyslexic learners than reading. Unsurprisingly, the control group without dyslexia exhibited stronger spelling and reading skills than both dyslexic groups. Yet, after the intervention, Nijakowska observed significant improvement for the experimental group. In fact, the experimental group performed substantially better than the dyslexic control group on the reading and spelling post-tests. A further substantiating finding was the fact that the experimental group, surprisingly, actually outperformed the non-dyslexic control group. The non-dyslexic control group's results included an increase from a mean score of 38.41 on the pre-test to 79.37 on the Post-test 2 in spelling. The reading assessments showed that the non-dyslexic control group scored 76.51 on the pre-test and decreased to 74.76 in mean score on the Post-test 2. In comparison, the experimental group scored 87.62 on spelling Post-test 2 and 83.81 on the reading Post-test 2, which is significantly higher than the post-test results for the non-dyslexic control group. However, although the results are extremely promising, Nijakowska seems cautiously optimistic due to the limited number of participants in the study.

MSL research has also been carried out in other contexts, such as Singapore, where English is considered an official language (Lundbo & Thuesen, 2019). Lim & Oei (2015) conducted a year-long intervention study on 39 Singaporean dyslexic students, aged 6-15 years old, who were learning English. The intervention was based on the Orton-Gillingham method and the data collection included pre- and post-tests in the form of standardized tests. Comparison of the pre- and post-tests showed that the dyslexic students improved significantly in spelling and reading on the standardized tests, after one year of intervention. Furthermore, the authors concluded that their results indicated that the age of the students seemed to be an important factor for the success of the intervention. Younger students seemed to improve more due to the intervention, than older students. The authors then suggest that early identification of dyslexia and early intervention is crucial to the individual's literacy.

In the US, Schlesinger & Gray (2017) investigated whether a multisensory structured language teaching approach had an advantage over a structured language teaching approach alone in regard to letter name, sound production, word reading and spelling for second grade children. For the purpose of the study, the authors created two alphabets. This was done to control the

effect of external variables on the independent variable. Both interventions were adapted from Orton-Gillingham (OG) based programs. Results from pre- and post-test showed how the dyslexic students did not benefit more from being taught through the multisensory approach, than the structured language. Consequently, the authors suggest that components such as phonemic spelling and reciprocal teaching of reading and spelling could play an important role in the effectiveness of the intervention. Thus, they speculate whether time would be more wisely spent on other components of the OG method than multisensory techniques. The conclusions of Schlesinger & Gray differ vastly from those of Lim & Oei (2015) & Nijakowska (2010, pp. 134-144) as presented above. However, the researchers all seem to agree that a phonological focus is beneficial.

In addition to phonological and multisensory interventions, there is empirical evidence for the success of computer-assisted intervention in English language teaching. Torgesen et al. (2010) tested the effectiveness of computer-assisted reading instruction for L1 learners of English who were considered at risk for dyslexia. First graders in the category were divided into three groups: two experimental groups and a control group. Both experimental groups received instruction from trained teachers to prepare them for the computer programs. Then, they received computer-assisted intervention in the form of two distinct software. The participants in the experimental groups received roughly 80 hours intervention with 4 lessons of 50 minutes per week. The control group was subject to the normal reading program within their school. After the intervention, there were no significant differences between the two experimental groups. However, both of the experimental groups scored significantly higher than the control group. When the procedure was repeated in second grade, the researchers achieved similar results. There is also evidence in congruence with the findings of Torgesen et al (2010), that supports computer-assisted interventions for dyslexic EFL learners. Pfenninger (2016) tested the benefits of a multisensory computer-mediated intervention for Belgian L3 learners of English. After the intervention, which lasted for three months, she found that self-directed multisensory computer-assisted L3 training was beneficial for the dyslexic EFL learners. In fact, the dyslexic learners who received the intervention reported gains in motivation, and improvements in EFL acquisition and autonomy was detected. The author accentuates the importance of improving autonomy in foreign language learning for dyslexic learners. To conclude, the intervention program is inherently an opportunity for the dyslexic students to develop their autonomy and practice their EFL skills.

In a Norwegian context, English as a foreign language and dyslexia was actually not researched until 2005, when Helland & Kaasa (2005) developed a test battery for assessing a group of 20 dyslexic students and a non-dyslexic control group. Both groups attended 6th or 7th grade in a Norwegian school context. The test battery included assessments of verbal skills including receptive and expressive language, and pragmatics. Assessments of spelling, reading and translation were also integrated. Unsurprisingly, the control group scored significantly higher than the dyslexic group in general on all tasks, but Helland & Kaasa found differences within the group of dyslexic learners. Thus, the authors created two subgroups within the dyslexic group, based on their comprehension level. The subgroup with good comprehension (C+) did not differ significantly from the non-dyslexic group on any verbal tasks except for morphology. The low comprehension subgroup (C-) on the other hand, scored significantly lower than the non-dyslexic group. In tasks regarding literacy, both subgroups scored significantly lower than their non-dyslexic peers. The results on the reading and translation assessment showed a dispersion within the dyslexic group, as C+ scored significantly higher than C-. However, spelling seemed to be equally as impaired in both subgroups. Furthermore, the authors found that the dyslexic students seemed to write words phonetically but adjusted to the Norwegian phonology and orthography. They list the spellings: "bjutiful", "boi", and "haus" as examples. In addition, some of the subjects seemed to include some English orthography in their spellings, for example "byouthyfoool" and "whery". Finally, the dyslexic subjects gave up on spelling more words than their non-dyslexic peers. These findings clearly demonstrate how dyslexic learners generally are not as proficient as their classmates. Undoubtedly, there are differences among dyslexic learners, as subgrouping the dyslexic group provided evidence of vast differences in verbal tasks and literacy tasks except spelling. Therefore, spelling seems to be a persistent difficulty for dyslexic learners.

Stagelund (2016) investigated the effect of so-called "dyslexia friendly schools". Dyslexia friendly schools are schools that apply to guidelines from and are certified by the Norwegian Dyslexia Association. Dyslexia friendly schools have teachers who strive to use structured teaching methods like the multisensory approach. The teaching environment is also described as inclusive. To test the effect of dyslexia friendly schools, Stagelund used the test battery developed by Kaasa, Sanne & Helland (2004). Stagelund (2016) compared the results of her study, to the aforementioned results of Helland & Kaasa (2005). Stagelund's (2016) findings indicate that dyslexia friendly schools positively affects oral and literacy skills for dyslexic and non-dyslexic students. Non-dyslexic students who were attending dyslexia friendly schools

seemed to improve their spelling and reading in comparison to the non-dyslexic control group. The dyslexic students also displayed better reading skills than the dyslexic control group. However, the dyslexic students did not show improvement in their spelling. Stagelund points out that this is in line with previous research. Evidently, reading can be successfully improved, but spelling will likely remain difficult.

In her thesis, Szaszkiewicz (2013) examined the experiences of six Norwegian dyslexic students learning EF. She conducted qualitative interviews with dyslexic students and found that their experiences with English were mostly negative. Her participants described English as the most difficult subject in school. Her participants also expressed that they felt disadvantaged in regard to EFL learning. Although they acknowledged dyslexia as the cause of their difficulties, they blamed their English teachers for their failure in EFL acquisition, as the teachers would exhibit inappropriate pedagogical decisions. Szaszkiewicz concluded that teachers have the opportunity to facilitate development, shape the dyslexic learner's attitude towards learning English, as well as influence their motivation, self-esteem and possibly reduce their anxiety towards the language.

Through Szaszkiewicz' study, the importance of the English teacher's knowledge of dyslexia and his or her ability to accommodate dyslexic students is illustrated through the voices of Norwegian dyslexic learners of EFL. Thereupon, the role of the English teacher is evidently crucial. Yet, a substantial number of EFL teachers seem insecure in their abilities to include their dyslexic students. Nijakowska, Tsagari & Spanoudis (2018) administered a questionnaire regarding preparedness for inclusion of dyslexic students in the mainstream EFL classroom to over 500 pre-service and in-service teachers of EFL in Greece, Poland and Cyprus. They found that in-service teachers experienced greater preparedness than pre-service. The authors linked this finding to pre-service teachers' lack of experience with dyslexic students. The respective teacher educational programs available in the aforementioned countries were found to be insufficient in training the pre-service teachers for including dyslexic students in their teaching. This could explain the unpreparedness experiences by pre-service teachers. Thus, including dyslexic students in the EFL classroom could be a demanding task for novice teachers, as the teacher educational programs do not ensure the readiness to include dyslexic learners in the EFL classroom. Experience with teaching EFL dyslexic learners seems to improve preparedness of including dyslexic learners. Additionally, most questionnaire respondents seemed to express a need for more information regarding effective EFL teaching methods for

dyslexic learners. Most of the teachers also expressed that they were self-educated in teaching dyslexic EFL students. The authors conclude that there is a need for development of the EFL teacher educational programs within Greece, Poland and Cyprus in the department of training pre-service teachers to better include dyslexic learners in their classroom.

Kormos & Nijakowska (2017) also report similar findings. A massive four-week online course designed for foreign language teachers on dyslexia and foreign language teaching was carried out. The course included video lectures, teaching demonstrations, interviews with dyslexic learners and experts as well as relevant literature readings. An emphasis was also put on reflection, forum discussion and task design. In addition, quizzes were used to assess each participant's development in their understand of the topic. Participants in the course were approached with a pre- and post-survey. 1187 responded to the pre-survey and 752 responded to the post-survey. The population of the survey was mainly from various European countries, but America, Asia, Australia and Africa were also represented in some capacity. The authors found that the four-week online course was successful in raising attitudes and self-efficacy confidence. A decline in apprehensions concerning inclusion was also observed between the pre- and post-survey. The subsidence was attributed to the online course. Also, the massive number of participants in the course itself illustrates the high demand for training in EFL teaching for dyslexic learners. Although the findings of Nijakowska et al (2018) and Kormos & Nijakowska (2017) are not directly related to Norway, the findings support the notion that various teacher educational programs do not sufficiently train teachers to be ready for teaching dyslexic EFL learners. Still, in recent years, through attending the Norwegian EFL teacher training programs it is expected that graduate students are able to identify and accommodate reading and writing difficulties (Section 1). This is a positive development. Yet, many teachers who attended the previous education, like the current researcher, did not experience this. Therefore, many Norwegian EFL teachers could still feel unprepared to support dyslexic students.

In sum, Helland & Kaasa (2005) demonstrated how Norwegian dyslexic EFL learners struggle in literacy compared to their non-dyslexic peers. Therefore, there is a need for accommodation. Naturally, the importance of the EFL teacher's role and ability to accommodate is stressed (Szaszkiewicz, 2013). It is expected that newly educated teachers are able to identify and accommodate dyslexic learners. Also, it is a legal right for every student in the Norwegian school to receive adapted education (Section 1). Yet, amongst EFL teachers there is reportedly

a high demand and need for training in EFL teaching for dyslexic learners and many teachers express difficulties in accommodating these students (Nijakowska et al. 2018; Kormos & Nijakowska, 2018). Although Nijakowska's (2010, 134-144) MSL intervention study of Polish dyslexic students who were learning EFL, which included an experimental group, one dyslexic control group and one non-dyslexic control group has shown positive outcome for the experimental group, the number of Norwegian studies regarding the effect of any teaching method for dyslexic EFL students is tremendously sparse. Helland (2012) accentuates that there are few to no studies regarding the effects of teaching methods for EFL for Norwegian students with dyslexia. An extensive literature search seems to confirm this statement, as no intervention studies who match the specific criteria were found. However, Stagelund's research into the effect of school practices is a step in the right direction. Her findings seem to indicate that dyslexia friendly schools who incorporate structured teaching method like the MSL approach are beneficial for both dyslexic learners and non-dyslexic learners (see Section 2.9 for a discussion of the MSL approach).

2.12 Summary

An extensive amount of research has been done on dyslexia. The studies that were presented in Section 2.11 all highlight the importance of phonological awareness. Furthermore, there is extensive evidence in favor of incorporating the MSL approach while working with dyslexic learners (see Sections 2.9 and 2.11). In addition, there are many adjustments that the EFL teacher can do to accommodate and include their dyslexic students in the EFL classroom (see Sections 2.8 and 2.9). However, EFL teachers express concerns regarding their preparedness to support their dyslexic students. There is also a high demand for training on supporting dyslexic EFL learners. Moreover, Snowling & Hulme (2011) emphasize the need for closing the "virtuous circle between theory and practice". Therefore, theory needs to lead to a formulation of recommendations for teaching and an evaluation of teaching effectiveness need to inform and refine theory. Furthermore, there are no Norwegian evidence-based studies that focus on the impact of specific English didactics for dyslexic students. This prompts an inquiry into a Norwegian elementary school.

Based on the theory above, the research questions of this study are as follows:

1. How does teaching EFL through MSL impact spelling for Norwegian dyslexic students in 5th and 6th grade?

2. What implications does this MSL spelling intervention have on motivational and emotional aspects of dyslexia for Norwegian dyslexic students who are learning EFL?

Because spelling appears to be a lasting difficulty for dyslexic students, and since it is neglected in intervention studies, the current study focuses on this behavioral aspect of dyslexia. As working with phonological awareness through direct multisensory methods is advocated for, this approach is applied within the intervention. Therefore, I will examine how MSL can influence spelling skills, because it has not been researched extensively in Norway. I will also incorporate ICT within the intervention to some extent, as ICT is highlighted as beneficial for dyslexic learners. As a secondary objective, I will examine the motivational and emotional aspect of the intervention.

3. Research Design

3.1 Design-based Research

The research questions, as clearly stated above, will be answered through design-based research. This is a common label for related research approaches with differences regarding their aims and characteristics. Van den Akker, Gravemeijer, McKenney, Nieveen (2006) found that related terms included, but were not limited to, design studies, design experiments, developmental research and formative research but the terminology had yet to be established. However, more recently, Anderson & Shattuck (2012) used the term "design-based research" (DBR). Thus, the term DBR seems appropriate to describe the current study. In other words, the present study is characterized as a design-based research.

A substantial amount of education research has been carried out as DBR in recent years, according to Anderson & Shattuck (2012). Moreover, DBR is a type of research methodology that is developed by educators for the purpose of impacting, transferring and translating education research into an improvement of classroom practice. When using a DBR methodology the researcher is situated in real educational settings. Hence, the researcher is enabled to assess, inform and improve practice through intervention research, at least in that specific context. Van den Akker et al (2006) classify interventionists as design-based education researchers. The current researcher designed an intervention that was carried out in a Norwegian school (see Section 3.2 for a discussion of intervention designs, and Section 4 for a presentation of the intervention itself). This is a way to study education (Van den Akker et al.,

2006). DBR ought to possess some realistic transfer value from the experimental setting to the everyday classroom (Anderson & Shattuck, 2012). Accordingly, DBR can bridge the gap between research and practice. There is a need for bridging the gap between dyslexia research and practice, and the Norwegian evidence-based research on dyslexia and EFL is sparse (see Section 2.12), Consequently, DBR is applicable within this context.

Moreover, the present study was carried out as a mixed-methods approach. Formal research in the field of language teaching is often carried out in this type of format (Ellis, 2012). The mixed methods approach is an approach to conducting research in social, behavioral and health sciences. To incorporate a mixed-methods approach means that the researcher gathers both quantitative and qualitative data (Creswell, 2015). According to Creswell (2015, p. 2, 18), the assumption is that when statistics (quantitative data) are combined with stories and personal experience (qualitative data), the data collection gives a better understanding of the topic. The mixed-methods approach integrates the two data types by combining, merging and connecting them. The data collection of this study consists of pre- and post-tests and questionnaires (close-ended, quantitative data) as well as a semi-structured qualitative interview and observation notes (personal experience, qualitative data).

As with any method, there are advantages and disadvantages that come with both the qualitative and quantitative methods incorporated within this study (Avineri, 2017, p. 78). Creswell (2015) points out that, as opposed to quantitative research, qualitative research records the voices of the participants. On the other hand, it is not very generalizable unlike quantitative research. Whereas quantitative research does not explore the context of the participants, but qualitative research does. Qualitative research minimizes the researcher's expertise, but quantitative research is largely researcher driven. Quantitative research investigates cause and effect and controls bias. By contrast, qualitative research is subjective. The mixed-methods approach enabled the current researcher to view the problem and research questions from two different perspectives, from the close-ended response data (quantitative) and the open-ended personal data (qualitative). Furthermore, qualitative data can help assess personal experiences of participants during the study. Evidently, mixed-methods provides a more extensive material regarding the issue (Creswell, 2015). In other words, the mixed-methods approach in this study, where the qualitative interview and observational data are used to corroborate and explain the statistics is advantageous.

The research questions (as presented in Section 2.12) are the basis for this study. They are based on explicit theory of EFL teaching methods for dyslexic learners. It should therefore be noted that the objective of this study is confirmatory. This means that the purpose of this research is to prove a hypothesis (Ellis, 2012). The hypothesis in the present study, that MSL instruction is particularly effective in practicing EFL spelling skills for dyslexic students, is built upon prior research and relevant theory, which is evident from the literature review (Section 2). Ellis (2012) deems studies that build upon theory as confirmatory. Confirmatory research can be divided into two subcategories: experimental and correlational, with the former being the focus of the current study. Researchers who are conducting experimental research such as interventions aspire to find causal relationships (Tymms, 2012). Confirmatory studies include at least two variables. It is hypothesized that there is a causal relationship between two variables, which means that the researcher seeks to investigate whether variable A has an effect on variable B (Ellis, 2012). In the current study, it is presumed that there is a causal relationship between MSL instruction and the dyslexic students' spelling skills. In other words, it is assumed that MSL instruction causes a development within their EFL learning. However, Ellis (2012) maintains that in classroom research, the relationship between two variables is likely to be influenced by other variables. These variables can be viewed as moderating variables. This will be debated in Section 3.5.

3.2 Intervention Designs

As apparent from Section 3.1, the current research is conducted through a mixed-methods approach. According to Creswell, (2015), intervention designs are examples of such an approach. Researchers who conduct intervention research, study problems by performing an experiment or intervention trial and adding qualitative data into it. Before interventions, control and experimental groups are selected. The aim is to test what effect a treatment has on the experimental group. Ellis (2012) describes classroom-based studies as quasi-experimental, since they are not randomized. In a quasi-experimental study, a type of intervention is carried out to investigate whether an independent variable has an effect on the dependent variable. To find the effect of the treatment, the researcher uses a pre-test to assess the learner's competence prior to instruction. Subsequently, the intervention is carried out, this is referred to as the treatment. Finally, a similar post-test is administered. Normally, both an experimental group who receives the intervention and a control group who does not receive the intervention, are included and assessed in intervention studies. This ensures that the researcher is able to compare

the results of the pre-test with the post-test and compare the development of the experimental group and control group, to examine the effects of the experimental intervention. The current study was conducted in the approximately same manner as described by Ellis. However, there is no control group (see Sections 3.5, 6.7 and 7.2).

Therefore, this study can be defined as a single group before-and-after design (Check & Schutt, 2012, p. 132). Or, as Marsden & Torgerson (2012) call it, a single group pre-test-post-test design. In this sort of design, all the subjects are exposed to the experimental treatment and are tested prior to, and after the intervention. The individuals of the group becomes their own controls, as the basis for comparison lies in the pre-test (Check & Schutt, 2012, p. 132-133). For instances where only one group is available, or when withholding a potential helpful treatment from a control group is unethical, the single group Before-and-After design is viable (Cranmer, 2017).

Although the emphasis in intervention studies is on the results of the pre- and post-tests, Ellis (2012) maintains that some quasi-experimental studies are not entirely product-oriented. This means that the focus is not solely on the effect that the intervention had on L2 learning, but also on the process of the intervention. In the current study, the qualitative data was gathered during and after the intervention. The qualitative data, in the form of observation notes was gathered during the trial, whereas the interview with the special education teacher (Sp.Ed) was executed approximately a month after the post-testing was completed. According to Creswell (2015), collecting qualitative data during the trial can be done to show how the participants experience the activities and to modify the intervention. Creswell calls this a convergent design. Furthermore, Ellis (2012) considers an intervention study that employs both quantitative and qualitative data as a process-product study. This particular type of research is a powerful way of investigating language teaching, because it also allows the researcher to investigate the process. Therefore, it is possible to explain the results of the pre- and post-tests. Correspondingly, the qualitative data provided by the current study is used to explain the statistical differences between the spelling development of the participants. In addition, it is used to corroborate the quantitative data (see Section 3.4 for further elaboration).

The design of the intervention is a collaboration between researchers and practitioners (Anderson & Shattuck, 2012). In this particular study, the design of the intervention was mostly designed by the current researcher. I am an educated teacher of EFL and possess essential

knowledge of dyslexia and accommodation of dyslexic EFL learners. Therefore, I am qualified to teach English to Norwegian dyslexic learners. Although I designed most of the activities myself, I did not underestimate the value of the special education teacher. The Sp.Ed possesses valuable knowledge I do not possess. Thus, it was important that the Sp.Ed could impact on the lessons. The intervention consequently became a collaboration between the current researcher and the Sp.Ed.

3.3 Participants

Prior to contacting participants, the principle of the specific school was contacted, as "permission is often necessary before you can enter a site and collect data." (Creswell, 2012, p. 147). The principle was informed about the study and its aims, because the permission has to be granted from persons of authority (Creswell, 2012, p. 147). Subsequently, the principle granted me the permission to enter the school to collect data.

The first participant who was recruited for this study was the special education teacher, "Loretta". Loretta works at a school in a small Norwegian city. In an informal meeting, she was provided with information of the study, and her rights regarding anonymity and her right to withdraw at any point during the study. She gave her consent to participate in the study during the informal meeting. Loretta is a female in her 30's, who has studied special education at a Norwegian university. She has 60 credits in the subject of special education. Loretta continuously participates in relevant courses to further develop her expertise. She is experienced in her field and has worked as an Sp.Ed teacher at the same school for several years.

Prior to meeting with Loretta, the population of the study was defined as Norwegian dyslexic students. The importance of defining a population is stressed by various sources (Creswell, 2012; Check & Schutt, 2012). The "population" is a group of individuals who have a certain characteristic in common, in this case Norwegian students who are dyslexic. After defining the population, a sample or a subgroup of the target population is selected as participants (Creswell, 2012, p. 148). Dyslexic students in 5th-7th grade are in a critical phase of their life, where they often experience failures with respect to learning outcome and their struggles become more apparent (Høien & Lundberg, 2012). With this in mind, the students who were interesting for this study were Norwegian dyslexic EFL learners in 5th to 7th grade. Consequently, the

population was defined as dyslexic 5th to 7th grade students in a Norwegian elementary school. Since the participants were required to be dyslexic elementary students, the sample was chosen purposively because they were relevant to the study (Anderson, Herr & Nihlen, 2007).

Loretta helped recruit students who were known to have dyslexia at her school. Five of the six students in the sample were officially diagnosed dyslexic students. The last student has AD/HD. The participants were recruited from 5th and 6th grade, because there were no officially diagnosed dyslexic students in 7th grade at the school. The students were either 10 or 11 years old. Three of the participants were recruited from 5th grade, and three were recruited from 6th grade. The participants from 5th grade were two boys and a girl, whereas the participants from 6th grade included a boy and two girls. They are all given English names as pseudonyms to ensure that their identities will not be revealed.

Both of the male fifth graders are diagnosed with comorbid disorders that could affect their learning (see Section 2.5 for a discussion of comorbidity). "William" has TS and SLI combined with dyslexia. "Jack" has AD/HD paired with dyslexia. In the semi-structured interview, the Sp.Ed disclosed that Jack does not exhibit hyperactivity deficits. The female fifth grade student, "Emily", was officially diagnosed with dyslexia after the first intervention lesson, thus she was not included from the onset of the intervention. However, because of her official dyslexia diagnosis, her teacher approached the Sp.Ed about including her in the intervention. The Sp.Ed teacher and I decided to approach Emily's parents in the hope of including her in the study, as it could affect her learning positively and a larger sample was also beneficial for the present study. Her parents were provided information about the current study and presented with the consent form. They consented to include Emily in the group. She joined the group during the second lesson and was tested after this lesson. Thus, this could have affected her score on the pre-test somewhat. Emily is not officially diagnosed with any other disorder.

"Caroline", "Philip" and "Catharina" were recruited from 6th grade. Caroline is officially diagnosed with dyslexia. Philip is diagnosed with a comorbidity of dyslexia and SLI. Loretta pointed out in the interview that she considers his language difficulties to be quite severe (see Section 5.3). Catharina, on the other hand, is officially diagnosed with ADHD and not dyslexia. However, the special education teacher voiced concerns that she could have dyslexia. Also, as the girl in 5th grade was added after the first lesson, the Sp.Ed considered Catharina to be a support for Caroline. Therefore, Catharina was included in the experimental group.

As the pre- and post-tests in the present study are not standardized for Norwegian students, a control group of students with no language impairments at the same school, within the same classes as the participants of the experimental program, were recruited. They were tested once, at the same time of the post-test, to calculate the mean scores on the spelling test in the respective grades. Reid & Guise (2017, p. 113) maintain that when assessing students in their additional language, it should be taken into account that a test score that relies on vocabulary knowledge is likely to be extremely low when compared to native speakers. Consequently, the mean scores at fifth and sixth grade were used in a comparison between the dyslexic students' scores and their respective grades instead of using the standardized scores of the HAST2.

Check & Schutt (2012) argue that some participants cannot give an informed consent. Because a child cannot legally give their consent to their participation, the child's legal guardian has to give informed written consent. However, it is important that the child is given an explanation of the research, and subsequently the opportunity to verbally give or withhold consent to participate in the study (Check & Schutt, 2012, p. 54). As a result, the principal, teachers, parents, and finally the student, had to give their consent to participation. The parents who expressed interest were given the consent forms and returned them with their written consent.

To involve the participants, the intervention had to be of value to the students (Helland, 2012). Accordingly, it was important that information accentuated the possible benefits for the participants. It was also of crucial importance that the consent form had to be quite informative. Check & Schutt (2012) state that informed consent has to be given from the participant, in this study that would be the parents of the participants. However, as perfect communication is not possible, a full disclosure of all necessary details cannot be ethically required. The language had to be concise and clear and still remaining sufficient. It was important for the information to be descriptive of the research, so that the participants knew what their participation entailed. Furthermore, privacy protection and confidentiality needed to be addressed in the consent forms (Check & Schutt, 2012). I strived to follow these guidelines in my consent forms. Thus, I used a template created by the Norwegian Centre for Research Data (NSD). In Norway, NSD, evaluates social science research projects that process sensitive information about participants (Helland, 2012). By definition, an official diagnosis would be considered sensitive information. Therefore, I sent descriptive information regarding my research project, including first drafts

of the consent forms. Subsequently, after correspondence with and guidance from NSD, the present study was approved by NSD, as apparent in Appendix A.

Privacy, confidentiality and anonymity was carefully considered during the data collection, as well as after the deadline of the current thesis. Creswell (2012, p. 148) maintains that privacy and confidentiality during and after the data collection is essential in research. To ensure that privacy is protected, all the students who are participating in this study were given English names as pseudonyms. Their pre- and post-tests were stored safely during the implementation of intervention and during the analysis. The tests were shredded after the deadline to further protect their identities.

The absence of a control group in this study should be addressed. Høien and Lundberg (2012) emphasize that far too often, research on dyslexia and the effect of a treatment does not include a control group. In my research, the initial intention was to include a control group, but it proved difficult, due to limitations of the study in regard to time limits and the criteria of inclusion in the project. According to Ellis (2012) this could be a substantial issue and limitation of the study, but Creswell (2012, p. 313) points out that in some cases participants may be limited and thus, an inclusion of more than one group is not possible. There are also ethical limitations to be considered, because if the method is considered likely to positively affect the learners, then it is ethically difficult to withhold this intervention from individuals in need of the treatment (Høien & Lundberg, 2012). The absence of a control group will be further discussed in Sections 3.5 and 6.7. I will make suggestions regarding future studies that could prevent limitations caused by the lack of a control group in Section 7.2.

Furthermore, the sample size of the present study is small. De Winter (2013) points out that although working with larger samples is advised, occasionally, researchers have to work with smaller samples. Due to factors such as time, or ethical restraints, gathering a larger sample can prove difficult or even impossible. Accordingly, critics would suggest that the researcher should attempt to replicate the study with a larger sample, which in some instances could be difficult to achieve (De Winter, 2013). This matter will be discussed in Section 6.7 and suggestions for future research will be provided in Section 7.2.

3.4 Data Collection

The research questions concern the effect of teaching spelling through direct multisensory approaches and phonological awareness teaching activities (see Section 2.12). As such, an intervention design is appropriate because the effect of these language learning activities can be measured quantitatively and explained qualitatively. Tymms (2012) states that the focus of intervention designs is normally to measure the effect of the independent variable on the dependent variable. This is referred to as the "outcome" of the intervention. However, as emphasized by Daloiso (2017), an assessment of a dyslexic learner's EFL competence should not be confined solely to language tests. The author explains that informal observation should also be used to assess their competence. In addition, a typical set of data collected from interventions are tests, questionnaires and observations, all of which are included in this study. A semi-structured qualitative interview with the Sp.Ed teacher is also a part of the data.

3.4.1 Pre- and Post-tests

In interventions, a pre-test is administered to assess an attribute or characteristic prior to the treatment. After the treatment, a post-test is administered to measure the development of the same attribute or characteristic (Creswell, 2012, p. 297). Within this study, the pre- and post-tests regarding spelling are the main data. These tests are incorporated to measure the effect of the intervention and thus to answer the main research question. When the baselines, or the pre-tests, are used as controls, the power of statistical tests are enhanced (Tymms, 2012, p. 138). Measures were taken for ensuring valid test results. For testing, external factors such as the time of the school day and school year, the physical surroundings of the testing environment such as temperature and noise, the importance of the test, examination and the degree of formality should all be considered (Cohen, Manion & Morrison, 2011, p. 210). To account for this, the testing commenced in either the first or second period, as the time of the day affect students' attention and concentration (Raviv & Low, 1990). Also, the place for the test was chosen with careful consideration of the surroundings, as dyslexic learners require a peaceful environment (Helland, 2012). In addition, it is stressed that positive reinforcement can have significant positive effects on children with or without learning difficulties (Morin, 2017). Thus, the students were informed that there would be a reward after they had participated in the test, in accordance with positive reinforcement practice.

The plan was originally to use the "English 2 Dyslexia Test", which is a standardized test that is designed specifically to assess Norwegian dyslexic students' English skills. It was first developed as a written test by Kaasa, Sanne & Helland (2004) for Norwegian 6th and 7th grade students with dyslexia. Later on, it was standardized and computerized (Helland, 2008).

However, when the project was scheduled to commence, the test was being upgraded and, therefore, unavailable. Because a standardized assessment tool designed specifically for students learning English as a second language in Norway was not available, I had to find another solution. After reading the book "The Dyslexia Assessment" by Reid and Guise (2017), I discovered standardized tests for L1 learners of English provided by The Helen Arkell Dyslexia Centre. One of these tests were The Helen Arkell Spelling Test Version 2 (HAST2) (Caplan, Barke & Mclean, 2012). I decided to incorporate the HAST2 into my research, but HAST2 is designed specifically for students with English as their L1. If the tests were to follow the age-appropriate start and stop points provided in the test manual, the students would start at item 1 and stop at item 60, which is the word "feint". Between the 46th and 60th items are words such as "hypochondria", "circumference" and "insatiable" (Caplan et al., 2012, p. 14-17). To make the test more accessible for Norwegian students, I chose to stop at item 46, which is the word "chaos". The reason for this is that the subsequent words are low frequency words that are not present in Norwegian EFL classrooms. In addition, high frequency words from the McNally Wordlist were added to evaluate knowledge of spelling patterns in words that should be particularly familiar. Holmberg (2019) explains that the McNally Wordlist is a collection of 250 high frequency words. She further elaborates that 70% of texts that children and young adults read are comprised of the 250 high frequency words. Finally, she suggests that a focus on teaching these words can be influential in reading development. Thus, I added high frequency words to the test battery.

According to Reid & Guise (2017), a spelling test should measure the ability to spell sight words, i.e. words that have to be remembered visually because of their irregularity, and the ability to spell words by following phonic rules. Words of both categories are included in the spelling test. The national English subject curriculum (Ministry of Education, 2013a) states that Norwegian EFL students are expected to be able to use common short words and simple spelling patterns after 4th grade. They are also expected to understand the relation between English phonemes and graphemes, as well as be able to manipulate them. After Year 7 they ought to be capable of understanding and using vocabulary related to familiar topics. It is

therefore expected that the words that were used in the test should be familiar to the students. See Appendix G for the accommodated test in its entirety.

The test was performed as a dictate, where the assessor read the word to be spelled once aloud. Then, a supporting phrase with the word was read, before the word itself was read aloud one final time. The students were given clear instructions not to write anything until after they had heard the word the second and final time, in line with the direction provided in the HAST2 (Caplan et al., 2012). As a way of accommodating, the test was also performed in a separate room, this is in accordance with Kormos & Smith's (2012, p. 152) statement that a change in setting is often helpful in accommodating the assessment for students with SpLDs. The comorbidities were also considered during the testing. Reid & Guise (2017, p. 102-103) maintain that AD/HD can influence the assessment due to inattention. As both Jack and Catharina are officially diagnosed with AD/HD, this has to be addressed. Reid & Guise expand on their statement, by saying that time differentiation could be beneficial and letting the students move around during tests is advised. Kormos & Smith (2012, p. 149) also suggest that children with AD/HD could take the test in separate rooms from other candidates to account for their attention impairments. On both the pre- and the post-test all students took the test individually. All students were given the opportunity of taking a break during the test. Jack and William needed a pause in the middle of the test, whereas the other students did not.

In the analysis stage of the study, the results of the tests were compared. Within the group, the scores of the pre-test were compared with the results of the post-test. Also, the scores of each dyslexic student were compared to the average score of their classmates. I expected the results of the pre-test and the post-test to differ for the dyslexic students. I also expected their test scores to be below the average of their classes.

3.4.2 Questionnaires

The questionnaires were administered after the intervention as a way for the students to evaluate their own development. The data collected from the questionnaires is important because it elucidates the students' point of view. The questionnaires are used to corroborate and explain the results of the pre- and post-tests. Data from the questionnaires are also employed to answer the secondary research question regarding motivational and emotional aspects of dyslexia.

Questionnaires are asynchronous, which means that the participant and the researcher do not interact with each other. In other words, I would read the questionnaires after they were handed in. They were also done individually. Hence, every student got to express their own opinion. Questionnaires were appropriate for the purpose of the current study because they can be used as an evaluation (Avineri, 2017, p 78-80). Avineri (2017, p. 81) maintains that it is crucial to consider how the students perceive organization, purpose and questions of the questionnaire they are presented with. Therefore, it was important to consider the psychology of the questionnaire, which Avineri refers to as "Johnson's five steps". These are steps that the participant goes through during the questionnaire. Step 1: encoding and storage of the information, step 2: the comprehension of the question and step 3: retrieval of information. As reading skills and working memory are impaired for dyslexic learners, these steps were especially important to consider. Therefore, the questions and information given had to be short and avoid the use of difficult words. The last two steps are step 4: judgement and estimation, and step 5: reporting of answers. It should be noted that the responses are the respondent's version of the truth and complications could arise. For instance, failure of comprehension or misinterpretation of the questions as well as memory problems can intervene with the results (Avineri, 2017).

This is what we practiced		This is my level of competence			
					
Vocabulary	English names for the letters				
	Matching capital letters and small letters				
	Building, painting and writing words				
	Spelling words with silent E (Power E)				
	Writing words with the «th» letter combination				

Figure 1: Questionnaire example

To account for the difficulties experienced by dyslexic students in EFL, the questionnaire was developed in their native language. Figure 1 is an example task from the questionnaire. As apparent, the questionnaire included visuals, in the form of emojis, rather than number scores, to aid their understanding. To further accommodate, the font of the questionnaire was carefully considered. Arial was subsequently chosen, since it is advocated for (see Section 2.8.1). Furthermore, the students were not required to produce any language, only cross the boxes that

they felt were most fitting (See Appendix D for the entire questionnaire in English). When executing the questionnaire, I read the questions aloud and explained explicitly what they were supposed to do, as well as gave them the opportunity to ask questions. Overall, the questionnaire required them to assess their EFL learning development, as well as their motivation and attitude towards English before and after the intervention. They were also required to assess the activities, by marking the ones they enjoyed and the ones they felt that they learned the most from, in addition to assessing the intervention overall. An optional extra comment section was also provided, where they could write suggestions for what could have been improved with the intervention.

3.4.3 Observation

A distinction is made between quantitative (countable or measurable) and qualitative (verbal) observations (Angrosino, 2012, p. 165). The observations within the current study are qualitative as they are verbal, soft data, and not countable or measurable hard data. (O'Leary, 2014, p. 95-96). There are eight observation notes, one for each lesson. These are recorded chronologically in the form of handwritten notes, which is typical for qualitative observations (O'Leary, 2014, p. 95-96). Observation is rarely the sole method (Angrosino, 2012, p. 165). Therefore, the qualitative observations describe interactions during the intervention, and are used to support and explain the results of the pre- and post-tests. The observations can thus be regarded as "hypothesis-generating", because they are used to form a hypothesis of why each individual developed in the manner that they did (O'Leary, 2014, p. 95-96).

It was interesting to see how the participants engaged in the activities. The observations aids in explaining why the individual learners experienced the development that they did. As Daloiso (2017) explains, the dyslexic learner's performance can be observed during any activity. However, it is important that the information is gathered systematically by the use of checklists or anecdotal records. The observer can therefore keep track of the learner's performance by taking notes.

I produced an observation form template to ensure that the information was gathered systematically. However, the observation notes can be seen as semi-structured, as the records are shaped by a set of criteria as apparent in Appendix E (O'Leary, 2014, p. 106). The semi-structured type of observation notes allowed for the current researcher to consult the set of criteria, which guided me to interpret the interactions and occurrences within the group of

dyslexic students (O'Leary, 2014, p. 106). According to Avineri (2017, p. 137), observation note templates can be divided into "who, what, where, when, why and how". When the topic of the research is narrowed, the researcher can focus on particular aspects of this typology. The current researcher answered questions regarding who (who was present), what (what happened, what was done), when (at what time of day) and how (how the students worked) in accordance with Avineri's suggestions.

3.4.4 Semi-structured Interview with the Special Education Teacher

Approximately a month after the intervention had ended, the qualitative interview with Loretta was conducted. The purpose of the qualitative interview was to obtain descriptions from Loretta, the interviewee (Kvale & Brinkmann, 2015). Conducting the interview was beneficial because it allowed for the "full range of the what, how and why" of Loretta's experience regarding the intervention, and its effect, to be recorded (Avineri, 2017, p. 102). The interview conducted for this thesis is semi-structured, which means that it is neither a conversation, nor a questionnaire conversation (Kvale & Brinkmann, 2015). Semi-structured interviews are based on a set of topics, but fluidity and spontaneous reactions or questions is allowed during the interview (Avineri, 2017, p. 106). I developed an interview guide prior to the interview. According to Kvale & Brinkmann (2015), an interview guide specifies the topic of the interview and includes suggestions for questions. The semi-structured interview was recorded and transcribed, then analyzed by examining the transcribed interview and the recording. During the analysis, Loretta's explicit and implicit opinions regarding the success of the intervention were important.

Loretta's statements were used to elaborate on the success of the intervention and further explain the development of each pupil, as well as to increase the validity in accordance with the principle of triangulation (see Section 3.5.1). Loretta's descriptions and explanations of each student's development were particularly interesting as these descriptions and explanations could corroborate or explain the results of the pre- and post-tests. Statements that comply with these characteristics could also pinpoint development in EFL that the spelling tests do not discover. Loretta's perception of the intervention's success is especially important because it can further corroborate the main data. Her statements regarding motivational and emotional aspects could also aid in answering the secondary research question. Thus, the Sp. Ed's statements are used to aid in resolving the research questions.

3.5 Validity and Reliability

3.5.1 Validity

Validity concerns whether a given research method is suitable for measuring what the study is supposed to measure. Furthermore, validity concerns whether the results validly answer the research questions (Johannessen, Tufte & Christoffersen, 2006, p. 199). According to Check & Schutt (2012, p. 38), the goal of validity is reached when our conclusions about the empirical reality are correct.

As reported by Check & Schutt (2012, p. 38) to establish validity, it is purposeful to look at measurement validity, generalizability and internal validity. Measurement validity concerns whether the measurements actually measure what they are supposed to measure. Generalizability is related to the extent of how the data can be used to inform us about random persons within the population. Internal validity or causal validity is achieved when A evidently causes B.

It is difficult to generalize due to the small sample and the lack of any control group. There are certain concerns in respect to the internal validity of this study and it is difficult to assess the internal validity without a control group. In the following paragraphs these concerns are discussed.

For one, Cranmer (2017) states that history effects can be considered a type of threat to internal validity. History effects are related to external variables such as the fact that the students could learn in another class, be affected by multimedia, or practice as extracurricular activities. Although history effects cannot be completely ruled out, the duration of the intervention is 3 months, which is relatively short. Hence, history effects are not very likely due to the duration of the intervention.

Secondly, there are risks of the so-called “maturation effect”, but the short duration of the study also minimizes this effect. Cohen et al. (2011, p. 183) explain that the maturation effect can be defined as the odds of a change within the subject between one observation and another. These changes can produce differences between two measures that are independent of the research. As stated by Cranmer (2017), such changes could be due to development of the subject’s brain and cognitive capabilities with age. A study that lasts for a short period of time, is less likely to

be affected by maturation than a longitude study. The relatively short time period could help ensure that maturation effects do not become an issue in the present study. To further counteract the maturation effect on the testing, the non-dyslexic students in the respective classes were tested to find the mean of the class the same week that the dyslexic students were tested after the intervention. However, maturation cannot be completely ruled out, since there is no dyslexic control group for comparison.

Furthermore, the regression to the mean (RTM) effect needs to be addressed. Marsden & Torgerson (2012), defines RTM as a statistical phenomenon that affects intervention designs based on single group pre- and post-tests that analyzes data from participants with extremely low or high scores. According to Cranmer (2017), a student with an extremely low score on the pre-test is likely to score closer to the average score on the post-test. In other words, when a student scores extremely low on the pre-test, it is highly likely that their score on the post-test will be closer to the mean. Yet, as evident in the quantitative comparison of the pre- and post-test this is not the case for Philip nor Jack (see Section 6.1).

A so-called "Hawthorne effect" should also be considered. The "Hawthorne effect" refers to the fact that improvements that are observed within the students cannot certainly be ascribed to the teaching method itself. The participants receive extra attention during the intervention, which also needs to be accounted for in regard to validity (Høien & Lundberg, 2012). Additionally, if the participants did not know of their involvement until after the pre-test, they would likely put in more effort during the post-test because they know that they are being assessed (Cranmer, 2017). For this study, all the participants knew about their involvement in the study prior to the pre-test. Because the students already knew of their involvement before the baseline assessment, the Hawthorne effect is controlled for to some extent, as the external variable of participation knowledge is the same during both measurements.

Although there is no control group, which could have controlled for the Hawthorne, maturation, history and RTM effects, measures have been taken to strengthen the validity of the current study. Results from the pre- and post-tests are the main data. These results are supplemented and supported by the semi-structured qualitative interview with the special education teacher, the student questionnaires, and the observations of each lesson during the intervention. The data is in other words comprised of both qualitative and quantitative methods. Both the qualitative and the quantitative data are employed to elucidate and answer the research questions. It is

purposeful to use both qualitative and quantitative research, because one approach builds upon the other, which increases credibility (Flick, 2007). According to Check & Schutt (2012, p. 83) this is a way to ensure the validity of a study. Convergent validity is provided because one measure of a matter is compared to different types of measure to improve validity. In this study, the differences in scores between the pre- and post-test are analyzed quantitatively and compared qualitatively. The findings from the pre- and post-tests are supported, as well as explained, with observation notes, the qualitative semi-structured interview and student questionnaires. By doing so, the statistics are corroborated by the students and Loretta's points of view, as well as by the interpretations of the current researcher.

By collecting different data through various methods, this study's validity is elevated through triangulation. Triangulation is defined as the perception that a convergence of evidence collected through two or more methods is likely to enhance validity of the research data (Biesta, 2012, p. 147). Cohen et al. (2011, p. 195) maintain that triangular studies seek to explain the complexity of human behavior by studying the phenomenon from various angles. Triangulation controls for bias because it ensures that the observed results are not the product of one specific method if the different methods yield the same results. In this case, the pre-test and post-test comparisons are substantiated by several aforementioned perspectives through various data collection methods.

As a way to further validate the quantitative findings, I have checked for statistical significance. For this purpose, I used the software JASP (JASP team, 2018). In educational research, where repeated measures regarding the same subject over time are common, paired t-tests are frequently employed (Zimmerman, 1997). A paired t-test is used when the same group is measured on two occasions, for example through pre- and post-tests (Cohen et al., 2011, p. 644). T-tests can be used to establish statistical significance (Tymms, 2012, p. 139). Cohen et al. (2011, p. 644) maintain that t-tests can help investigate the "null hypothesis". The null hypothesis is the assumption that no statistically significant difference exist between the measures. In the current study, the null hypothesis entails that there is no difference in results between the pre- and post-test. When a paired t-test exhibits a p value below 0.05 the difference between the two values can be considered statistically significant (De Winter, 2013). Thus, if the p value is below 0.05, the null hypothesis can be disproved. Zimmerman (1997) maintains that an experimental design that involves paired measures is more likely to detect differences between scores. The aim of this study is to test the effect of the independent variable (in this

case the MSL intervention) on the dependent variable (EFL spelling skills). It is tested by using a pre- and post-test, which thus suggests that a paired t-test would be efficient in determining whether there is a statistically significant difference between the pre- and post-test results. During the analysis, the pre- and post-test scores were compared to check if there was a statistical difference between the two. The p value was found to be 0.041, which indicates a statistical difference. See Section 6.1.1 for a detailed discussion of the results from the paired t-test.

Furthermore, De Winter (2013) states that in sample sizes at 5 or below, it is important to investigate whether the data complies with prior relevant evidence. In accordance with De Winter's statement, to ensure credibility, due to the small sample size of the present study, my data is later compared to findings from other relevant studies (see Section 2.11 for a review of these studies).

According to Daloiso (2017), assessment of language competence often consists of language tests. The most fundamental issue in assessing dyslexic students' language skills is the validity of the test. Because the main data stems from the spelling test, the validity of the current study is intertwined with the validity of the spelling test. Fairbairn & Spiby (2019) state that the validity of the test involves fairness and accessibility. To be valid, the test has to be able to discriminate between candidates based on the specific item of assessment. Thus, a relevant question regarding the test would be, if the spelling test measures what it is supposed to measure. Daloiso (2017) maintains that an unfair assessment is invalid, because it does not reflect the standing of students. Hence, a language test for dyslexic students must be accommodated to their level. An issue with language tests could be that students with dyslexia who suffer from foreign language anxiety could score lower than their actual competence as a result of their anxiety. These students could also struggle with their performance under time pressure. Formal assessment of dyslexic students could thus be less reliable than suggested if not accommodated properly. To account for this, specific accommodations were performed (see Section 3.4.1). HAST2 is developed for The Helen Arkell Dyslexia Centre. The organization is specialized in the field of dyslexia. Also, the test is used as a diagnostic test, as such, the test is likely to discriminate between the test-takers based on their spelling skills.

As the sample includes five dyslexic students in the Norwegian equivalent to elementary school, they can be viewed as representative of the population. This guarantees the relevancy

of the evidence provided by the present study (Helland, 2012). The relevancy of the evidence further aids in the validation of the current research. Finally, the fact that the research is conducted in the classroom strengthens the validity of the study (Anderson & Shattuck, 2012).

3.5.2 Reliability

According to Cohen et al (2011 p. 199), reliability is a synonym for dependability, consistency and replicability over time, instruments or respondents. Reliability is often related to whether the study produces consistent scores, but in this instance, it concerns whether the difference between the pre- and post-test scores actually reflect actual changes in the phenomenon that is studied (Check & Schutt, 2012, p. 83).

As the results from the pre- and post- spelling tests provide the main data, the reliability of this test is relevant. Thus, the reliability of this study is checked by analyzing the internal consistency of the spelling tests, by means of a coefficient alpha. As such, JASP (JASP team, 2018) was used to check the coefficient alpha, measured as Cronbach's a. Muijs (2010) states that a measure of 0.7 and above implies that the test is internally consistent and thus reliable. As apparent in Figure 2, Cronbach's a is 0.878 between the two tests, and 0.798 and 0.893 on the pre- and post-tests respectively. In conclusion, the reliability of the spelling test is strongly implied because Cronbach's a is above 0.7 between the tests and on both the pre- and post-test.

Reliability Analysis

Scale Reliability Statistics

	Cronbach's α
scale	0.878

Note. Of the observations, 5 were used, 0 were excluded listwise, and 5 were provided.

Item Reliability Statistics

	If item dropped
	Cronbach's α
Post-test	0.893
Pre-test	0.798

Figure 2: Test Reliability Analysis

4. The Intervention

The original school for the project withdrew right before the intervention was set to launch. A new school was not set until after the intervention was scheduled to commence, which led to the project coming to a halt. Further delay was caused by the strict rules regarding parents' consent to their child's participation (see Section 3.3). The delays affected the intervention. It was originally scheduled to last for 16 lessons. However, due to the severe delay and the eminent approach of the deadline, the intervention had to be compressed to eight lessons. Thus, many of the planned intervention lessons had to be cut. A draft of the original plan for the intervention is attached in Appendix J.

Furthermore, the intervention was supported by competence aims from the English subject curriculum. The competence aims that were relevant were chosen among the aims that students are suspected to have achieved by the end of year 7. This is because the study is focused on elementary students. The competence aims that justify the type of intervention (as seen in Table 1) are:

1) understand and use a vocabulary related to familiar topics
2) use basic patterns for orthography, word inflection, sentence and text construction to produce texts
3) identify and use different situations and learning strategies to expand one`s English-language skills (Ministry of Education, 2013a)

The first competence aim is centered around vocabulary acquisition. The spelling intervention is essentially centered around practicing familiar and acquiring new vocabulary items. The second competence aim emphasizes the ability to use basic patterns for orthography among other central aspects of language proficiency. However, the most relevant aspect is orthography, since the intervention activities were on a word level, as opposed to the syntactic level. The third competence aim is relevant because the intervention introduced new learning techniques to the participating EFL learners. Therefore, the intervention was supported by the curriculum.

The intervention lessons were designed prior to the pre-test. The lessons targeted specific difficulties that dyslexic learners often experience (see Section 2.4) through methods that are advocated for and supported by existing research (see Sections 2.8-2.11). Several of the lessons deviated from the original lesson plans (see the Appendix I for the original lesson plans). Table

1 illustrates how the intervention was executed. As apparent in Table 1, the intervention was focused on spelling, because it is said to be the most impaired skill for dyslexic learners (see Section 2.4 for a detailed discussion). Furthermore, the results of the pre-test influenced the focus and activities of the intervention.

The multisensory spelling intervention featured a focus on letters names through auditive and visual presentation and practice through hands-on, and online training. Phonological awareness was practiced through explicit instruction, worksheet and sorting activities. It was also present in the more explicit spelling-oriented activities, as the students were expected to color, build or paint words in their distinct sounds.

Lesson number	Date: Time	Activities	Purpose	Curriculum aim no.
Lesson 1	11.11.18: 10.15-11.15	Alphabet song with visuals	Repetition of the alphabet and letter sounds.	1, 2
		Small and capital letter puzzle		
		Monster Mansion Alphabet Match		
		Sound-letter correspondence explanation and worksheet	To practice understanding of sound-letter-correspondence.	
Lesson 2	11.30.18: 08.45-10.00	Monster mansion match	Repetition	1, 2, 3
		Sound-letter correspondence explanation and worksheet	To practice understanding of sound-letter-correspondence and segmenting.	
		Coloring worksheet.		
		Painting words		
Lesson 3	Group A - 12.05.18: 10.30-11.15 Group B – 01.04.19: 08.40-10.00	Rhymes instruction	To practice identifying and manipulating sounds.	1, 2, 3
		Odd one out activity		
		Book Creator rhyming task		
		Ninja Board Game		
Lesson 4	Group A - 12.12.18: 10.15-11.15 Group B – 01.09.19: 10.15-11.15	Guessing activity: Writing words on each other's backs	To practice spelling explicitly.	2, 3
		Building words with WikkiStix		
		Book Creator: WikkiStix pictures and recording of words		
Lesson 5	01.11.19: 08.45-09.45	Explanation of minimal pairs	To practice distinguishing between and spelling minimal pairs.	2, 3
		Distinguishing worksheet		
		Odd one out worksheet		
		Minimal pairs bingo		
Lesson 6	01.16.19: 10.15-11.15	Power E: presentation through rule card	To practice spelling words with the silent E spelling pattern.	1, 2
		Silent E song		
		English Sounds Fun: Power E worksheet		
		Auditory practice		
		Silent E song writing task		
Lesson 7	Group A - 01.18.19: 08.45-09.45 Group B - 01.18.19: 10.15-11.15	Explanation of the two "th" sounds	To practice distinguishing between "th" sounds and other sounds and spelling words with "th".	1, 2, 3
		Th sounds instruction and practice		
		Auditory discrimination		
		Smart Notebook sorting activity		
		WikkiStix/Painting activity		
Lesson 8	Group B - 01.25.19: 08.45-09.45 Group A – 10.15-11.15	Look-Trace-Cover-Write-Check	To practice spelling explicitly.	1, 2, 3
		Quizlet practice		

Table 1: Intervention Overview

5. Results

The results and findings from the triangulated data collection will be presented and described in the following subsections. The findings will be discussed in light of related literature in Section 6.

5.1 Pre- and Post-test Analysis

The results of the pre and post spelling tests are analyzed quantitatively below, and qualitatively in the following section.

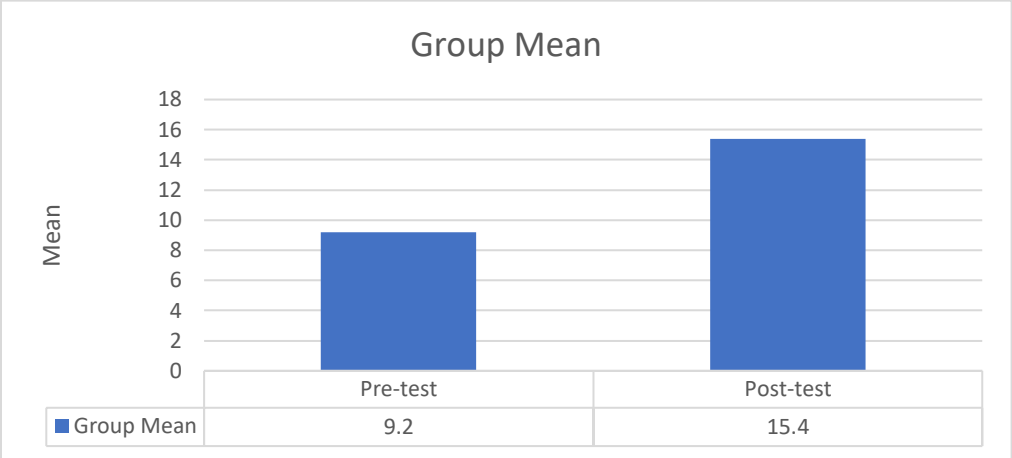


Figure 3: Overall Group Mean Development

Figure 3 shows the group mean value at baseline and after the intervention. The pre-test mean value was 9.2 points, whereas the mean value on the post-test was 15.4 points. There is a 6.2-point difference in means, or a 67% increase, which shows quite a positive development in the group overall.

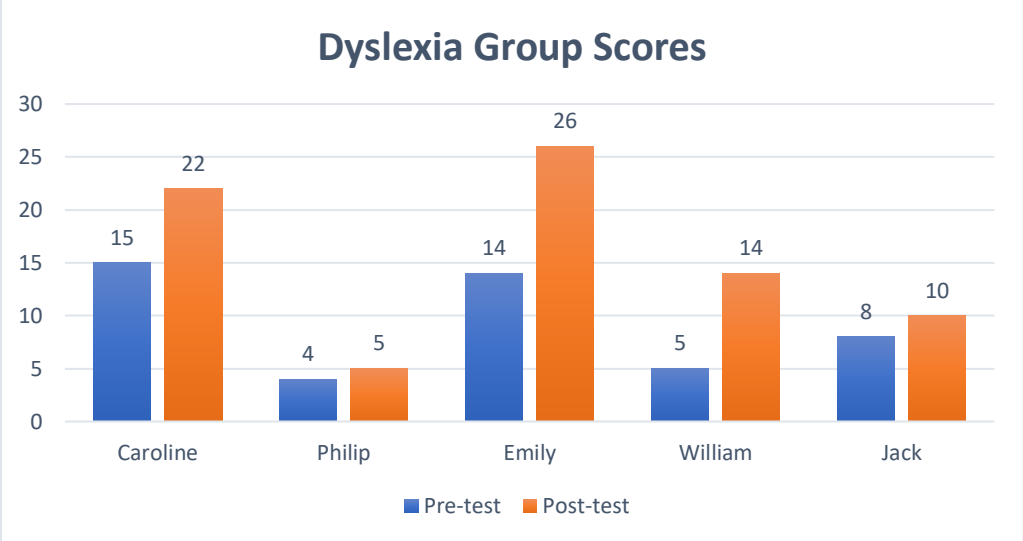
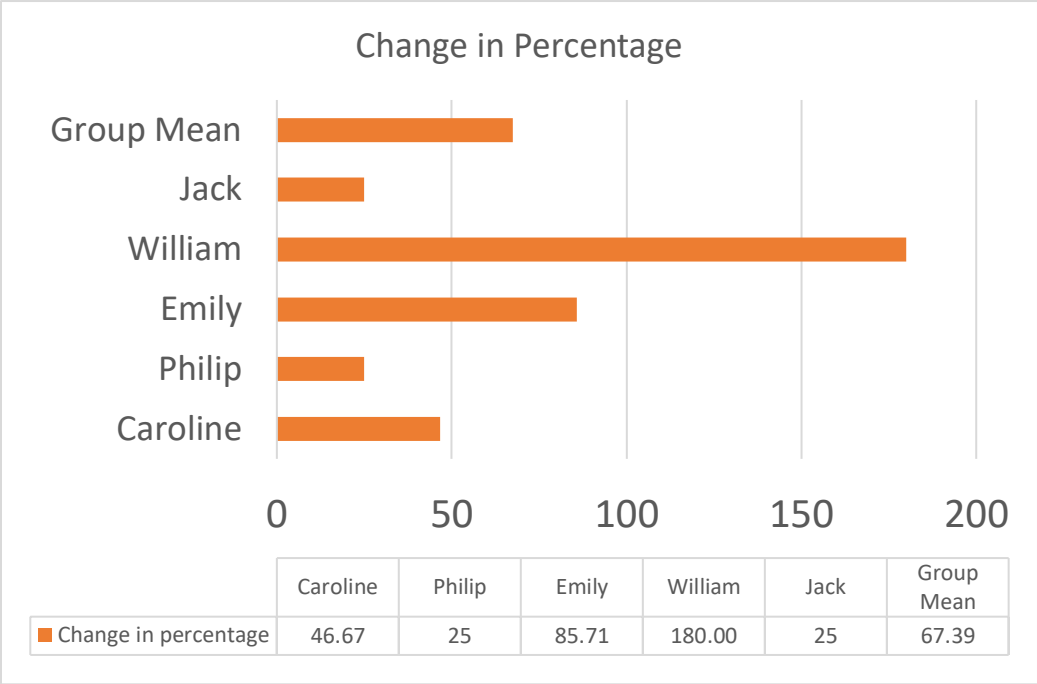


Figure 4: Pre-test vs. Post-test Scores in Numbers

The development between the pre- and post-test differ vastly between the individuals (Figure 4). For Caroline, the difference after the intervention was 7 points. For Philip, there was only a 1-point difference. Whereas for Emily, there was a difference of 12 points. William scored 9 points higher on the post-test, whereas Jack only scored 2 points higher on his post-test. Nonetheless, all the students exhibited a positive development.



	Caroline	Philip	Emily	William	Jack	Group Mean
Change in percentage	46.67	25	85.71	180.00	25	67.39

Figure 5: Change in Percentage

Figure 5 presents the development of the overall group, and each student's development, from the pre-test to the post-test in percentage change. As apparent, William experienced a 180% increase, which is the largest increase by far. Emily exhibited an 85.71% increase, which is the second biggest increase. Caroline's increase was at 46.67%. Considering the fact that she only received four out of eight lessons this is also quite interesting. Jack only increased his score by 25% on the post-test, as did Philip. The latter's results could be explained by the fact that he had a severe SLI condition paired with dyslexia, according to Loretta (see Section 5.3). Also, like Caroline, Philip changed to another school after receving only four out of the eight intervention lessons.

To counteract the maturation effect (see Section 3.5.1), as the students in 6th grade are older than the 5th graders, the students are also compared to the general score, or the mean, of their respective classes.

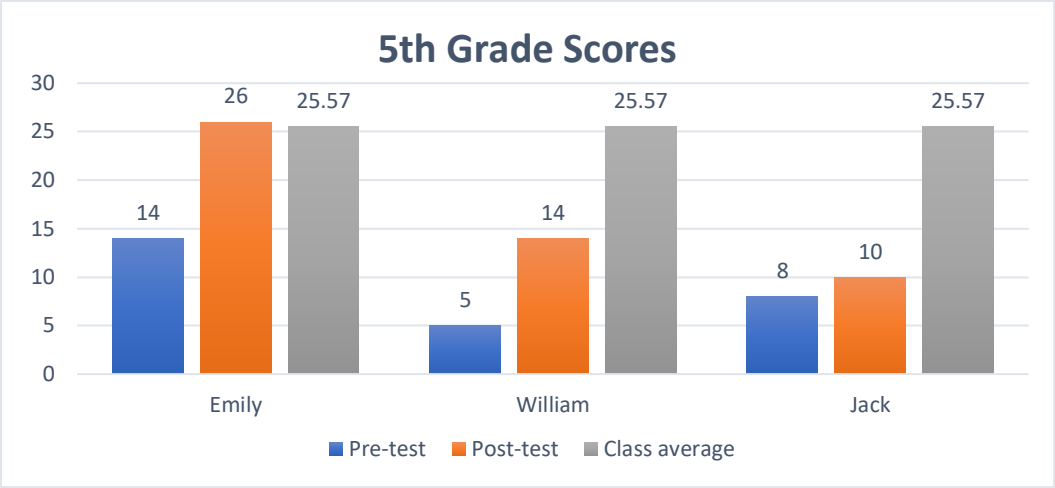


Figure 6: 5th Grade Scores

It is evident from Figure 6 that the dyslexic students in 5th grade were far behind their non-dyslexic classmates' average score on the spelling test before the intervention. The mean of the non-dyslexic 5th grade students was 25.57. When compared to their non-dyslexic classmates, all of the three dyslexic students were far behind prior to the intervention. Evidently, William scored the lowest of the three, whereas Emily seemed to be the most competent in EFL spelling of the dyslexic students in 5th grade. However, the post-test showed growth for all three students. Quite interestingly, Emily went from 14 to 26 correctly spelled words, which is slightly above the average of her class. William exhibited the highest increase but is still far behind his non-dyslexic classmates. Jack on the other hand, only spelled two more words correctly on the post-test. As such, he exhibited the smallest development among the 5th grade students.

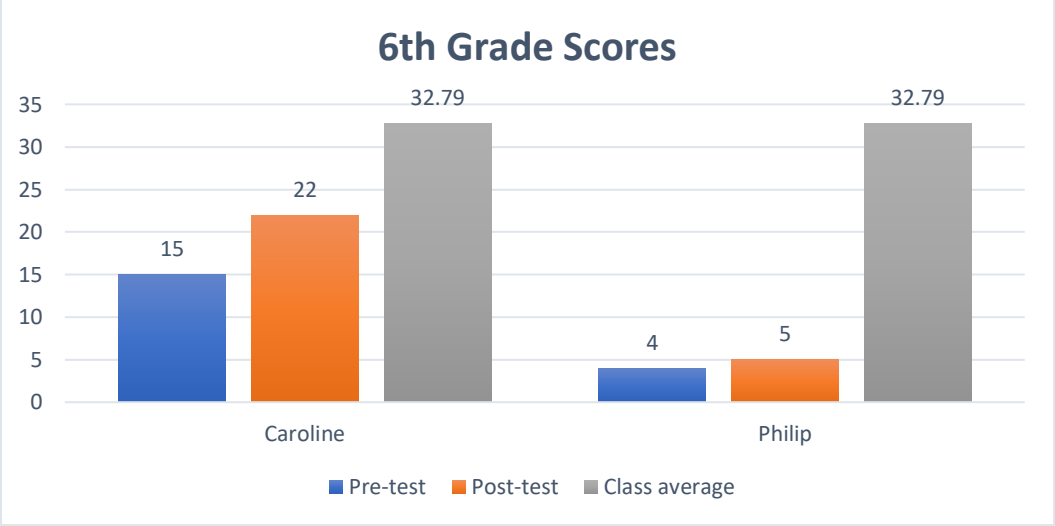


Figure 7: 6th Grade Scores

As seen in Figure 7, the mean of the non-dyslexic students in 6th grade is 32.79 points on the spelling test, which is 7.22 points higher than the mean results of 5th grade. This could be due to the effect of maturation (see Section 3.5.1). There could also be other external variables that affect these differences. For example, they have different English teachers. Although these teachers are situated at the same school, they likely employ different language teaching methods. In addition, they likely interpret the curriculum differently and emphasize different aspects of language acquisition in their teaching.

In the experimental group, as apparent from Figure 7, Caroline scored 15 points on the pre-test, which is as much as 45% of the class mean. On the post-test, however, her score had increased to 22 points, which is 67% of her class mean. This is quite an impressive increase, especially considering the fact that she only received half of the intervention. Philip, on the other hand, scored 4 points on the pre-test and 5 points on the post-test. Compared to his non-dyslexic peers this is very low and a quantitative approach to measuring his development is not sufficient. His results will be elaborated and discussed further in Section 5.1.2.5

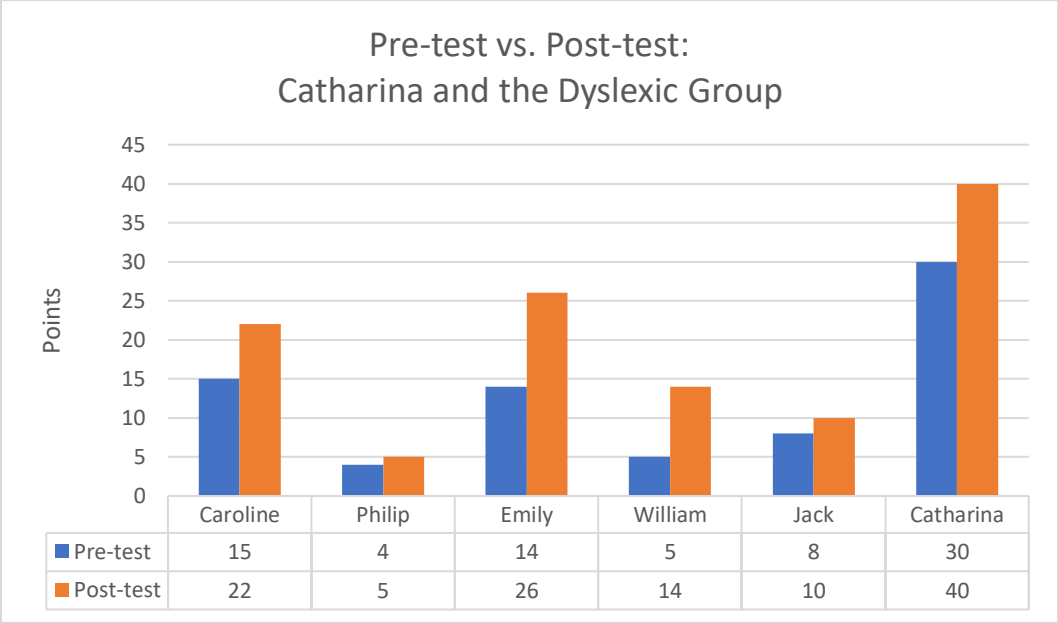


Figure 8: Catharina Compared to the Dyslexic Students

The final 6th grade student is Catharina. Her results have been excluded from the analysis of the dyslexic group. She is not officially diagnosed with dyslexia, but AD/HD. Her disorder could affect her writing, but she does not seem especially impaired when compared to her dyslexic classmates. Additionally, she could be referred to as a statistical outlier. In statistics outliers are scores or measurements that differ vastly from the other individuals within the group (Fraenkel & Wallen, 2008, p. 203. Noticeable from Figure 8 is how much higher her

score is. She had 30 points on her pre-test, compared to her classmate, Caroline, who had 15 points. In other words, Catharina scored more than double as high as Caroline. Also, she experienced a small change measured in percent (33,3%), because of her high score on the pre-test. Accordingly, she was excluded in the estimation and statistical analysis of the dyslexic group.

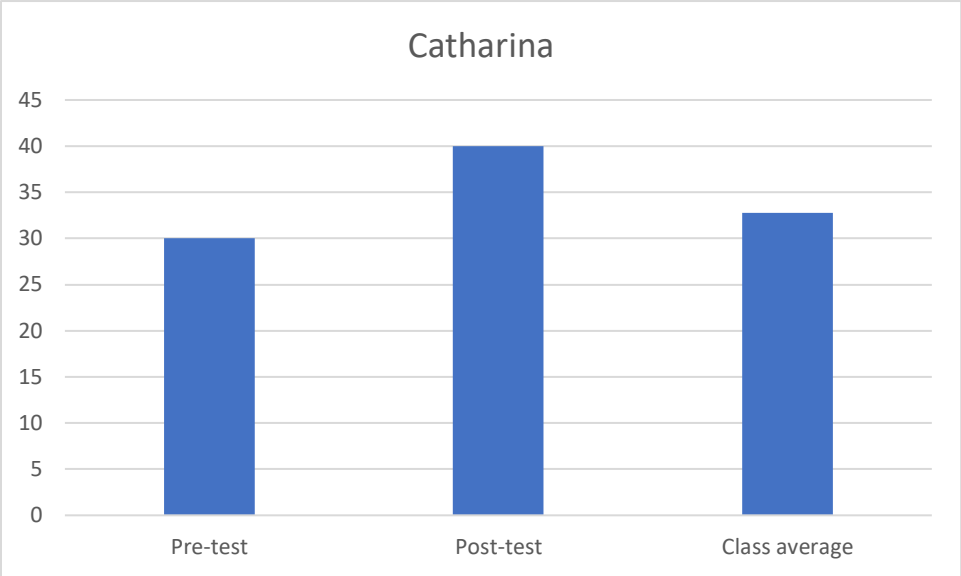


Figure 9: Catharina's Scores vs. Class Average

Yet, Catharina's results are interesting in that they show a positive development. After the intervention, she seemed to have developed her spelling. As apparent from Figure 9, she was beneath the mean score of her non-dyslexic classmates on the pre-test, but on the post-test, she rose above the mean of her non-dyslexic classmates. In other words, a non-dyslexic student benefited from the intervention. This finding could have implications for classroom practice and will be further elaborated later.

5.1.1 Statistical Analysis

							95% CI for Mean Difference		
			t	df	p	Mean Difference	Lower	Upper	Cohen's d
Post-test	-	Pre-test	2.976	4	0.041	6.200	0.416	11.98	1.331
Note. Student's t-test.									

Figure 10: Paired Samples T-Test

It is interesting to statistically analyze a small sample size. De Winter (2013) states that small sample sizes have been advised against, since they are often considered to be of low statistical

power. Also, as indicated by Cohen et al. (2011, p. 184), Type I and Type II errors are considered noteworthy issues in small sample studies. The Type 1 error refers to the failure of reporting findings of differences between measures, when the differences actually exist. Type II error refers to an actual report of differences between measures when this difference really is nonexistent. However, most educational studies involve small samples, and according to Fraenkel & Wallen (2008, p. 226) smaller samples can actually be an advantage regarding what they refer to as "practical significance". They state that in smaller samples, differences are more difficult to detect, thus the difference has to be bigger to be detected. Also, De Winter (2013) maintains that as long as the effect size in the sample is large (defined as Cohen's d= between 0.8 and 2.0), using a t-test to check the statistical significance on a sample size of 5 can be feasible. Quite notably, the t-test was actually developed for small sample sizes.

As apparent in Figure 10, the p value = 0.041. Also, the Cohen's d effect size between the repeated measures is 1.331, which is interpreted as quite large (Cohen, 2013, p. 24-25). Although the sample size is small, since the p value is below 0.05 and the effect size is interpreted as large, the difference between means can be considered statistically significant. This means that the null hypothesis, or the hypothesis that there is no difference between the pre- and post-test, can be rejected, because the statistics exhibit a statistically significant difference (Fraenkel & Wallen, 2008, p. 224).

Further analysis brings the statistical term "confidence interval" into question. Creswell (2012, p. 194) defines the confidence interval as the range of upper and lower statistical values in the observed data that is likely to contain the true mean of the population. According to Helland (2012), checking the CI is a way of finding the margin of error between the sample mean and the true population mean. A 95% certainty is often set, meaning that 95% of the time the true population value will be within the range of this interval (Creswell, 2012, p. 194). As evident from Figure 10, the 95% confidence interval for mean difference is quite large due to the small sample size, as it ranges from 0.416 to 11.98. Although it can be cautiously noted that with 95% certainty, it is likely that there will be a difference in the true population's means between the pre- and post-test, it is difficult to make any statistical inferences based on this CI, because of its width. However, because the results are interpreted as statistically significant, the effect size is large, and the mean difference between the pre- and post-test is 6.2 points, the statistical results are quite promising.

5.1.2 Qualitative Analysis of Pre- and Post-tests

In the following section interesting findings in the differences between the pre- and post-test will be presented qualitatively for each student. Incorrect spellings are marked red.

5.1.2.1 William

Word	Pre-test attempt	Post-test attempt
are	ar	are
on	å	one
what	wat	what
have	hev	have
little	litor	little
he	hi	he
ripe	rayp	ripe
next	neks	next
there	der	der
watch	varts	vads

Figure 11: William's Development

On the pre-test, William's spellings were adjusted to Norwegian phonology. Moreover, the Norwegian letters *æ*, *ø* and *å* are present in William's pre-test spellings. Figure 11 are examples of William's development in spelling between the pre- and post-test. Students in the 5th grade should be familiar with the words in Figure 11. As apparent from Figure 11, he does not use any of the Norwegian letters. His spellings are closer to those of the English orthography on the post-test. He is also more aware of sound-letter correspondence as well as the silent e in words like "are" and "have". However, his post-test also showed that he still struggles with spelling words with the /ʧ/, /θ/ and /ð/ sounds, all of which are not present in the Norwegian phonology.

5.1.2.2 Jack

Word	Pre-test attempt	Post-test attempt
next	nekst	next
born	-	born
shirt	shørt	shørt
that	det	dat
heard	hørd	hørd
he	hei	he
one	one	von
flags	flægs	flegs

Figure 12: Jack's Development

Out of the three students from 5th grade, Jack is the one who showed the least development both in scores numerically and comparatively. On the positive side, while he omitted words on

the pre-test, he attempted spelling all words on the post-test (Figure 12). However, as apparent from examples of his attempts, Jack still struggles with the English orthography. He also still uses some of the Norwegian letters in his spellings. In addition, some of the words that he wrote correctly on the pre-test were written incorrectly on the post-test. During the post-test, Jack even struggled with writing the letter *p* and asked how it was supposed to be written.

5.1.2.3 Emily

Word	Pre-test attempt	Post-test attempt
next	nekcst	next
there	ther	there
ripe	raip	ripe
ground	grawd	ground
stay	stey	stay
have	heav	have
one	von	one

Figure 13: Emily's Development

As opposed to William and Jack, Emily did not use any Norwegian letters on the pre-test, but still struggled with spelling even high frequent words, such as "have" and "one" (Figure 13). After the intervention though, Emily spelled these high frequent words correctly. She also seems more aware of the silent e, as seen in her correct spellings of the words "ripe", "there", "have" and "one". Her spelling of the word "next" on the pre-test can be described as a mix of Norwegian and English orthography, but on the post-test, she managed to spell it correctly. Also, she managed to spell "ground" correctly on the post-test. It is obvious that Emily has had a positive development in her spelling skills.

5.1.2.4 Caroline

Word	Pre-test attempt	Post-test attempt
next	nekst	nexst
on	ond	on
help	hellp	help
and	eand	and
stay	stei	stay
that	thet	that
there	wher	ther
shirt	shørt	shørt
heard	hørd	hørd
with	fif	fif

Figure 14: Caroline's Development

All words in Figure 14 should be familiar for a student in the 6th grade. Yet, as evident, Caroline even spelled words from the McNally wordlist, specifically "and", "that", "on", "there", wrong

on the pre-test. The words “help”, “next” “stay” should also be familiar but were spelled incorrectly. As illustrated in Figure 14, she got five out of the seven aforementioned words correct on the post-test. She spelled the word “next” as “nekst” on the pre-test. This spelling is adjusted to Norwegian phonology, as the letter x is considered foreign to the Norwegian language. The letter is only present in loan words and the /ks/ sound is generally represented by k and s. On the post-test Caroline wrote “nexst”, which is somewhat closer to the English orthography, but the extra “s”, makes the spelling a mix of Norwegian and English orthography. Her spellings are closer to the English orthography on several of the words that are not spelled properly in their entirety. She has become better at hearing the /θ/ and /ð/ sounds, but her spelling attempts of the word “with” illustrates that Caroline is not completely aware of how the sound is spelled. Additionally, Caroline used the Norwegian letter *ø* in her spellings of the words “heard” and “shirt” on the post-test. Still, after only receiving half of the intervention, her development in spelling skills is quite positive.

5.1.2.5 Philip

Word	Pre-test attempt	Post-test attempt
letter: H	A	H
on	on	ån
people	pel	pipol
antique	ek	antik
beautiful	btifo	budfol
are	rar	ar
born	bå	bon
and	ed	æd

Figure 15: Philip's Development

Assessing Philip’s development is difficult, because the comparison shows no significant development, especially quantitatively. Also, his handwriting was rather difficult to assess, because he appeared to write letters within letters on multiple of the test items. An example of this is illustrated in Figure 16. The word “people” was dictated, and the figure shows his response to the dictation on the pre-test. It seems that he wrote the letter i within the letter e.

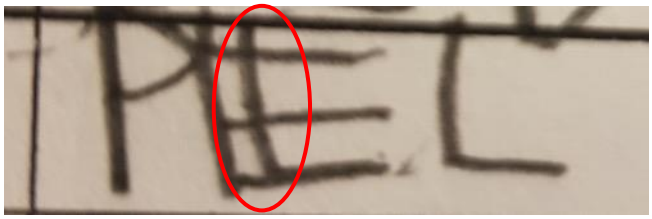


Figure 16: Philip's Handwriting

Overall, Figure 15 shows that Philip struggles particularly much, in comparison to his peers, as well as compared to the 5th grade pupils. He does not seem to have control over neither the

English, nor the Norwegian orthography or phonology. After the intervention he showed some improvement in getting letter names correct but struggled with spelling even high frequency words. He also used Norwegian letters on the post-test, which further proves his difficulties with the English orthography. On the other hand, it is possible that he could have done better on a computerized test like the English 2 Dyslexia Test.

5.1.2.6 Catharina

Word	Pre-test attempt	Post-test attempt
letter: H	A	H
Letter: I	E	I
spell	spel	spell
antique	and teak	antique
shirt	shert	shirt
ripe	raep	ripe
watch	watsh	watch

Figure 17: Catharina's Development

Catharina struggled with letter names prior to the intervention, as evident from Figure 17, but got these letters names correct on the post-test. She also improved her spelling of irregular words such as "antique" and "ripe" between the pre- and post-test. Catharina seems to have become more aware of sound-letter correspondence and silent letters. She also seems to have become better at the /ʧ/ sound, as apparent from her respective pre- and post-test spellings of the word "watch".

5.2 Observational data

Accounts of significant events throughout all lessons are presented in this section. These events are used to explain the results of the pre- and post-tests. The observational data also aids in answering the research question regarding the motivational and emotional aspect of the intervention.

5.2.1 Lesson 1

In the beginning of the first lesson, the Sp.Ed explained the intervention schedule, by a visual in form of a road map (see Appendix H). When activities commenced, the boys from 5th grade, Jack and William, were not present. They came late and did not receive most of this intervention lesson. The students, and Catharina in particular, expressed that they thought a repetition of the alphabet was unnecessary. However, their pre-tests showcased a need for practice, when this was made explicit to them, they all participated. The lesson included visual, auditive, tactile

and kinesthetic practice. Loretta expressed that the activities seemed useful and educational for the students. Overall, it seemed that repetition of the alphabet was useful for the students and the letter name focus appears to have improved the post-test results of the letter names.

5.2.2 Lesson 2

There was an upheld between the first and the second lesson, because of difficulties in scheduling, which were due to various extracurricular activities. During this lesson, several of the students were distracted. In particular, William seemed especially unmotivated this lesson. While Philip and Jack were both a bit distracted, they finished their tasks, but William had to do some of the tasks with the special ed teacher at a later time. The girls were able to work during most of the class. William, Jack and Philip distracted each other a lot, which seemed to annoy Catharina. Subsequently, after this lesson, the special ed teacher and I agreed that the group should be split in two, especially for the sake of the boys' focus and thereby their learning. Thus, Emily, Philip, Catharina and Caroline were one group (Group A), as were Jack and William (Group B). Even though concentrating was a bit difficult for several students, it seemed that the activities were useful because the students became more aware of the individual sounds in words.

5.2.3 Lesson 3

Catharina was a bit distracted at the beginning of the lesson but gained concentration throughout the lesson. The lesson focused on phonological awareness through sound distinguishing worksheet and finding odd ones out in rhyming activities. These activities seemed mostly accessible. Finally, the Book Creator task (see Appendix K) included a few words that appeared to be difficult for the students, but the task seemed generally accessible. Group B struggled with their concentration during this lesson. Because William had forgotten his iPad at home they had to work together. Furthermore, Jack spent a lot of time on finding pictures, which seemed to distract William. When Loretta supported and encouraged them heavily, they managed to finish the task. William, in particular, seemed to exhibit skills in finding words that rhyme during this lesson. Although Group B was a bit distracted during parts of the lesson, both Jack and William expressed that they enjoyed the lesson and that they understood why they had to practice rhymes. Group A exhibited greater inner motivation, as they all expressed a wish to become better in English. The students overall exhibited a further increase in their phonological awareness.

5.2.4 Lesson 4

Lesson 4 deviated from the lesson plan, since Loretta introduced the idea of the pupils writing on their groupmate's backs. The task instruction was that student A wrote on another student B's back, then student B had to guess what the word was. The pupils all expressed motivation towards this activity. Later, they built words with WikkiStix in different colors for the separate sounds. Student Task 1 is an example of how they built the words. When they had finished building the words, they took pictures of their creations and put the pictures in Book Creator. Finally, they recorded themselves saying the words. Both groups worked well and seemed motivated. Overall, the lesson included visual, tactile and kinesthetic sensory channel stimulations. This was the last lesson Loretta was able to find time for before Christmas. Also, it should be noted that this was the final lesson for Philip and Caroline, who both switched schools right before Christmas. This lesson seemed particularly motivating for the students, as they got to work with English through various types of activities, different to the approaches they were used to.

5.2.5 Lesson 5

In lesson 5, we joined the two groups again, since both Philip and Caroline had moved. Jack struggled with his attention and concentration during this lesson, but the lesson went fine. The students expressed that they wanted more English lessons, thus the intervention seemed to have a positive effect on their motivation towards English language learning. This lesson focused explicitly on minimal pairs through teacher explanation, different worksheets, and finally an auditory minimal pairs bingo. The worksheets seemed to be accommodated and kept a focus on phonological awareness through coloring words according to their sounds. Jack exhibited development in phonological awareness throughout this lesson and was especially good at a distinguishing task. William worked effectively with each task, as did Emily and Catharina. During the auditory bingo all of the students struggled with the difference between "reach" and "rich", but other minimal pairs seemed to be more comprehensive. Throughout this lesson, the students seemed to exhibit greater understanding of sound-letter correspondence.

5.2.6 Lesson 6

The first activity included a game called "Ninja Phonics Race", which provides opportunity to practice phonics through rhymes and phonemes in a playful way. The students expressed enjoyment during this activity. Silent E was also practiced through explicit explanation,

auditory presentation and worksheet from the English Sounds Fun workbook developed by well-known expert, Dr. Anne Margaret Smith, and Anastasia Metallinou (see Appendix K for an example). There was also an auditory discrimination practice worksheet. During this lesson William was struggling with his concentration. Both Jack and William resigned from the activities. Jack and Catharina also got into an argument, which prompted Loretta to split the group again. She brought William and Jack to another room, while I had to finish the intervention lesson with Emily and Catharina. Thus, for the last half of this lesson, I became not only the observer, but the teacher as well. When the boys left, the girls worked well. The girls expressed that they felt distinguishing between sounds in words had become easier. Loretta expressed that the boys struggled with their attention throughout the lesson. She completed the activities with them at a later time. For the remaining lesson, the groups were split. Throughout the lesson with Emily and Catharina, it became apparent that both students became more proficient in the silent e spelling pattern. This lesson could have affected words on the spelling test with the silent e spelling pattern.

5.2.7 Lesson 7

Lesson 7 focused explicitly and only on the two "th" sounds, because all students struggled with these on the pre-test. These sounds are not present in Norwegian phonology and the pre-tests showed how they all, except for Catharina, switched the sounds for "v", "d" and "w". Again, the students expressed a desire for more English lessons. The activities were varied through explicit instruction, auditory distinguishing tasks on worksheets and a Smartboard. The pupils also built words with "th" sounds. The lesson seemed motivating, because it was varied enough. The activities appeared to cause an increase in their awareness of both the sounds. The explicit focus on the two sounds could have affected the results on the post-test with respect to words with this particular letter combination.

5.2.8 Lesson 8

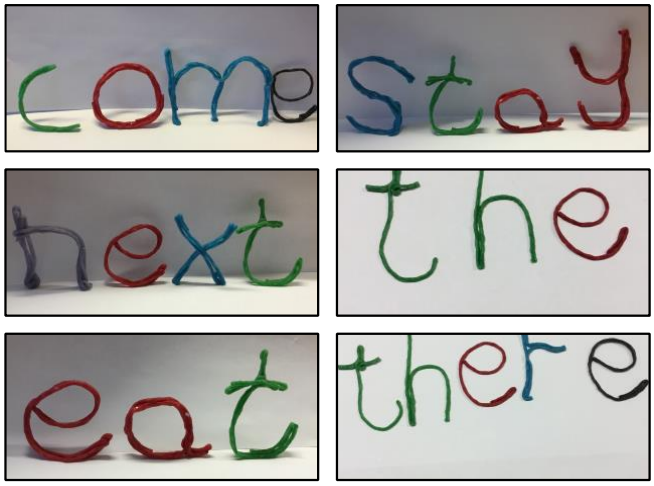
Lesson 8 was a repetition lesson but introduced the familiar "Look Cover Write Check" spelling activity, with a modification. We brought tracing into the activity. The lesson also incorporated Quizlet, as this is also a web app for practicing words that is advocated for. The students wanted to compete with each other on Quizlet, which was further motivating. William, who often was the most unmotivated was excited about beating his own records. When all students had left after the lesson, William came back to show us how much faster he had become at matching the English word with its Norwegian translation. Quizlet was apparently a very appropriate

technological tool to finish the intervention with, due to the motivation it clearly brought forth. As the words that were practiced were on the spelling test, this could have positively affected the results of the post-test.

5.3. Semi-structured Interview

The semi-structured interview with the special education teacher was conducted after the post-test. The interview was performed in Norwegian, because this is Loretta's native language. Thus, I have translated some of her statements from the transcription of the interview, as well as summarized the most important findings hereunder. The transcription in its entirety can be found in Appendix F.

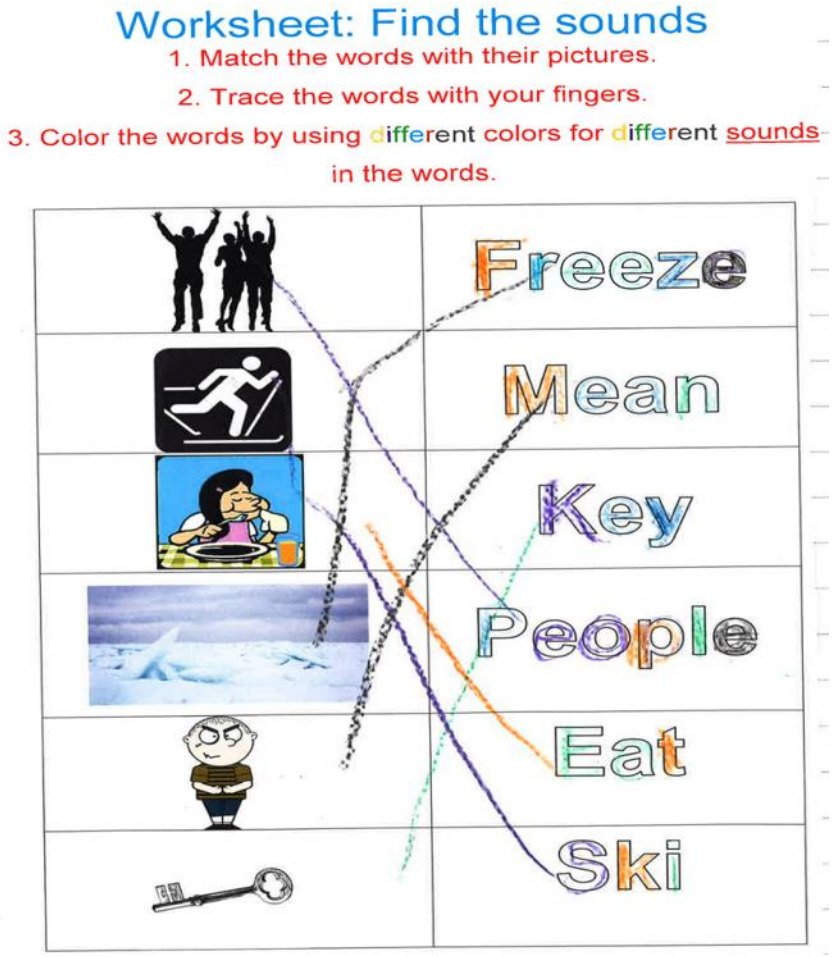
When asked what her overall opinion of the intervention was, Loretta said that "the overall impression has been that there have been varied and very multisensory tasks". Furthermore, she said that most of the students within the group struggle with their attention, but the tasks motivated them. Regarding the tasks' level of difficulty, she replied that the tasks were successfully accommodated. Loretta was also asked what type of activity she thought was the most useful for the students, with regard to the learning outcome.



Student Task 1: Lesson 3

She expressed that the WikkiStix task (see Student Task 1 above) seemed to be the most useful, because "they got to use their creativity and shape the words that were presented beforehand".

She also stated that the students "learned a lot from instruction when they colored and became familiar with the sounds". In this statement she is referring to the phonological awareness worksheets. An example of such a worksheet is Student Task 2 as completed by William.



Student Task 2: Lesson 2

When Loretta was asked to describe each student and elaborate on their development, she said: "I think everyone has had huge developments, especially William. William has been the most surprising. He had the greatest development and he is the one who was the most unfocused." In sum, she highlighted William as the student who had the biggest development, and added that it was surprising, as he was extremely unfocused at times. During the interview Loretta claimed that William's had improved his understanding of silent e. She also explained that William's dyslexia is comorbid with TS and SLI.

Regarding Jack, Loretta disclosed that "Jack has a lot of mistakes because of his dyslexia, and he has ADD in addition". In Section 2.5.1 it was concluded that "ADD" is part of the continuum AD/HD. It was also stated how individuals with AD/HD can have deficits in either attention, or hyperactivity solely, but also deficits with regard to both aspects. However, because Loretta

said he has “ADD”, he does not seem to exhibit any hyperactivity. Loretta further described Jack as quite thorough in his work. She thinks he has a strength in his creativity. She also expressed that “he learned a lot and is very interested in the connection between the sounds and the letters”, but she would like for him to further develop his reading skills. His classmate, Emily, exhibits no comorbidities and seemed very positive towards the intervention.

Furthermore, Loretta observed an increased awareness in sound-letter correspondence for Philip and Caroline, even though they moved after the fourth lesson and thus did not receive the entire intervention. Caroline is diagnosed with dyslexia, whereas Philip exhibits comorbidity. Loretta explained that Philip “increased his skills the least, but in a way, he had the most difficult preconditions. He had a lot of specific language impairment, in addition to dyslexia”. Despite Philip’s difficulties, Loretta reported positive development: “I noticed that after the first lesson, he thought more about where the sounds came from in other lessons that I worked with him.” In other words, the Sp.Ed observed a greater phonological awareness in Philip in other lessons.

As previously mentioned, Loretta wanted to include Catharina, who is not officially diagnosed with dyslexia. In the interview she expressed that Catharina was in part included as a support for Caroline, but she also thought Catharina would further develop her English skills through her participation. As disclosed by Loretta, Catharina has AD/HD. This could affect her writing skills. “I have been to courses at Statped (a national special education service), and read a little regarding this, and I have seen that very many with AD/HD struggle with dyslexic symptoms also, because they are very unfocused and think about several things at the same time.”, Loretta explained. Furthermore, the Sp.Ed elaborated by saying that “I have seen her mapping tests. On the word chain test, she scored in the Stanine 5 category”. Incorporating stanines is a way to scale test scores on a scale from 1-9, where 1 is the lowest, 5 is the mean, and 9 is the highest score. It is also reported that low scores on word chain tests correlate with low scores on reading comprehension tests (Lundetræ & Mossige, 2017). As Catharina is placed on stanine 5, Loretta maintained that she would like her student to advance on the scale. After the intervention, Catharina did not increase her score from the pre- to the post-test as extensively as for example Emily, but Loretta has observed positive development. Regarding Catharina’s development, Loretta said that “She says something, then stops to think about how the sounds are interrelated”. In other words, Catharina seems to have increased her phonological awareness,

as she has exhibited an increased understanding of the individual sounds in words and their corresponding letter combinations, according to Loretta.

When asked about the reception of the intervention, Loretta also stated that there has been positive feedback regarding the project. Especially Catharina and Emily have expressed an enormous positivity. According to Loretta, Emily had said that "she feared English before, but now she looks forward to it". In addition, "even William, has said that it has been the best lesson he has been in for a long time", Loretta stated. This seemed to surprise Loretta the most, because according to her, William is rarely positive towards lessons, as everything is described as "boring". Loretta also stated that he does not offer much effort in regular class, which made her astounded by his efforts during the intervention. Thus, his positivity towards the intervention is especially encouraging. It is also notable that Jack has asked Loretta for more lessons in the same vein as those of the intervention.

Finally, Loretta anticipates that the activities from the intervention could be employed in a whole class setting as well. As the lessons were explicit and structured, she proposed that a lot of students could respond well to the activities regardless of whether they have SpLDs or not.

5.4 Questionnaires

It has to be noted that Philip and Caroline did not respond to questionnaire before they changed schools. However, they both expressed positivity towards the intervention after the post-test was administered. Except for Philip and Caroline, the rest of the group completed the questionnaire after the post-test was administered. The questionnaire itself can be seen in Appendix D.

5.4.1 Part One

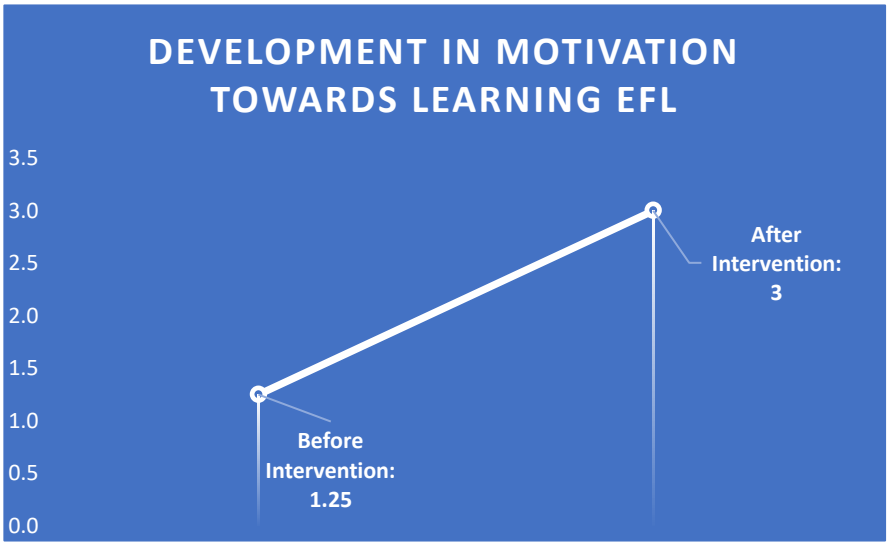
The analysis of the questionnaire can be divided into two parts. During the first part of the questionnaire the students were asked to respond to questions, which are referred to as "items", on a scale from 1-4, where 4 is best. The tendencies of part 1 are presented on a scale from 1-4 in Table 2 and analyzed in this section. Afterwards, the latter part of the questionnaire is represented visually.

Item Number	1	2	3	4	Mean Score
Item 1: Letter names		1	2	1	3
Item 2: Capital/Small letters				4	4
Item 3: Writing words		1	3		3
Item 4: Silent E			3	1	3
Item 5: Writing «th» words	1	1	1	1	2.5
Item 6: Identifying sounds		1	2	1	2.75
Item 7: Rhymes			2	2	3.5
Item 8: Sound-Letter mapping	2		1	1	2.25
Item 9: Pronouncing the «th» sounds	1	1	1	1	2.5
Item 10: Distinguish between "th" sounds and other sounds	1	2	1		2
Item 11: Attitude and motivation towards EFL prior to the intervention	3	1			1.25
Item 12: Attitude and motivation towards EFL after the intervention		2		2	3
Item 13: Level of motivation that the activities brought			2	2	3.25
Item 14: Competence in English prior to the intervention	2	2			1.5
Item 15: Competence in English after the intervention		2	1	1	2.75

Table 2: Questionnaire Part One

The scoring of Item 1 shows that the students seem more aware of the English letter names, as the mean score is 3. The third item considers the ability to write words in a creative manner such as building the words through WikkiStix or painting them. 3/4 students scored this questionnaire item as 3, whereas 1 evaluated their ability as a 2. Spelling words with silent E seemed fairly simple, as the mean score is 3 on Item 4. However, Item 5 illustrates that most of the students are insecure in their ability to write words with the "th" letter. The mean score of Item 5 is 2.5, but Catharina scored 4. The mean score would be 1.5, if Catharina's score was not taken into consideration. The mean score of Item 6, which is 2.75, demonstrates how each student feels confident in identifying and coloring each sound in a word. The mean score regarding rhymes (Item 7) is 3.5, which shows that the students are quite confident in regard to rhymes as well.

Item 9 shows the mean score of 2.5, which demonstrates the students' difficulty in pronouncing the "th" sounds. Distinguishing between these sounds and other familiar sounds seems challenging, as the mean score of Item 10 is 2.

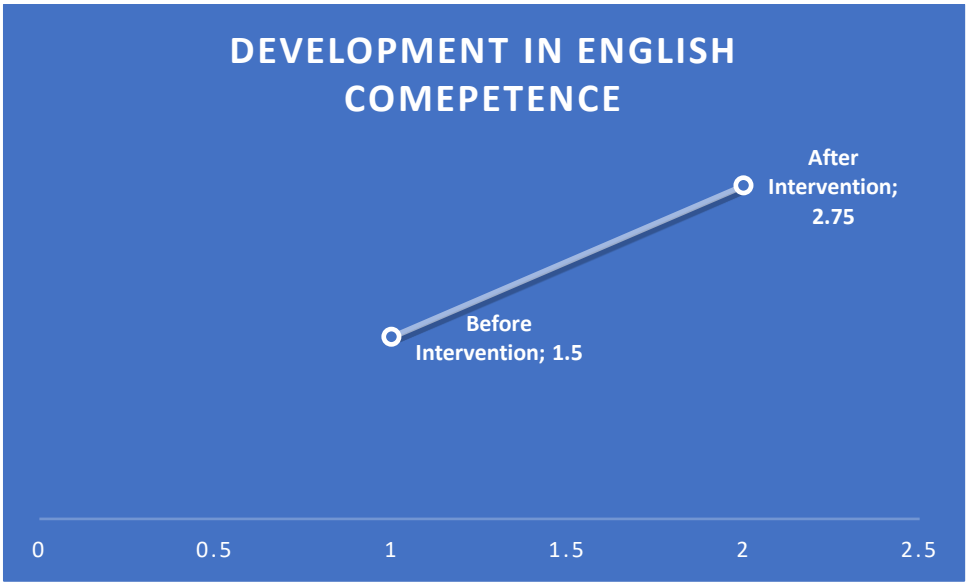


Graph 1: Development Between Item 11 and 12

Item 11 and Item 12 regards attitude and motivation towards English prior to and after the intervention respectively. Graph 1 illustrates that there has been a general improvement of these emotional aspects. According to the students, the mean score of their attitude and motivation towards EFL was 1.25 prior to the intervention. All students chose 1, except Catharina who chose 2, which produced the mean score of 1.25. There are positive tendencies after the intervention, as Item 12 shows that all students report more positive attitude and a gain in motivation after the intervention. Both Catharina and Emily scored Item 12 as 4, whereas Jack and William scored 2, thus the mean score went from 1.25 to 3. Item 13 regards the level of motivation that the tasks brought forth within each student and was scored 3.25 on average, but both Catharina and Emily chose 4, and Jack and William chose 3. As such, it is implied that the tasks were fairly motivational for the students.

Item 14 and 15 are of particular interest, as they measure each student's subjective analysis of their level of competence in English in general before and after the intervention. Graph 2 shows a comparison of the mean scores of Item 14 and Item 15. As apparent there was an increase from 1.5 to 2.75, which is almost a doubling of the score. The results indicate that the group in general seems to think that they have benefited positively from the intervention. More specifically, Emily went from 2 to 3 (50% increase), Catharina went from 2 to 4 (100%

increase), whereas both of the boys went from 1 to 2 (100% increase). Although the sample is especially small, this is a very promising result.



Graph 2: Development Between Item 14 and 15

Overall, it seems that there are very positive tendencies within the first part of the questionnaire. The feedback provided by the students denote that the intervention was successful according to their point of view. The second part of the questionnaire is analyzed below.

5.4.2 Part Two

Within the first task of Part Two, each student chose whether the tasks that they were presented with were a) too difficult, b) too easy, or c) challenging, but not too difficult. As apparent from Figure 18, all participants chose option c. This result implies that the tasks were successfully accommodated.

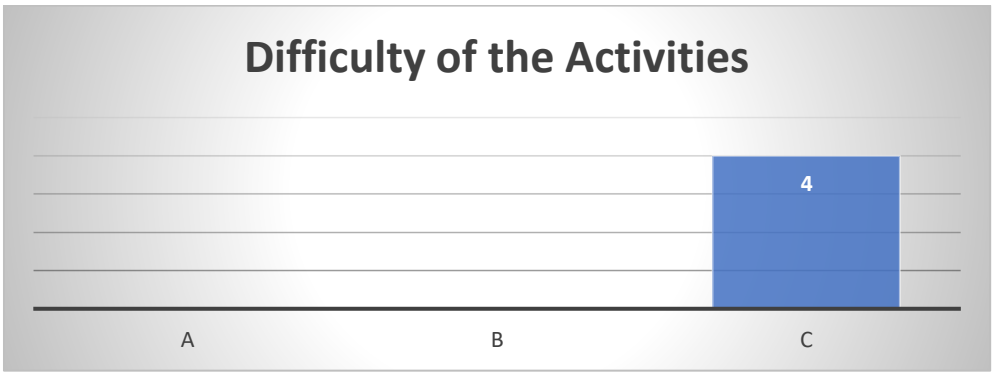


Figure 18: Difficulty of the Activities

Subsequently, they were to tick boxes with the activities that they liked. As apparent in Figure 19, all students expressed enjoyment towards activity b) Ninja Phonics Race board game, e) writing words on each other's back, and f) Building words with WikkiStix after their sounds. Whereas all except William enjoyed g) painting words.

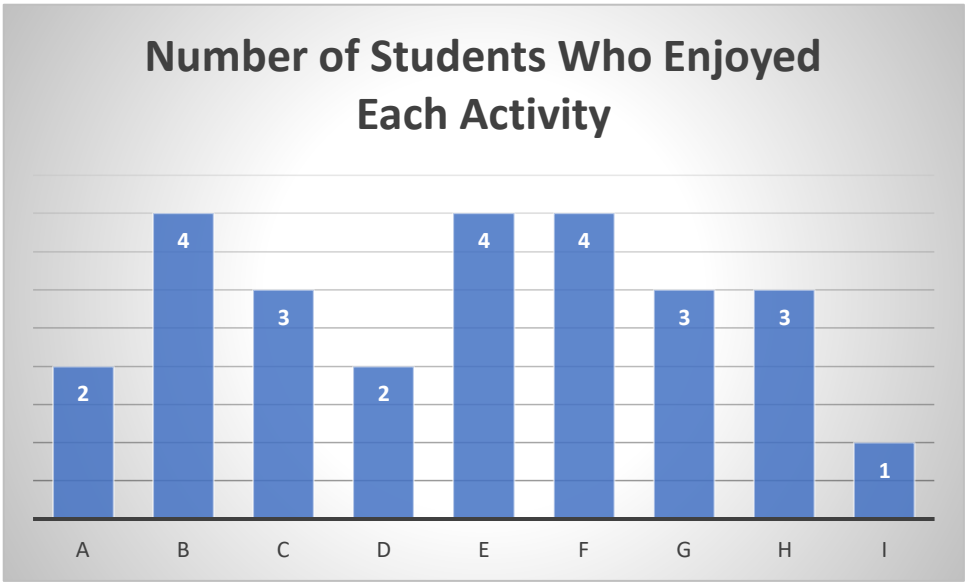


Figure 19: Number of Students Who Enjoyed Each Activity

In Item 20 (See Figure 20), the students were also asked which three activities that were most educational for them. Catharina and Emily agreed that Ninja Phonics Race and coloring worksheets were especially educational, as for the last selection, Catharina and Emily chose the Smartboard sorting activity and building words with WikkiStix after their sounds respectively. Jack and William agreed with Emily that the WikkiStix activity was especially educational also. However, the boys differed in their subsequent choices. William thought writing on each other's backs and the alphabet bingo was the most educational, whereas Jack accentuated painting the words in different colors and agreed with Catharina and Emily that Ninja Phonics Race was educational.

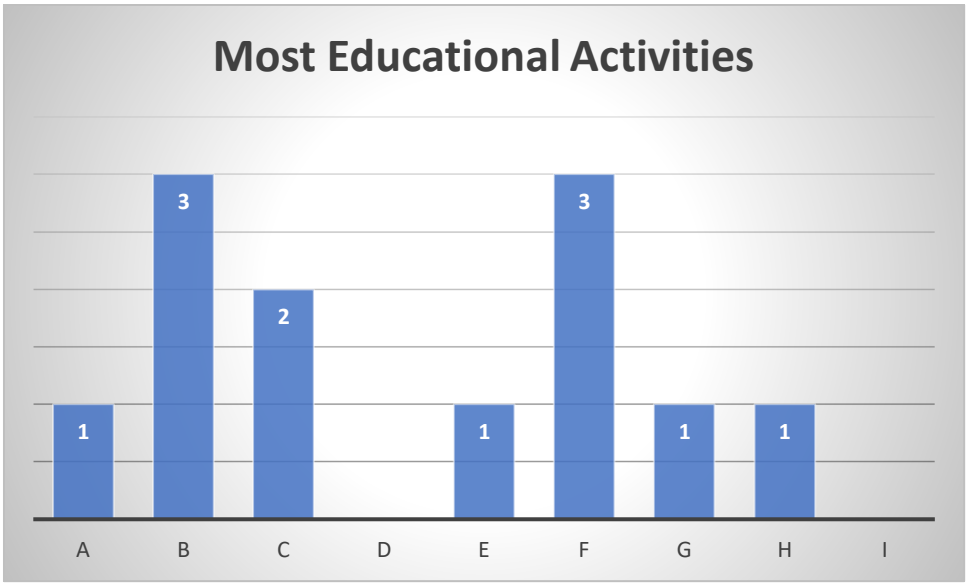


Figure 20: Most Educational Activities

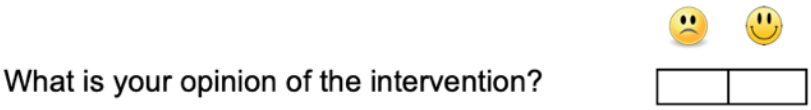


Figure 21: Evaluation of the Intervention

Finally, each student was asked to rate the intervention in accordance with Figure 21. All four students chose the latter option, which further supports the notion that the intervention was a success.

5.5 Summary of Findings

There are several noteworthy findings across the triangulated data collection methods. Like stated initially in the 5th section, the main data are the spelling tests. Between the baseline and final assessment, an increase in the amount of correctly spelled words was observed within the dyslexic group overall. The statistically significant difference in means between the pre- and post-test is 6.2 points, which entails a 67.39% increase. As a whole, the development is very positive. Still, there were vast differences in improvement between individuals, ranging from marginal at best, to particularly considerable. The scores of Philip and Emily can viewed as two separate ends of the scale. The former scored 4 points on his pre-test and 5 points on his post-test, whereas the latter scored 14 points on her pre-test and 26 on her post-test. Philip scored far below any other group member and is evidently far behind his non-dyslexic peers. Emily, on the other hand, has the highest score among the dyslexic individuals, and the second biggest increase, and is actually at approximately the same level as her non-dyslexic classmates after

the intervention. This is a particularly interesting finding. Yet, the most surprising finding of the study is William's extensive development. Even with several neurodevelopmental disorders (see Section 3.3), he had the strongest increase in the entire group, as he went from 5 to 14 points, a 180% increase. The quantitative data was corroborated by the interview with the Sp.Ed, who highlighted William as the one who benefited the most from this study. However, the student questionnaire, which was administered after the post-test, showed how Emily and Catharina evaluated their developments in a more significant manner than William. Possibly due to the fact that they exhibited greater proficiency at both the baseline and final measurement.

Also, Catharina, the non-dyslexic learner in the group had a positive development. Although, as verified by Loretta, Catharina did not experience a development as significant as Emily, she went from 30 to 40 correctly spelled words. This means that she is beyond the mean score of her classmates with no SpLDs. Also, she was way beyond her groupmates at baseline and could be considered a statistical outlier. This illustrates a difference between non-dyslexic students with AD/HD and dyslexic learners.

Jack did not display an especially significant development in his spelling ability after the intervention. He scored eight points on the pre-test and 10 points on the post-test, which is a 25% improvement. In addition, even after the intervention, he used Norwegian letters in his spellings of several words. Philip had the same increase as Jack but went from 4 to 5 points, which is practically insignificant. Quantitative comparisons of the pre- and post- spelling test did not establish any noteworthy development in regard to Philip's phonological awareness nor spelling. On the other hand, the qualitative comparisons are somewhat more promising. Moreover, Loretta saw improvements regarding Philip's phonological awareness that the spelling test did not explicitly establish.

Between the baseline and final assessment, several of the participants improved their spellings, even in words that were not spelled completely correct. Again, William had the most positive development, as he used Norwegian letters on his pre-test, but did not use any of these on his post-test. Still, both Jack, Philip and Caroline produced spellings with Norwegian letters on both their tests. Moreover, there seems to have been an advantage for those who received the entire intervention, as both Caroline and Philip did not extend their spelling skills as much as

Emily and William. It also seems that students with comorbid disorders exhibited greater impairments than students with dyslexia as the sole difficulty.

Another important finding comes from the questionnaire responses and the observation data. It seems that the intervention has brought forth an increase in the motivation towards learning EFL in all students, although their self-evaluated development in scores are somewhat dispersed. The Sp.Ed also reported increased motivation in students.

6. Discussion

The present study investigated the effect of multisensory EFL instruction on spelling skills and motivation for Norwegian dyslexic 5th and 6th grade students. As evident from Section 2.4, dyslexic learners display a range of behavioral patterns. These patterns, or symptoms, are likely to differ with age and maturation, but also between learners. Yet, dyslexia is typically characterized by reading and writing, or more specifically spelling difficulties. Research has shown that reading skills can be successfully improved but spelling deficits seem to prevail throughout life. Therefore, spelling is the most persistent difficulty for dyslexic learners.

The act of spelling is complex, because it requires alphabetic knowledge and phonological awareness is expected. Essentially, one is expected to associate graphemes with phonemes. It is also required that the learner is able to retrieve words from their lexicon and remember how to spell them (see Section 2.8). Spelling is especially difficult for dyslexic learners, because their phonological awareness is impaired (see Section 2.4).

6.1 Development in Spelling After the Intervention

Scientific articles regarding spelling interventions in the field of dyslexia and EFL are not abundant. Therefore, the current study investigated the effect of specific English didactics on spelling development for dyslexic learners. To check the improvement in spelling ability, a spelling test was administered prior to and after the intervention. The spelling test was checked statistically for reliability by means of a computer software, which established its reliability as a test battery (see Section 3.5.2).

The overall group score of the spelling pre- and post-tests differ significantly, with the mean scores being 9.2 and 15,4 on the pre- and post-test respectively, which is a 67.39% surge in mean scores. Considering the relatively short duration of the intervention, this is certainly a positive difference. Moreover, a paired t-test showed positive statistical tendencies between the two assessments, as the difference between the pre- and post-test is statistically significant (see Section 5.1.1). These results provide important evidence in favor of multisensory instruction for dyslexic learners. Still, there were noteworthy differences in the spelling development between the individuals in the group. This finding is consistent with the opinion that interventions or accommodations should ideally be adapted to the needs of each individual (Section 2.8).

In particular, the development that William displayed is especially encouraging. He scored 5 to 14 points on the pre- and post-tests respectively (Figure 6). Prior to the intervention he seemed to struggle especially much with the English orthography, but he increased his correct spellings by 180% on the post-test. Although William still is behind his non-dyslexic classmates in terms of spelling skills, his development is extremely impressive. Furthermore, on the pre-test William used the Norwegian letters *æ*, *ø* and *å* multiple times in his spellings, but not at all on the post-test. He clearly displayed an exceptionally positive progress in his alphabetic knowledge. William also appears to have become more aware of the silent e spelling pattern after the intervention. For example, he spelled the words "ripe", "little", "have" and "are" incorrectly on his pre-test, but correctly on his post-test (see Section 5.1.2.1). Because silent e was an explicit focus point in Lesson 6 of the intervention, this development is likely due to the intervention. Additionally, William's spelling attempts of several words, although incorrect, are closer to the English orthography on his post-test (see Section 5.1.2.1). In response to the questionnaire, he thought that his English skills had improved after the intervention (Section 5.4.2). Loretta also considered his development the most impressive development, which was surprising to her (Section 5.3). Therefore, it appears that the intervention was successful for William.

Emily's development is the second most impressive. The quantitative analysis of differences between pre- and post-tests showed that Emily scored 14 and 26 on her pre-test and post-test respectively, which is a difference of 12 points. Measured in percentage, her development is 85.71%. This is a large increase and Emily is actually above the mean score of her non-dyslexic classmates, though by a small margin (Figure 6). Unlike her dyslexic 5th grade classmates, Emily did not use Norwegian letters in any of her spellings on neither the pre-test nor the post-test. This indicates that Emily's alphabetic knowledge is sufficient. On her pre-test, Emily only spelled two out of seven high frequency words from the McNally Wordlist correctly, whereas on the post-test five out of seven were correctly spelled. Additionally, Emily also seems to be more aware of silent e spelling patterns after the study (see Section 5.1.2.3). Emily herself was tremendously positive towards the intervention. She evaluated her English skills as improved due to the intervention. She also stated that she was apprehensive about English lessons before but looks forwards to them now.

Even Caroline, who only received four out of the eight intervention lessons, improved her score significantly on the post-test. She spelled 15 words correctly on the pre-test but displayed a 7-point difference on the post-test. Measured in percentage this is a 46,67% increase. As the mean score on the spelling test for her non-dyslexic classmates was 32.79, Caroline is evidently still behind her class. However, she did not receive the latter half of the intervention, which could explain why she did not further develop her spelling skills. Also, after only four lessons, she gained on her classmates substantially. Yet, Caroline seems to still require further assistance to further improve her spelling skills. For instance, when the word "next" was dictated, she spelled it as "nekst" on the pre-test. This spelling could be explained by the fact that, in Norwegian, the letter x is a foreign letter only present in loan words. Thus, Caroline could have been unfamiliar with spellings of words with the /ks/ sound that the letter x represents in "next". Caroline spelled the word as "nexst" in her post-test, which could be characterized as a mix between English and Norwegian orthography. In addition, when the words "shirt" and "heard", transcribed as: /ʃɜ:rt/ and /hɜ:rd/ respectively, were dictated, Caroline spelled these by using the Norwegian letter *ø*, consequently she produced the "shørt" and "hørd" spelling attempts. She seems to confuse the /ɜ:/ sound, with the similar sounds that the Norwegian letter *ø* represents (see Section 2.7). In other words, Caroline adjusted her spelling to Norwegian orthography on these spellings. Though she displayed a significant improvement in her spelling score, the aforementioned spelling attempts show that she is not proficient in the English orthography yet.

Jack, on the other hand, did not demonstrate a particularly apparent development in his spelling skills. He spelled eight words accurately on the pre-test and only two more words correctly on the post-test, which entails a 25% increase. At best this difference is marginal. However, Jack gave up on spelling several words on the pre-test, but not on the post-test, which is positive. Still, this variance could be explained by his attention problems. Therefore, making an inference that the difference was caused by the intervention would be exceedingly enthusiastic. Nonetheless, Jack seems to be more proficient in regard to letter names, because he wrote *l* for *h* and *a* for *i* on the pre-test but wrote the correct letters on the post-test. This indicates that Jack is more familiar with the English letter names after the intervention. As such, it seems that the intervention was successful for Jack in terms of extensively practicing the letter names through a range of activities, especially considering the fact that he did not receive most of the first lesson. Moreover, when test item 14 (flags) was dictated, Jack wrote "flægs" on the pre-test, but on the post-test, he changed the vowel to an e, making his spelling "flegs". It is positive that he excluded the letter *æ*. Yet, for the words "shirt" and "heard", Jack spelled these with an *ø*,

similar to Caroline. By including *ø* in his spellings, Jack demonstrated how his alphabet knowledge still is inadequate. During the intervention, Jack's attention was varying, which could explain why he did not develop his spelling skills as significantly as his peers. In addition, Loretta implied that Jack's little development in spelling could have something to do with his thoroughness, because a lot of his effort is spent on making his tasks perfect. Furthermore, Jack has comorbid AD/HD. Perhaps this additional neurodevelopmental disorder interfered with how much he profited from the intervention, because of attention deficits. It could therefore be said that learners with SpLDs should ideally receive customized interventions. However, Jack actually exhibited a positive development in his phonological awareness during one of the tasks in Lesson 5. In this particular task, he distinguished between short and long vowels with no errors. On his response to the questionnaire Jack also conveyed that he had developed his English proficiency. The Sp.Ed also seems to be of the opinion that participating in the intervention was valuable for Jack.

Philip seems to struggle exceptionally much with the English language, even more so than Jack. On the pre-test he spelled four test items correct, one of which by letter dictation. It is difficult and almost impossible to detect any significant progress quantitatively, because he only spelled five words correctly on the post-test (see Section 5.1). This is a 25% increase, similar to Jack. However, Philip's extremely low score distinguishes him from Jack. It is also interesting that Jack, who is one grade below, scored better on both measurements. Furthermore, it was difficult to interpret Philip's handwriting on several of his spellings, since some of his words are close to unintelligible (Figure 16). Yet, the qualitative analysis indicates that Philip has somewhat advanced his knowledge of letter names (see Section 5.1.2.5). Additionally, the word "are" was spelled "ar" on the post-test, as opposed to "rar" on the pre-test. While Philip forgot the silent e, his spelling is phonetically correct. Whilst the test item "people" was dictated, Philip wrote "pel" on the pre-test, but "pipol" on the post-test. The low-frequency irregular word "antique" was also spelled more phonetically correct, as it was spelled "antik", as opposed to "EK" on the pre-test. The three words are phonetically transcribed as /ɑr/, /ˈpipəl/ and /ænˈtik/ respectively. Therefore, his post-test spellings of these words are clearly closer to their respective phonetic transcriptions. In accordance, the Sp.Ed reported that she observed an improvement in his phonological awareness. On the other hand, his application of Norwegian letters in his spelling attempts demonstrate that his alphabetic knowledge still is unambiguously insufficient (see Section 5.1.2.5). Philip's minimal progress could be explained by the fact that he did not receive the entire intervention. This probably affected his score on the post-test,

because he was not given the crucial opportunity for overlearning (see Section 2.8.1). Also, as stated by Loretta, he suffers from severe impairments caused by his dyslexia and comorbid SLI (see Section 5.3). Children with SLI have a limited oral language and impaired comprehension of language. They are also reported to have slower progression in language acquisition than their peers. With this in mind, Philip's language difficulties are most likely extremely severe, in concord with Loretta's statement. Therefore, his severe comorbidity of dyslexia and SLI contributed to his small progression (see Section 2.5). Accordingly, Philip seems to require further assistance and explicit instruction to improve his alphabetic knowledge and phonological awareness, and thus his spelling.

It is difficult to determine how Philip and Caroline would have fared on the post-test, if they had received the latter half of the intervention. Yet, both Emily and William scored particularly well on the post-test when compared to their post-test. Philip shares similarities with William regarding their diagnostic profiles, since both possess comorbid dyslexia and SLI. William exhibited the biggest development in percent. Although students with comorbid disorders likely need specific interventions for each of their disorders, dyslexia and SLI have several behavioral markers in common (see Section 2.5.2). Therefore, it could be speculated that Philip might have benefited a lot more, had he received the entire intervention. Caroline, on the other hand, is diagnosed with dyslexia solely. Her development is very positive after only four lessons. In comparison, Emily, who is also officially diagnosed with only dyslexia, received seven out of eight intervention lessons and was actually above the mean of her class on the post-test. If Caroline had participated in all lessons, it is possible that she would have further developed her score, perhaps even to the point where she could have caught up with her non-dyslexic peers. Nonetheless, these are merely speculations and cannot be scientifically sustained.

6.2 Catharina: The Non-Dyslexic Student

Catharina was not included in the spelling test statistics of the overall group for two specific reasons. Though she has AD/HD, she is not officially diagnosed with dyslexia. However, despite the fact that this disorder might affect writing skills, Catharina scored so high on the baseline and the final measurement that she is a statistical outlier of the study. On the pre-test she spelled 30 words correct, which is the highest baseline score among all the participants in the intervention. Still, she was behind the mean score of her classmates with no SpLDs which is 32.79. After the intervention she rose to 40 points, which is approximately seven points more

than the mean score of her class. Catharina herself reported an impressive increase in her English proficiency and motivation towards learning EFL. Loretta also observed an increased phonological awareness. Consequently, a non-dyslexic student seems to have benefited from and appreciated the intervention.

6.3 The Current Study in Light of Related Studies

The findings of the current study are in line with preceding research. Primarily, differences between dyslexic students and non-dyslexic control groups in terms of EFL literacy skills are frequently observed in studies. Helland & Kaasa's (2005) study proved how Norwegian dyslexic learners struggle more than their non-dyslexic peers in EFL acquisition, especially considering spelling skills. Nijakowska (2010, pp. 134-144) also saw great differences between dyslexic learners and non-dyslexic learners in English language proficiency. All dyslexic learners of the current study were evidently behind their classmates at baseline measurements. The previously observed differences in EFL development between dyslexic learners and non-dyslexic learners are replicated in the current study. Therefore, the discrepancy among these two groups of learners is further authenticated by the pre-test results that are provided in this study.

Furthermore, Stagelund (2016) compared the effectiveness of certified Norwegian dyslexia friendly schools to schools that are not certified as dyslexia friendly. Dyslexia friendly schools apply to certain characteristics provided by the Norwegian Dyslexia Association. Stagelund established that there were positive results in favor of the dyslexia friendly schools. For one, dyslexic learners seemed to benefit from attending dyslexia friendly schools in regard to reading and oral skills. The approaches that were adopted at these schools appeared to have contributed to improving oral and reading skills for dyslexic learners. Moreover, the author found that non-dyslexic learners at the certified schools showcased better spelling and reading skills than a matched group at a non-certified school. Conversely, Stagelund discovered that spelling seemed to be equally as impaired for dyslexic learners at both dyslexia friendly schools and non-certified schools, which strengthens the consensus that spelling difficulties prevail. The dyslexic students of the present study were also far behind their non-dyslexic classmates prior to the multisensory phonological spelling intervention. Yet, after the intervention Emily had surpassed the mean score of her non-dyslexic classmates on the spelling test. Both William and Caroline had also improved their spelling skills significantly. The intervention was executed in

a small group, as opposed to in class. Therefore, the notion that dyslexic learners require specific intervention and support outside of class is authenticated by these results. Hence, it seems plausible that multisensory phonological instruction can improve spelling skills substantially.

On the other hand, Schlesinger & Gray (2017) found that a multisensory structured language teaching approach had no advantage over a structured language teaching approach in regard to spelling (Section 2.11). Although none of the other studies presented in Section 2.11 assessed the differential effects of these two types of interventions, there offer substantiating evidence in support of the multisensory approach. The general consensus is also that MSL should be employed, because the techniques of MSL are meant to compensate for auditory or visual sensory deficits. Contrary to Schlesinger & Gray's conclusion that the MSL approach is not especially efficient, other researchers have demonstrated strong evidence in favor of the MSL approach. As such, the authors' conclusion is not supported by other conclusions regarding the success of MSL by Nijakowska (2010, pp. 134-144) and Lim & Oei (2015).

Nijakowska (2010, pp. 134-144) reported immense gains in both spelling and reading after an MSL intervention that focused on phoneme-grapheme relations, spelling patterns and rules (see Section 2.11 for a more detailed discussion). The author's intervention was quite similar to the current study in that both were multisensory and phonologically oriented, and also targeted spelling explicitly. Prior to Nijakowska's intervention all dyslexic subjects in the experimental group were behind the non-dyslexic control group on both reading and spelling. After the intervention, the experimental group surpassed both the dyslexic control group and the non-dyslexic control group. Lim & Oei (2015) reported similar results in spelling for dyslexic learners who received an Orton-Gillingham intervention. In accordance, my study also examined what effect multisensory training had on spelling skills for dyslexic learners. Prior to the intervention all dyslexic students were far behind their non-dyslexic classmates, but after the intervention the group overall improved significantly. Despite this promising development, the group in general is still far behind both the non-dyslexic learners in 5th and 6th grade (25.57 and 32.79 respectively). However, in particular concord with Nijakowska's discoveries, Emily surpassed the mean of her non-dyslexic classmate. Therefore, the positive impact that MSL can have on spelling skills is made explicit.

Finally, studies conducted by Torgesen et al. (2010) and Pfenninger (2016) support the use of technology while teaching dyslexic learners. It is also stated that technology can be successful in providing the opportunity for the amount of overlearning that dyslexic learners require (Lyster, 2012). While practicing spelling it can also be useful (Philips & Kelly, 2016). The current study employed technology to some extent through the use of Book Creator, Quizlet, an alphabet game and a smartboard activity. Yet, it was not extensively employed and should be further investigated.

6.4 Comparison of Learners with Dyslexia and Learners with Other Comorbidities

Although dyslexic learners share behavioral patterns, there are differences between dyslexic students, because symptoms differ due to several factors (Section 2.8). In their study, Helland & Kaasa (2005) found differences within their group of dyslexic students. Therefore, the authors divided the group of dyslexic students into two groups based on their comprehension of the English language. The authors found that the subgroup with good comprehension did not differ significantly from the control group on verbal tasks, whereas the low comprehension subgroup did (see Section 2.11 for a more detailed discussion). The results of the present study do not deviate from the notion that there are individual differences between dyslexic learners. Besides the differences in development between the pre- and post-test, there are also variances in the manner that students evaluated their own proficiency in English. However, Helland & Kaasa's (2005) data did not reveal any noteworthy differences between the high and low comprehension subgroups in their study in regard to spelling. Contrastingly, the scores on the spelling tests conducted for the present study are quite dispersed, but there seems to be a consistency in the results. Emily and Caroline, who are the only dyslexic students with no comorbidities, spelled approximately the same number of words correctly on the pre-test. The other dyslexic students, all have comorbidities and their difficulties seem more severe in regard to English proficiency. Therefore, the results point to comorbidity as a factor that intervenes with the behavioral aspect of dyslexia, which can be sustained by existing theory on dyslexia and comorbidity. It is also in line with the opinion that learners who experience comorbidities may necessitate specific interventions for each of their disorders (see Section 2.5).

With this in mind, it is peculiar how William, who is diagnosed with TS and SLI in addition to dyslexia, displayed a greater development than the other male students. Firstly, William and Philip share similarities in their diagnostic profiles. Therefore, there would be reason to

anticipate a similar response to the intervention. However, their developments are quite dissimilar. Yet, Philip did not receive the entire intervention. He was also described as having severe SLI and dyslexia, which could further explain the difference in spelling improvement of these two students. Secondly, as disclosed by Loretta, Jack has both dyslexia and what she refers to as "ADD", in other words, he has AD/HD but exhibits no sign of the hyperactivity often associated with the disorder. Nevertheless, this additional neurodevelopmental disorder influences his attention, but could also impact his working memory and spelling, both of which are already affected by dyslexia. Therefore, it is plausible that Jack suffers impairments that could affect his learning, beyond those caused by his dyslexia. However, this could be the case for William as well, because his TS could affect his concentration. Essentially, the individual differences between dyslexic learners should be stressed. Ideally, all dyslexic students should receive adapted education that is tailored to them.

6.5 Comparison of Dyslexic Learners and Non-Dyslexic Learners

Further support for the Phonological Deficit Hypothesis is also provided by the present study (see Section 2.3.2.1 for a discussion of this hypothesis). The discoveries in support of the hypothetical underlying cause of dyslexia are provided by comparison of the non-dyslexic Catharina and the dyslexic students. Item 8 on the student questionnaire require the students to assess their sound-letter correspondence proficiency. Herein, the two male respondents evaluated their competency as 1. Emily evaluated her capability as 3, while Catharina scored her ability as 4. Additionally, all students except Catharina found it varyingly difficult to write words with the th letter combination (see Section 5.4.1). There are also huge differences between Catharina and the dyslexic students in regard to the spelling tests. As a result, a discrepancy between Catharina's and the dyslexic students' phonological awareness is established. These variances could perhaps be ascribed to the phonological impairments that the dyslexic learners experience but were not mentioned in the reviewed literature regarding individuals with AD/HD (see Section 2.5.1). Subsequently, there seems to be distinct dissimilarities between Catharina with AD/HD and the dyslexic participants. So, spelling appears more difficult for dyslexic learners, because of their impaired phonological awareness, than for learners with other SpLDs.

6.6 Motivational and Emotional Aspects of Dyslexia

Szaszkiewicz (2013) interviewed Norwegian dyslexic students and found that the interviewees seemed to blame their teachers for their failures because of improper teaching. She concluded that the English teacher has the ability to influence attitude and motivation towards learning EFL for dyslexic learners. Although it is difficult to measure motivation accurately, or even at all, the findings from the present study point in the same direction. On the questionnaire, all students reported reluctance to learning EFL prior to the intervention (see Section 5.4). This is in line with Kormos' (2017) statement that dyslexic learners often possess foreign language anxiety. Yet, the present study's qualitative observations revealed that several of the intervention activities seemed motivating. The students also expressed an increase in their appreciation of the English subject. Both the anxiety towards EFL learning and a wavering motivation could explain why students approach activities in the manner that they do, and thus explain learning outcomes to some extent. Dyslexic students tend to lose motivation towards learning English gradually (Section 2.8). Therefore, it is interesting how the intervention increased motivation towards learning English. As motivation and foreign language anxiety are factors that could impact learning, it should be noted that multisensory techniques seem to be important for EFL learning.

Both concentration and attention were varying during the intervention lessons for the students (Section 5.2). The group was initially comprised of six individuals with various SpLDs. Their concentration could be influenced by dyslexia or the comorbid disorders (Helland, 2012; Section 2.5). A typical marker of the AD/HD diagnosis is the attention deficit. For Jack and Catharina, attention deficits seems to have caused concentration difficulties, since they were distracted on several occasions. Tourette Syndrome could also cause concentration difficulties as a result of the tics. In other words, William is also more at risk for attention and concentration deficits because of his TS.

Because of attention, concentration and to some extent behavioral issues, the group had to be divided into two separate groups twice. In the second lesson, Philip, William and Jack distracted each other so much that they agitated Catharina, who seemed motivated to learn. This prompted the first split. Then, in Lesson 5, after Philip and Caroline had moved, the groups were rejoined. It seemed to go well during this lesson. However, in the following lesson, Jack and Catharina got into an argument, so the Sp.Ed split the group immediately. The girls worked well together,

whereas Jack and William seemed to require close monitoring to finish the activities because of their concentration deficits.

Prior to the intervention Emily had exhibited foreign language anxiety, according to Loretta. She used to fear English class, but now she looks forward to it. Moreover, all questionnaire respondents reported gains in motivation and attitude towards learning EFL. Thus, the intervention had a positive effect on motivation and the efforts of each students. It also influenced learning positively for each individual, because if foreign language anxiety is reduced and motivation improve, learning is likely to be augmented. Furthermore, during several of the lessons the students expressed a desire for more English lessons (see Section 5.2). This is an accomplishment in itself, especially considering the fact that all students reported reluctance to EFL prior to the intervention. Similarly, Loretta also stated that the students expressed delight towards the intervention.

Observational notes during some of the lesson demonstrated that William seemed particularly distracted, which was corroborated by the interview with Loretta. Furthermore, the Sp.Ed stated that William commonly deems everything "boring". Yet, the Sp.Ed explains that he seemed remarkably positive towards some of the intervention lessons. One incident during the last lesson is also quite illustrative of his positivity towards the intervention. After the lesson, William actually came back to show Loretta and the current researcher how much faster he had become at Quizlet. Additionally, he normally does not offer much effort in class, which is why Loretta was astounded that he worked as efficiently as he did during the intervention. This further demonstrates an increase in motivation for William. It is likely that this increase in motivation contributed towards William's astonishing development in spelling skills. If he put in more effort towards learning English during the intervention than usual, due to his increased motivation, is fathomable that he would display a considerable development.

During the intervention, it seemed that Jack got to use his creativity, which is one of his strengths, as revealed by Loretta. His creativeness was apparent in his execution of several tasks. Student Task 1 is a characteristic example of Jack's creativity during a WikkiStix-based activity. The last two words in the second column are the first two words that he built. Initially, he started laying the words on the paper, but after building two words in such a manner, he discovered that he could build them three-dimensional. The types of activities where Jack could use his creativity, seems to have also been his favorite types of activities. On the questionnaire

he highlighted the activities with WikkiStix and painting as particularly delightful and educational. Evidently, these are the types of activities that appealed to Jack the most. Overall, Jack considered the level of motivation that the intervention yielded to be 3/4, which is positive. What is even more positive though, is the fact that Jack reported a positive development in his attitude towards learning EFL. In addition, according to Loretta, Jack has asked for more lessons in the same vein as those of the intervention. This is a very positive indication. This provides further evidence in support of the intervention, because Jack's level of motivation is likely to contribute to his EFL learning outcome in the future (see Section 2.7). However, interventions should ideally be accommodated to each individual. In this respect, it is possible that an individualized intervention for Jack should rely heavily on the type of multisensory tasks that appeal more to his strength in creativity.

In sum, it seems that motivation and attitude towards learning EFL improved for most students. Szaszkiewicz' (2013) findings illustrated that improper teaching can negatively impact dyslexic learners and their attitude and motivation towards English. The multisensory techniques that were incorporated in the intervention seemed to be suitable for teaching both the dyslexic learners and Catharina. Thus, multisensory instruction could positively impact attitudes and motivation towards the English subject. Furthermore, if dyslexic learners' motivation is improved, it is likely that their investment of effort and consequently their learning will advance as well.

6.7 Limitations

There are several limitations to the present study. Several concerns regarding validity arise when control groups are absent in intervention studies. The absence of a control group makes it difficult to control for external variables (see Section 3.5.1 for an expanded discussion). However, the relatively short time span controls for several of the external variables to some extent. The history and maturation effects are rendered less likely because of the short duration of the intervention, as well as the relatively short period of time between the baseline and final assessment. The Hawthorne effect cannot be completely controlled for, because of the lack of a control group.

The small number of participants is also of concern, because it limits the statistical power of the quantitative data. Therefore, these results, although promising, should be viewed as

tentative. An ideal intervention study would involve a larger sample, because it is difficult to make any inferences of the population with a small sample. There would also be an age-matched dyslexic control group to control for external variables and as a way to compare the effect of multisensory and phonological instruction to the effect of common EFL teaching methods. Therefore, the limitations of this study provide implications for further research (see Section 7.2).

There is a strength in the diversity of the data material. The perspectives of the students, the Sp.Ed as well as the analysis provided by the current researcher are considered through the triangulate data collection. The triangulation of data elevates the validity of the current study and provides an extensive inquiry into the effect of the intervention, through both the statistics and the qualitative data. The data also seems to align with findings from previous studies, which further validates the findings of the study.

6.8 Implications for Classroom Practice

Initially (Section 2.1), dyslexia was defined as "a neurodevelopmental disorder, implying the existence of a complex causal chain embracing biological, cognitive and behavioural factors, present since birth and characterized by a set of behavioural symptoms subject to change over time." (Nijakowska, 2010, p. 8). Within this definition, it is declared that the behavioral aspect of dyslexia is likely to be reflected diversely in correspondence with age. As such, Reid (2013) describes dyslexia as a “hidden disability” because dyslexic learners often do not exhibit any symptoms until literacy or information processing is required. This would be in the early school years, as it is expected that Norwegian students should be able to read simple Norwegian texts by 2nd grade (Ministry of Education, 2013b). In regard to EFL acquisition, it is expected that they should be able to experiment with reading and writing English words, expressions and simple sentences after 2nd grade (Ministry of Education, 2013a). Thereupon, Norwegian learners are expected to be literate in Norwegian and to start developing literacy in English after 2nd grade. The early years are when many dyslexic learners fall behind (Helland, 2012, p. 147). Consequently, Lim & Oei (2015) suggest that early identification and intervention is crucial for literacy development of learners with dyslexia. Dyslexia should accordingly be diagnosed during the first school years and an intervention should be implemented as early as possible. Yet, dyslexia is not diagnosed until the upper grades of elementary school, or even after, in numerous cases. As such, 5th – 7th grade becomes a critical phase for dyslexic students, because

their difficulties in reading in writing continue and seem to become more apparent. Dyslexia has also been reported to have negative psychological consequences due to struggles in academics (Section 2.4). Their difficulties typically amplify while learning EFL because of the language's deep orthography and countless irregularities, in agreement with the orthographic depth hypothesis (Section 2.7). It is therefore vital that dyslexic learners are identified, accommodated and supported properly throughout these formative years.

Norwegian dyslexic students struggle more with EFL acquisition than their non-dyslexic peers (see Helland & Kaasa, 2005). It is also implied that unless these learners receive proper, explicit instruction, they will undoubtedly suffer extensive academic failures, especially in EFL. Dyslexic learners could require specific interventions. As such, an explicit focus on sound-letter correspondence is allegedly particularly beneficial (Section 2.8). Research shows how interventions focusing on phonological awareness are especially successful in developing reading and spelling skills. Also, interventions based on the MSL approach have yielded considerably positive results in regard to reading and spelling development (Sections 2.8-2.11). Hence, international studies provide empirical evidence in support of utilizing phonological and multisensory interventions. Conversely, there are very few Norwegian studies on the effect of EFL teaching methods for dyslexic learners. The present study focuses on the effect that English teaching didactics, specifically multisensory techniques, have on spelling skills for dyslexic elementary learners in Norway. In other words, it provides a necessary insight into the Norwegian school context.

Moreover, a comprehensive and systematic theoretical review of the extensive literature on dyslexia is provided. The literature review offers a presentation of the historical background, definitions, hypothetical causes and symptoms of dyslexia. It also provides a comprehensive discussion of comorbidity, English as a foreign language and dyslexia, as well as specific recommendations for adapted education and a presentation of relevant research. For EFL teachers it is necessary to be acquainted with the field of dyslexia, therefore, the extensive literature review can be of aid to become familiarized with the SpLD.

The role of the EFL teacher in facilitating development for dyslexic learners is explicitly highlighted. Dyslexic students seem to blame their EFL struggles on teachers who made inappropriate pedagogical choices (Szaszkiewicz, 2013). The Norwegian educational law clearly establishes that all students have a right to adapted education. Concordantly, teacher

students enrolled in the EFL teacher program are expected to be able to identify dyslexic students and adapt education for these learners. Yet, many EFL teachers voice concerns regarding their preparedness in supporting dyslexic learners in the mainstream EFL classroom. There is also reportedly a high demand for training in EFL teaching for dyslexic learners (see Section 2.11). In congruence, the main intention of my study was to help provide other EFL teachers with the essential knowledge about dyslexia and substantial teaching techniques to support dyslexic students. As such, this study has several implications for the EFL teacher.

Multisensory techniques and phonological awareness training is encouraged through other relevant studies (See Nijakowska, 2010, pp. 134-144; Lim & Oei, 2015). The results of my study are in line with this consensus. The intervention seems to have been fruitful despite the diverse spelling developments. In general, the group displayed a significant increase in their spelling abilities. There are also students who benefited particularly well from this intervention, for example William and Emily, but also Caroline. The group developed their spelling from 9.2 to 15.4, which entails a 67% increase overall. There are diverse scores on the post-test, which signifies that no dyslexic students are alike. Indications that comorbidities should be taken into consideration when contemplating any intervention for dyslexic learners are also present. It seems that incorporating special education into EFL teaching, lead to substantial development in spelling for several of the dyslexic students.

There are also other indications that the intervention was successful in some way for all learners. Dyslexic learners often exhibit decreasing motivation towards learning EFL and are likely to develop foreign language anxiety. With respect to this psychological aspect, multisensory and phonological activities seemed to impact the self-efficacy, or the perception of their skills and what they can do with these skills (Bandura, 1986, p. 391). All students reported an increase in their self-efficacy, which is illustrated through overwhelmingly positive responses from the students and the teacher who carried it out. It seems apparent that an MSL spelling intervention that incorporates phonological awareness can be successful in increasing motivation towards learning EFL and reducing foreign language anxiety. As motivation is considered essential for learning, this type of intervention could be advantageous in improving EFL spelling skills for dyslexic learners.

Because the intervention was relatively short, and the students overall experienced a significant increase after the intervention, it should be tried out on more students. Since the data also

complies with results from other related studies, it can be said that dyslexic learners will likely develop their spelling substantially from the multisensory techniques and explicit phonological instruction. Motivational and emotional aspects were also impacted positively by the intervention. Consequently, EFL teachers should follow the principles of MSL while teaching dyslexic learners.

Though the effects of an inclusive learning environment should not be underestimated, dyslexic learners likely require extra support outside the class. The environment that the extra support is executed in is also of concern, since dyslexic learners require a peaceful environment to enhance learning outcome (Section 2.8.1). Thus, distracting factors should be avoided if possible. Because of the range of difficulties experienced by the individuals in the group, the students seemed to distract each other on several occasions. The group had to be split twice because it was dysfunctional. Therefore, if an intervention is to be executed in a small group, the grouping of students should be made with careful consideration.

Ideally, the intervention should be tailored to each individual. Yet, time-related limitations are typical issues in schools, and resources might be limited. Thus, individually tailored interventions outside the class, are not always possible. However, Catharina's development beyond the mean of her class indicates that even non-dyslexic students can benefit from such a program to further develop their spelling abilities. In support of this notion, the Sp.Ed also anticipated that the multisensory activities that were developed for the intervention could be employed in whole classes. A large number of students could respond positively to these types of activities, according to her (Section 5.3). As such, teachers could perhaps employ several of the activities in their full class teachings as an effort to develop all students', including the dyslexic students', spelling skills.

7. Conclusion

7.1 Summary

This study is both an English didactics study and a special educational study. It investigated the benefits of a multisensory spelling intervention for dyslexic learners. Findings provided by prior studies have presented evidence that typical EFL teaching does not seem to be sufficient in teaching dyslexic EFL learners (see Helland & Kaasa, 2005; Nijakowska 2010; Stagelund, 2016). My study complies with this notion, since there is evidence of vast differences in spelling abilities between the participants of the study and their non-dyslexic classmates prior to the intervention.

Diverse evidence in support of MSL and phonological interventions is provided by the current study through triangulation. For one, the group overall exhibited a statistically significant difference in means on the spelling pre- and post-test, which suggests that the multisensory phonological spelling intervention was successful. This finding resembles findings of other studies that have investigated the effects that MSL and phonological interventions have on spelling skills, where dyslexic learners have been observed to vastly increase their spelling abilities due to similar interventions (Nijakowska, 2010, pp. 134-144; Lim & Oei). The findings are also in congruence with the general consensus that dyslexic learners require specific interventions to compensate for their deficits (Kormos, 2017, p. 118). Secondly, the especially strong development between the pre- and post-test of both William and Emily, but also Caroline, encourages this type of intervention. However, quantitatively, the scores of each individual on the pre- and post-tests are quite dispersed, which signifies that tailored interventions could be more advantageous.

Furthermore, observational data, the questionnaire and interview with the Sp.Ed teacher revealed that the intervention positively impacted psychological factors such as motivation and attitude towards learning EFL. A reduction in foreign language anxiety seems to also have been caused by the intervention. Because foreign language anxiety may impede learning, and motivation is essential to learning, it is likely that multisensory techniques can bring forth a positive development in learning.

In Section 2.5 we saw that approximately 40% of the children with one neurodevelopmental disorder also exhibit behavioral patterns reminiscent of another condition. In correspondence,

the current study found that 3/5 dyslexic students experience comorbidity of dyslexia and other learning inhibiting disorders. The students with the highest scores on the spelling tests are officially diagnosed with dyslexia and no other conditions. This supports the perception that dyslexic learners with comorbidity could require specific interventions for each of their difficulties (Snowling & Hulme, 2011). Still, William, who is diagnosed with dyslexia, SLI and TS, had the strongest and most impressive development in spelling, which indicates that the activities were especially adapted to his needs. Furthermore, it is implied that individuals with comorbidities could benefit from MSL as well, if their motivation is impacted positively through multisensory techniques. Yet, Jack and Philip displayed such a small development, especially compared to William. The development of Jack could be explained by his attention problems, whereas the results of Philip could be explained by his severe language difficulties and the fact that he did not receive the entire intervention. In sum, this specific part of the data collection is ambiguous and must be further investigated.

Furthermore, the absence of an age-matched dyslexic control group makes it precarious to infer that the intervention is more effective than any other type of teaching method when teaching spelling. Nonetheless, the students in general improved significantly after a relatively short time period. The evidence of the current study is also in congruence with findings from other related studies (Nijakowska, 2010, pp. 134-144; Lim & Oei, 2015). Thus, it is likely that this type of intervention is especially effective. Furthermore, the overwhelmingly positive responses from the students and Sp.Ed during after the intervention illustrate that this type of intervention can be effective. The strength of this study is the triangulation of its data, which amplified the validity of the study (Check & Schutt, 2012; Biesta, 2012). The study provides a unique and diverse body of evidence in favor of multisensory spelling interventions through the triangulation of data. By means of the statistics and through the perspectives of the students, special education teacher, as well as the current researcher, the triangulated data provides diverse evidence in favor of the intervention. Though the methods of the intervention cannot be considered more effective than other methods in teaching spelling due to the limitations of this study, the motivation that the intervention brought forth is especially encouraging.

7.2 Future Studies

Due to the small sample in this study, it is problematic to make any inferences regarding the probable development of the true population. There is also a general lack of empirical evidence with respect to the topic of the current study in a Norwegian context. The present study could therefore be a pilot study for a future large-scale study, because there were previously no studies of its kind in Norway. The very promising evidence in favor of an MSL spelling intervention supports further inquiry into its effectiveness. Students in this project exhibited a significant increase in the number of words correctly spelled on the spelling test after only eight lessons. This is very promising and encourages a longer and larger study. However, previous studies (see Torgesen et al., 2010; Pfenninger, 2016) appear to prove the successfulness of technological intervention. Therefore, it is possible that a longer intervention should utilize technology more than the current study, possibly for individual practice as homework.

An ideal future study in the vein of the present study would be longitudinal. It would include both an experimental group and a control group of age-matched students. The number of participants in both groups would be significantly larger and the group dynamics would be more carefully considered. It should be conducted as mixed method approach because the triangulation further validates this type of study.

When the English 2 Dyslexia Test is available again, or if any other assessment tool specifically designed for Norwegian dyslexic EFL students becomes available, it would be interesting to see how a Norwegian dyslexic group would score after a multisensory and phonological spelling intervention. Also, as a textbook and workbook specifically designed for Norwegian dyslexic students learning EFL have become available, it would be interesting if a different study investigated how these coursebooks influence EFL learning for dyslexic learners in contrast to the standard textbooks and workbooks.

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Appendix

Appendix A: NSD Approval

Dina Tsagari
Postboks 4 St. Olavs plass
0130 OSLO

Vår dato: 17.07.2018 Vår ref: 61105 / 3 / EPA Deres dato: Deres ref:

Tilrådning fra NSD Personvernombudet for forskning § 7-27

Personvernombudet for forskning viser til meldeskjema mottatt 13.06.2018 for prosjektet:

61105	*Dyslexia and English as a Foreign Language*
Behandlingsansvarlig	*OsloMet - Storbyuniversitetet, ved institusjonens øverste leder*
Daglig ansvarlig	*Dina Tsagari*
Student	*Christopher Flaten Jarsve*

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er unntatt konsesjonsplikt og at personopplysningene som blir samlet inn i dette prosjektet er regulert av § 7-27 i personopplysningsforskriften. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:
• opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
• vår prosjektvurdering, se side 2
• eventuell korrespondanse med oss

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Ved prosjektslutt 07.06.2019 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 61105

VURDERING AV PROSJEKTET ETTER NY PERSONOPPLYSNINGSLOV

Den 20. juli trer EUs personvernforordning, samt den nye norske personopplysningsloven, i kraft. Prosjektet ditt er imidlertid vurdert etter dagens personopplysningslov, ettersom prosjektet ble meldt inn før det nye regelverket begynner å gjelde. Etter dagens lovverk har ditt prosjekt behandlingsgrunnlag i samtykke, jf. personopplysningsloven § 8 første ledd og § 9 a), og er vurdert av personvernombudet med hjemmel i personopplysningsforskriften § 7-27. Vi har i tillegg vurdert at informasjonsskrivene og samtykkeskjemaene dine fyller kravene til et informert samtykke også etter det nye regelverket. Det er derfor vår oppfatning at du vil ha gyldig behandlingsgrunnlag i samtykke når det nye regelverket trer i kraft 20. juli, da i medhold av personvernforordningen artikkel 6 nr. 1, bokstav a) og artikkel 9 nr. 2, bokstav a), jf. ny personopplysningslov § 10.

FORMÅL

Formålet med studien er å utforske hvilken effekt de anbefalte multisensoriske undervisningsmetoder har for utviklingen av skrive- og leseferdigheter blant en mindre grupper av elever på 6.-7.trinn med dysleksi. Studien vil også undersøke hvilken effekt ulike apper på iPad, deriblant iThoughts og Book Creator, kan ha for språkutviklingen blant gitte elever.

DATAINNSAMLING

Utvalget består av elever på 6.-7. trinn i norsk grunnskole som har fått påvist diagnosen dysleksi (ca. 15 barn). Kontrollgruppen vil forbli i vanlig undervisning og den eksperimentelle gruppen vil delta i et alternativt undervisningsopplegg. Alle deltakerne vil ta en standardisert engelskprøve som er tilpasset norske elever med dysleksi på 6.-7. trinn, som gjentas i løpet av datainnsamlingen. Innsamlet datamateriale vil også bestå av papirbasert spørreskjema, oppgaver som deltakerne utfører, muntlige logger i form av lydklipp, notater, og den sakkyndige vurderingen av barnet fra Pedagogisk-psykologisk tjeneste (PPT).

INFORMASJON OG SAMTYKKE

Dere har opplyst i meldeskjemaet at foreldre/foresatte vil motta skriftlig informasjon om prosjektet, og vil samtykke skriftlig til at barnet deltar. Vår vurdering er at informasjonsskrivene/samtykkeerklæringene mottatt 16.07.2018 er godt utformet. Dersom det blir aktuelt å innhente opplysninger om barnet fra læreren, bør det legges til utfyllende informasjon om dette (om hvilke typer opplysninger som skal innhentes) i informasjonsskrivet og i samtykkeerklæringen.

Selv om barnets foresatte samtykker til barnets deltakelse i prosjektet, må også barnet gi sin aksept til å delta. Vi anbefaler at barnet mottar tilpasset informasjon om hva deltakelse i prosjektet innebærer. Dere må sørge for at barnet forstår at deltakelse er frivillig, og at det kan trekke seg om det ønsker det.

SENSITIVE PERSONOPPLYSNINGER

Det vil behandles sensitive opplysninger om helseforhold (dysleksidiagnose).

INFORMASJONSSIKKERHET
Personvernombudet forutsetter at dere behandler alle data i tråd med OsloMet - Storbyuniversitetet sine retningslinjer for datahåndtering og informasjonssikkerhet.

PROSJEKTSLUTT OG ANONYMISERING
Prosjektslutt er oppgitt til 07.06.2019. Det fremgår av meldeskjema og informasjonsskriv at dere vil anonymisere datamaterialet ved prosjektslutt.
Anonymisering innebærer vanligvis å:
- slette direkte identifiserbare opplysninger som navn, fødselsnummer, koblingsnøkkel
- slette eller omskrive/gruppere indirekte identifiserbare opplysninger som bosted/arbeidssted, alder, kjønn
- slette lydopptak

For en utdypende beskrivelse av anonymisering av personopplysninger, se Datatilsynets veileder:
https://www.datatilsynet.no/globalassets/global/regelverk-skjema/veiledere/anonymisering-veileder-041115.pdf

Appendix B: Experimental Group Consent Form

Vil du delta i forskningsprosjektet

”Dyslexia and English as a Foreign Language”?

Dette er et spørsmål til deg om ditt barns deltagelse i et forskningsprosjekt hvor formålet er å utforske effekten som multisensoriske undervisningsopplegg og digitale ressurser har på læring i engelsk for elever på mellomtrinnet med dysleksi. I dette skrivet gir vi deg på vegne av ditt barn informasjon om målene for prosjektet og hva deltakelse vil innebære for ditt barn.

Bakgrunn og formål
Det er enighet rundt faktumet at elever med dysleksi sliter mer enn andre elever med å lære seg engelsk som fremmedspråk på bakgrunn av sine lese- og skrivevansker. Forskning viser at elever med dysleksi kan oppnå tilstrekkelige leseferdigheter med tilpasset opplæring, men at problematikken vedrørende skriftlige ferdigheter ofte er vedvarende.

Formålet med studien er derfor å utforske hvilken effekt anbefalte multisensoriske undervisningsmetoder har for utviklingen av skriftlige ferdigheter blant en mindre gruppe av elever på mellomtrinnet med dysleksi. Studien vil også undersøke hvilken effekt ulike apper på iPad kan ha for språkutviklingen blant gitte elever. En kontrollgruppe med dyslektiske elever som også testes, men forblir i vanlig undervisning vil også delta i studiet for sammenligning av resultater.

Ettersom forskningsprosjektet forutsetter tidligere satt dysleksidiagnose, tilsendes du denne forespørselen om ditt barns deltagelse i den eksperimentelle gruppen som vil få alternativ undervisning.

Hvem er ansvarlig for forskningsprosjektet?
Prosjektet gjennomføres som en del av OsloMets masterprogram for skolerettet utdanningsvitenskap med fordypning i engelsk. Forskningen utføres av masterstudent Christopher Flaten Jarsve. Professor Dina Tsagari ved OsloMet er registrert som prosjektleder og daglig ansvarlig.

Hva innebærer ditt barns deltakelse i studien?
I forkant av prosjektet er det ønskelig for prosjektleder, Christopher Flaten Jarsve, å lese den sakkyndige vurderingen fra Pedagogisk-psykologisk tjeneste (PPT). Dette er fordi den sakkyndige vurderingen kan gi verdifull informasjon angående tilpasning av undervisningen.

Prosjektet vil starte med en standardisert test som tar sikte på å vurdere elevens kompetanse i staving av engelske ord. Testen kan gi nyttig informasjon om elevens styrker og utfordringer i engelskfaget. Dersom det blir gitt samtykke, kan resultatene deles med elevens lærer.

Eleven vil deretter, i en periode på opptil 1 måned fra november, bli tatt ut av klassen i mindre grupper to timer i uken for et alternativt undervisningsopplegg. Opplegget planlegges av masterstudent Christopher Flaten Jarsve og utføres av skolens spesialpedagog. Det innebærer bruk av multisensoriske oppgaver og appen Book Creator på iPad, som anbefales av Dysleksi Norge. Oppgavene i Book Creator vil fokusere på egenproduksjon av kreative oppgaver hvor

deltageren blant annet vil få lage egen tegneserie på engelsk. De multisensoriske oppgavene vil fokusere på integrering av to eller flere sanseinntrykk. Blant annet vil deltageren få bokstavkort som skal settes sammen til ord som skrives ned i skjema og uttales.

Datainnsamlingen underveis i undervisningsperioden vil inkludere innsamling av oppgaver deltageren utfører, samt elevens egenvurdering i form av spørreundersøkelser. Spørsmålene i spørreundersøkelsene vil omhandle selve undervisningen og utbyttet deltageren har. Dette for å gjøre justeringer underveis som har til hensikt å forbedre undervisningsopplegget. Det vil også bli gjort observasjoner som noteres.

Etter endt periode med undervisning vil deltageren bli testet på nytt. Dette for å vurdere effekten av undervisningsopplegget.

På forespørsel er det mulig for foresatte å få se spørsmål til spørreskjema og aktiviteter.

Hva skjer med informasjonen om ditt barn?
Den sakkyndige vurderingen fra PPT vil kun leses av masterstudent Christopher Flaten Jarsve som har taushetsplikt. Kun masterstudent, skolens spesialpedagog og prosjektleder ved OsloMet vil ha tilgang til det øvrige innsamlede datamaterialet inkludert deltagerens produksjoner og testresultater.

Alle personopplysninger vil bli behandlet konfidensielt og kun masterstudenten vil ha tilgang til sensitiv informasjon. For å beskytte personopplysningene til deltageren vil det opprettes en koblingsnøkkel. Det vil si at navn og andre personidentifiserende opplysninger eller kjennetegn vil erstattes med et fiktivt navn som viser til en adskilt liste der koden viser navn. Koblingsnøkkelen vil oppbevares separat fra dataene som blir innhentet slik at ingen utenforstående vil få tilgang til koblingen mellom navn og kode. I tillegg vil indirekte identifiserbare opplysninger som navn på skolen og kommunen bli anonymisert i publikasjon og ved prosjektslutt. Dette for å forsikre at ikke deltageren skal kunne gjenkjennes i publikasjonen.

Deltagerens digitale produksjoner vil oppbevares på egen harddisk og anonymiseres når prosjektet er ferdig. Alle skriftlige dokumenter, deriblant den sakkyndige vurderingen fra PPT, samt spørreskjemaer og elevoppgaver, vil oppbevares innlåst og i et rom som låses.

Prosjektet skal etter planen avsluttes i månedsskiftet mai/juni 2019. Da vil alle personopplysninger som er lagret elektronisk anonymiseres. Sammen med andre fysiske dokumenter, som kan bidra til identifisering av deltageren, vil den sakkyndige vurderingen makuleres etter prosjektet er fullført.

Det anonymiserte datamaterialet vil publiseres.

Frivillig deltakelse
Det er frivillig å delta i prosjektet. Hvis du velger at ditt barn skal delta, kan du når som helst trekke ditt samtykke uten å oppgi noen grunn. Alle opplysninger om ditt barn vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg eller ditt barn hvis du ikke ønsker at barnet skal delta eller senere velger å trekke ditt samtykke.

Dine rettigheter

Så lenge barnet ditt kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om ditt barn,
- å få rettet personopplysninger om ditt barn,
- få slettet personopplysninger om ditt barn,
- få utlevert en kopi av ditt barns personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av ditt barns personopplysninger.

Hva gir oss rett til å behandle personopplysninger om ditt barn?
Vi behandler opplysninger om ditt barn basert på ditt samtykke.

På oppdrag fra OsloMet – storbyuniversitetet, har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Masterstudent Christopher Flaten Jarsve per telefon: 92633375 eller e-post: s197089@oslomet.no. **Det er også mulig å avtale et møte med masterstudent i forkant, dersom det er ønskelig.**
- Veileder/daglig ansvarlig, Dina Tsagari på dina.tsagari@oslomet.no eller 67 23 **53 78.**
- NSD – Norsk senter for forskningsdata AS, på epost (personvernombudet@nsd.no) eller telefon: 55 58 21 17.

Informasjon til deltageren
Du vil delta i et forskningsprosjekt som skal undersøke effekten av ulike oppgavetyper for elever med dysleksi som lærer engelsk. Dine engelskferdigheter vil testes. Du vil delta i alternativ undervisning 2 timer i uka i 1 måned med andre elever. Masterstudent Christopher Flaten Jarsve vil være til stede i timene. Vi vil bruke appen Book Creator på iPad og vi vil jobbe med oppgaver der du vil få øve på å stave engelske ord. Vi vil også bruke Scrabble for å lære nye ord og øve på å stave ord du kanskje har arbeidet med tidligere. Du vil bli testet på nytt etter at undervisningen med Christopher er utført, for å se om du har vist forbedring i engelsk. Christopher vil samle inn resultater av testene og oppgaver du har laget. Resultatene og oppgavene vil bli gjort anonyme. Det vil si at det ikke vil være mulig for andre å gjenkjenne deg.

Med vennlig hilsen

Prosjektansvarlig	Masterstudent
Dina Tsagari	Christopher Flaten Jarsve

Samtykke til deltakelse i masteroppgaven «Dyslexia and English as a Foreign Language»

Jeg har mottatt og forstått informasjon om prosjektet «Dyslexia and English as a Foreign Language», og har fått anledning til å stille spørsmål. Jeg samtykker til:

- ☐ at masterstudent Christopher Flaten Jarsve kan lese mitt barns sakkyndige vurdering fra PPT
- ☐ at mitt barns engelskferdigheter blir testet
- ☐ at resultatene av testene blir formidlet til mitt barns lærer
- ☐ at lærer kan gi faglige og pedagogiske opplysninger om mitt barn til prosjektet dersom nødvendig
- ☐ at barnet mitt deltar i alternativ engelskundervisning som inkluderer multisensoriske oppgaver og arbeid med apper på iPad to timer i uka i omkring 1 måned

Jeg samtykker til at mitt barn ved navn:

_____ deltar og at mitt barns

opplysninger behandles frem til prosjektet er avsluttet, ca. juni 2019.

(Foresattes signatur, dato)

Appendix C: Non-Dyslexic Control Group Consent Form

Vil du delta i forskningsprosjektet

”Dyslexia and English as a Foreign Language”?

Dette er et spørsmål til deg om ditt barns deltagelse i et forskningsprosjekt hvor formålet er å utforske effekten som multisensoriske undervisningsopplegg og digitale ressurser har på læring i engelsk for elever på mellomtrinnet med dysleksi. I dette skrivet gir vi deg på vegne av ditt barn informasjon om målene for prosjektet og hva deltakelse vil innebære for ditt barn dersom samtykke er gitt.

Bakgrunn og formål
Det er enighet rundt faktumet at elever med dysleksi sliter mer enn andre elever med å lære seg engelsk som fremmedspråk på bakgrunn av sine spesifikke språkvansker. Hovedsakelig går dette ut på vansker i form av skrive- og leseferdigheter. Forskning viser at elever med dysleksi kan oppnå tilstrekkelige leseferdigheter med tilpasset opplæring, men at problematikken vedrørende skriftlige ferdigheter ofte er vedvarende.

Formålet med studien er derfor å utforske hvilken effekt anbefalte multisensoriske undervisningsmetoder har for utviklingen av skriveferdigheter blant en mindre gruppe av elever på mellomtrinnet med dysleksi. Studien vil også undersøke hvilken effekt ulike apper på iPad kan ha for språkutviklingen blant gitte elever.

Dette er en forespørsel om ditt barns deltagelse i en kontrollgruppe som testes, for å finne gjennomsnittlig resultat på prøven som de dyslektiske elevene skal ta med den hensikt å vurdere effekten av undervisningsmetoden.

Hvem er ansvarlig for forskningsprosjektet?
Prosjektet gjennomføres som en del av OsloMets masterprogram for skolerettet utdanningsvitenskap med fordypning i engelsk. Forskningen utføres av masterstudent Christopher Flaten Jarsve. Professor Dina Tsagari ved OsloMet er registrert som prosjektleder og daglig ansvarlig.

Hva innebærer ditt barns deltakelse i studien?
Det vil ikke bli innhentet personopplysninger. Ditt barns deltakelse i studien innebærer derfor kun å delta i en kontrollgruppe som tar en test med den hensikt å vurdere elevens kompetanse i å stave engelske ord. Testen er laget for britiske elever for å vurdere deres kunnskap og er standardisert i henhold til den britiske skoles kontekst.

For å ikke forskjellsbehandle, vil alle elever på trinnet testes. Klassens lærer vil da samle inn alle prøvene. Dersom du velger at ditt barn resultater kan inngå i studiens data, vil ditt barns prøve overbringes uten navn til masterstudenten. Ditt barns anonymiserte resultat vil da påvirke utregningen av et gjennomsnitt på elevens trinn. Utregningen av gjennomsnittet gjøres for å kunne sammenligne klassens generelle resultat med elevene som deltar i den eksperimentelle undervisningen sine resultater. Elevens lærer vil utelate og makulere prøvene til eventuelle elever med individuell opplæringsplan for å sikre kontrollgruppens verdi i studiet.

Dersom du velger å ikke samtykke til ditt barns deltakelse, vil prøven makuleres etter testen er gjennomført.

Hva skjer med informasjonen om ditt barn?
Alle personopplysninger vil bli behandlet konfidensielt. Kun klassens kontaktlærer vil ha tilgang til elevenes navngitte prøver. Masterstudenten vil kun få tilgang til prøven der elevens navn er fjernet, dersom samtykke blir gitt. I tillegg vil indirekte identifiserbare opplysninger som navn på skolen og kommunen bli anonymisert i publikasjon og ved prosjektslutt. Dette for å forsikre at ikke deltageren skal kunne gjenkjennes i publikasjonen. Elevens anonymiserte prøve, vil også oppbevares innlåst og i et rom som låses.

Prosjektet skal etter planen avsluttes i månedsskiftet mai/juni 2019. Da vil de anonymiserte prøvene makuleres og det anonymiserte datamaterialet vil publiseres.

Frivillig deltakelse
Det er frivillig å delta i prosjektet. Hvis du velger at ditt barn skal delta, kan du når som helst trekke ditt samtykke uten å oppgi noen grunn. Alle opplysninger om ditt barn vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg eller ditt barn hvis du ikke ønsker at barnet skal delta eller senere velger å trekke ditt samtykke.

Dine rettigheter
Så lenge barnet ditt kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om ditt barn,
- å få rettet personopplysninger om ditt barn,
- få slettet personopplysninger om barn,
- få utlevert en kopi av ditt barns personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av ditt barns personopplysninger.

Hva gir oss rett til å behandle personopplysninger om ditt barn?
Vi behandler opplysninger om ditt barn basert på ditt samtykke.

På oppdrag fra OsloMet – storbyuniversitetet, har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Masterstudent Christopher Flaten Jarsve per telefon: 92633375 eller e-post: s197089@oslomet.no.
- Veileder/daglig ansvarlig, Dina Tsagari på dina.tsagari@oslomet.no eller 67 23 **53 78.**
- NSD – Norsk senter for forskningsdata AS, på epost (personvernombudet@nsd.no) eller telefon: 55 58 21 17.

Informasjon til deltageren

Du vil delta i et forskningsprosjekt som skal undersøke effekten av ulike oppgavetyper for elever med dysleksi som lærer engelsk. Dine ferdigheter til å stave engelske ord vil testes. Du er en del av kontrollgruppen, som vil si at du forblir i vanlig undervisning med din egen lærer. Du vil kun testes en gang for å regne ut et gjennomsnitt på trinnet ditt over hvor en elev i din aldersgruppe bør ligge resultatmessig. Resultatene vil anonymiseres. Det vil si at det ikke vil være mulig for andre å gjenkjenne deg.

Med vennlig hilsen

Prosjektansvarlig
Dina Tsagari

Masterstudent
Christopher Flaten Jarsve

Samtykke til deltakelse i masteroppgaven «Dyslexia and English as a Foreign Language»

Jeg har mottatt og forstått informasjon om prosjektet «Dyslexia and English as a Foreign Language», og har fått anledning til å stille spørsmål.

Jeg samtykker til:

- ☐ at mitt barns ferdigheter til å stave engelske blir testet og inkluderes i utregningen av et gjennomsnittlig resultat på trinnet

Jeg samtykker til at mitt barn ved navn:

_____ deltar i kontrollgruppen som testes.

(Foresattes signatur, dato)

Appendix D: Student Questionnaire

Self-assessment

This is what we practiced | This is my level of competence

					
Vocabulary	Engelske navn på alfabetet				
	Matching capital letters and small letters				
	Building, painting and writing words				
	Spelling words with silent E (Power E)				
	Writing words with the «th» letter combination				
Phonetics	Identifying and coloring the distinct sounds in words				
	Find rhyming words				
	The connection between letters and sounds				
	Pronouncing words with «th» sounds				
	I can distinguish between the «th» sounds and similar souns such as «t», «d» and «v»				

Tick the box for what you consider as correct

					
Attitude and motivation	Before the master group, this was my attitude and motivation towards English:				
	After the master group, this is my attitude and motivation towards English:				
	The activities I have participated in were motivating.				
Learning development	How was your competence level in English before the master group?				
	How is your competence level after the master group?				

Tick the alternative that you consider as correct

The tasks I did were too easy	
The tasks I did were too difficult	
The tasks I did were challenging, but not too difficult	

Which activities did you enjoy? Tick the boxes.

Alphabet bingo	
Ninja Phonics Race	
Phonological coloring worksheet	
Voiced and unvoiced th-sound distinguishing worksheet	
Writing words on each other's back	
Building words with wikki stix after their sounds	
Sound distinguishing Smartboard activity	
Painting words	
Capital and small letter matching puzzle	

Which activities were most educational for you? Tick 3 boxes at a maximum

Alphabet bingo	
Ninja Phonics Race	
Phonological coloring worksheet	
Voiced and unvoiced th-sound distinguishing worksheet	
Writing words on each other's back	
Building words with wikki stix after their sounds	
Sound distinguishing Smartboard activity	
Painting words	
Capital and small letter matching puzzle	

What is your opinion of the intervention?

Appendix E: Observation Form

Lesson number:	Date ___ /___ /___ Time:	Number of students present: ____ of ____	Student(s) not present:
Short description of lesson:			
Significant occurrence(s):			
Which student(s) understood what tasks?			
Which student(s) needed support to complete the task and what kind of support did they receive?			
How do the students approach and work with the tasks given?			
How long could each student work?			

Appendix F: Transcription of Semi-structured Interview

Interviewer (I): Hva er din helhetlige vurdering av intervensjonens vellykkethet?

Loretta (L): Jeg må si at, eh, helhetsinntrykket har vært at det har vært veldig varierte og multisensoriske oppgaver. Det har vært veldig spennende og lærerikt for elevene. Det er lov å tenke litt eller?

I: Det er lov å tenke litt.

L: Jeg synes at vi har hatt veldig fornøyde barn. Det er ganske mange i denne gruppen som er nokså ukonsentrert og vi har truffet dem med veldig varierte oppgaver, spennende oppgaver.

I: Så bra. Hva kan du si om vanskelighetsgraden til oppgavene?

L: Jeg trodde for eksempel at når vi skulle gå gjennom sangen om bokstaver og alt, at noen ville være veldig negative og synes det var veldig barnslig. Eh, men det viste seg jo at de hadde feil på... De fleste hadde faktisk hvert fall en bokstavfeil på første kartlegging og når dem tok bokstavbingo så fant dem ut at det faktisk ikke var så veldig lett. Da må jeg si at det jeg trodde kanskje skulle være lett, har heller ikke vært så veldig lett for dem. Så jeg syntes at tilpasningen har vært god. God gjennomgang på bokstaver og varierte oppgaver m:ed, ja, de WikkiStix og maletusjer, flotte oppgaveark som vi har fått gått gjennom og brukt.

I: Hvilke aktiviteter synes du det virket som elevene lærte mest av?

L: De jeg syntes de lærte mest av... Må jeg tenke litt på hva vi har vært igjennom. Jeg synes særlig der dem brukte WikkiStix, fikk brukt kreativiteten og formet ordene som vi hadde vært gjennom i forkant. Jeg synes også de lærte veldig mye av gjennomgangen når de farget og ble kjent med de ulike ordlydene, ulike bokstavlydene. Den der, «hvem skal ut» oppgaven også føler jeg ligger høyt oppe på hva de lærte mest av, for da gikk diskusjonen rundt i gruppa. Veldig nyttig.

I: Tror du at disse aktivitetene kunne vært brukt i en hel klasse?

L: Med god tilpasning og kanskje en klasse som også har hjelp av assistent, for det er jo... Det krever mye å klippe ut litt og lime og med en gang det blir litt praktisk... å ha kanskje, hvert fall en voksen til, tilstede. Men hvis vi hadde brukt det i klassen til de elevene som har vært med nå, så tror jeg også de kunne hjulpet de andre i gang og liksom brukt og vist kreativiteten sin så tror jeg det faktisk kunne vært veldig nyttig. Jeg tror, i hel klasse, med den gjennomgangen vi har hatt, så tror jeg faktisk at veldig mange kunne respondert bra på det. For jeg tror det er såpass, eh, godt forklart og godt strukturert at, ja. Det kunne absolutt vært brukt i hel klasse.

I: Mhm. Eh, hvordan synes du elevene har utviklet seg?

L: Jeg synes alle har hatt stor fremgang, spesielt «William». Han har vært mest overraskende synes jeg, hatt størst utvikling og det har vært han som har vært mest ukonsentrert og ufokusert også. Så han har virkelig fått med seg mye innimellom selv om det ikke har sett ut som han har fått med seg en del. Det er han som kanskje har vært mest negativ og, innimellom, men han har vist så kreativitet her, med WikkiStix, med å fargelegge raskt og effektivt, fått med seg mye

stum e og det er utrolig flott å se. Eh, alle har jo økt sin innsats, veldig synd at de elevene som flytta.

I: Det var etter den fjerde timen, var det ikke?

L: Det var etter den fjerde timen. Jeg synes at de hadde fått med seg veldig mye for å bare ha vært helt med i starten, de fire øktene de fikk med seg. Så synes jeg de fikk god nytte av det. De fikk også på en måte økt litt måten å jobbe på i full klasse da, med at de fikk tenkt litt mer over hvilke ord og, dele opp og hvilke lyder som henger sammen. De hadde mer fokus på det i etterkant.

I: Har det vært noen tilbakemeldinger fra foreldrene eller elevene selv?

L: Ja, det har vært mange positive tilbakemeldinger. Veldig fornøyde elever. Spesielt de to jentene, «Catharina» og «Emily». De har vært helt storfornøyd med opplegget. «Emily» sa at hun... Ja at hun gruet seg til engelsk før, men nå har hun sagt at hun gleder seg. Jeg tror at de kunne vært med hver eneste dag. Eh, de to guttene som ble igjen på slutten, de har også vært utrolig fornøyde. Det har ikke vært noe negativt om å bli med gruppa ut. Det at til og med «William», til og med han har sagt innimellom at det har vært den beste økta han har vært med på, på lenge. Det kjenner jeg meg veldig fornøyd med, når eh, han klarer å fortelle det. Det pleier ikke han å gi så mye uttrykk for ellers. Det pleier å være at alt er kjedelig, legger seg på gulvet... Eh, han pleier heller ikke vise særlig stor arbeidsinnsats til vanlig, så at han har jobbet så godt med dette er veldig overraskende. Selv om han ikke hadde så stor utvikling har også «Jack»... Ja, han har spurt etter flere lignende timer.

I: Mener du da at dette har truffet han da?

L: Ja, det har truffet han. Han har sett nytten av å gå så nøye til verks i de oppgavene.

I: I hvilken grad har de ulike elevene utviklet sin fonologiske bevissthet?

L: I stor, stor grad. De har... «Philip» som flyttet også, han hadde jo økt sine ferdigheter minst, men han hadde også på en måte de vanskeligste forutsetningene. Han hadde en del spesifikke språkvansker i tillegg til dysleksi. Jeg merket bare på han etter første økten, etter første økten at han tenkte på hvor lydene kom fra i andre økter som jeg var ute og jobbet med han. Eh, også til alle de andre elevene, så begynte dem å bli mer bevisste på å se sammenhengen, koble lyder sammen. Det er også når dem har lest andre tekster, da, at dem kjenner igjen det vi har vært gjennom her. Kjenner igjen både ord fra opplegget, også blitt mer bevisste på å bruke andre ord og begreper.

I: Du nevnte «Philip», som hadde dysleksi og spesifikke språkvansker. Er det noen av de andre som har flere forskjellige diagnoser?

L: Det er det. For eksempel William. Så at han har vært så fornøyd det er også veldig stort. Han, eh, har jo fått diagnosene Tourettes og spesifikke språkvansker, han har også fått at han har noe grad av epilepsi. Tourettes gjør at han har mye tics, som jeg fortalte i forrige spørsmål at han slenger seg ned på gulvet, lager mye lyder og føler seg generelt veldig ukonsentrert. Han har hatt noen økter underveis som har vært litt vanskelige, at vi delte gruppa i to. Det trengte de to gutta en liten periode, for å på en måte få ro og konsentrasjon til bare de. Likevel så har dem gjort og fulgt dette opplegget så bra, vært engasjert og med det praktiske. De ble også veldig

fornøyd når de skrev på ryggen til hverandre. Det tror jeg dem lærte veldig mye av, at de både fikk tatt oppgavene på ark og skrevet det på ryggen i tillegg til WikkiStix og igjen få det inn i Book Creator med lydfil. De fikk med veldig mye. Det var veldig variert. De fikk virkelig utfoldet seg og det synes dem var gøy. De måtte på en måte ikke bare sitte stille og jobbet med ark. Kjempenyttig!

I: Eh, det jeg lurte på, hva er din spesialpedagogiske vurdering av «Catharina» og hvorfor du ønsket å ha henne med i denne gruppa?

L: Jo, jeg har sett at hun som flytta, «Caroline»... For det første så hadde hun dysleksi og var veldig god venninne med «Catharina». Eh, så de trengte rett og slett hverandre. «Caroline» hadde ikke spesielt lyst til å være med heller, uten «Catharina». Jeg så egentlig at begge ville ha stor nytte av det. «Caroline» hadde jo dysleksi. Så har jeg studert litt kartleggingsprøver av «Catharina» og sett at hun... Hun har jo AD/HD. Jeg har vært litt på Statped på kurs og lest litt om dette og sett at veldig mange med AD/HD også sliter på litt dysleksiproblematikk også fordi dem er veldig ukonsentrerte og tenker på flere ting samtidig. Det er vanskelig for dem å sortere sanseinntrykkene de hører. Jeg har sett på kartleggingsprøvene hennes. På ordkjedetesten ligger hun på stanine 5. Høyeste er 9, laveste er ni. Selv om det er akkurat på snittet, så ville jeg gjerne hatt hun litt høyere. Hun... Jeg har sett på de fire lesenivåene, at rask og unøyaktig er en og sakte og unøyaktig, en rask og nøyaktig leser og en sakte og nøyaktig. Jeg ville hatt hun... Hun er nok en... For hun får med seg mye. Hun er glad i språk, men jeg ville hatt hun litt mer fra sakte og nøyaktige til nærmere rask og nøyaktig. Jeg tror at det tar tid før hun er på rask og nøyaktig, men ting tar ganske lang tid. Hun har ikke økt, for eksempel like mye som «Emily», som har dysleksi i gruppa her. Jeg ser at på en måte den sakte og nøyaktigheten hennes er også det som stopper henne under veien. Med den fonologiske bevisstheten til denne gruppa, har jeg sett at hun også har begynt også bare... Hun sier noe, også stopper hun og tenker over hvordan de lydene egentlig henger sammen igjen. Både når hun skriver setninger selv og når hun leser, så hun tenker mye mer over... «Ja, de lydene hører sammen. Jaha, da skrives det sånn». Så hun... Jeg så veldig nytten i at hun var med i støtte til «Caroline» og at hun faktisk har fått med seg veldig mye selv. Jeg tenker at siden hun også ikke har økt sin progresjon like mye som de andre i gruppa nesten, så gjenspeiler det den sakte og nøyaktigheten hennes. Hun trenger dette multisensoriske for å komme seg videre. Det har vært nyttig å ha henne med. Derfor ville jeg at du skulle ha henne med sammen med denne dysleksigruppa.

I: Er det til slutt noen andre kommentarer du har?

L: «Jack», selveste «Jack». Jeg synes han også kan ligne litt på «Catharina», litt på sakte og nøyaktig. At han ikke nødvendigvis alltid har så mye... Han har jo en del feil på grunn av dysleksien og han har ADD i tillegg. Eh, men jeg tenker at han har vist så stor nytte av det her han også. Han gjør det veldig nøye, veldig grundig. Så han får med seg det gjennom å jobbe såpass grundig. Det blir veldig fint, veldig vakkert, men derfor igjen ville man hatt han mer på rask og nøyaktig. Han lærer veldig mye, han er veldig interessert i sammenhengen mellom lydene og bokstavene. Kreativ på Book Creator, spennende å skrive på ryggen og det å farge og rime. Har vi glemt noen da?

I: Nei, da har vi vel snakket om alle. På «Caroline» og «Emily» er det vel kun dysleksi?

L: Ja.

I: Da tenker jeg at vi har fått...

L: Hvis du lurer på noe, spør meg gjerne på mail også. Det kan godt hende at jeg har glemt noe selv.

I: Ja, tusen takk for samtalen og takk for et godt samarbeid!

Appendix G: Spelling Test Form and Pre-Post Comparison Sheet

See the following pages

Name:		Date:	**Score (circle)**	
Age:		Date of birth:		
1			0	1
2			0	1
3			0	1
4			0	1
5			0	1
6			0	1
7			0	1
8			0	1
9			0	1
10			0	1
11			0	1
12			0	1
13			0	1
14			0	1
15			0	1
16			0	1
17			0	1
18			0	1
19			0	1
20			0	1
21			0	1
22			0	1
23			0	1
24			0	1
25			0	1
26			0	1

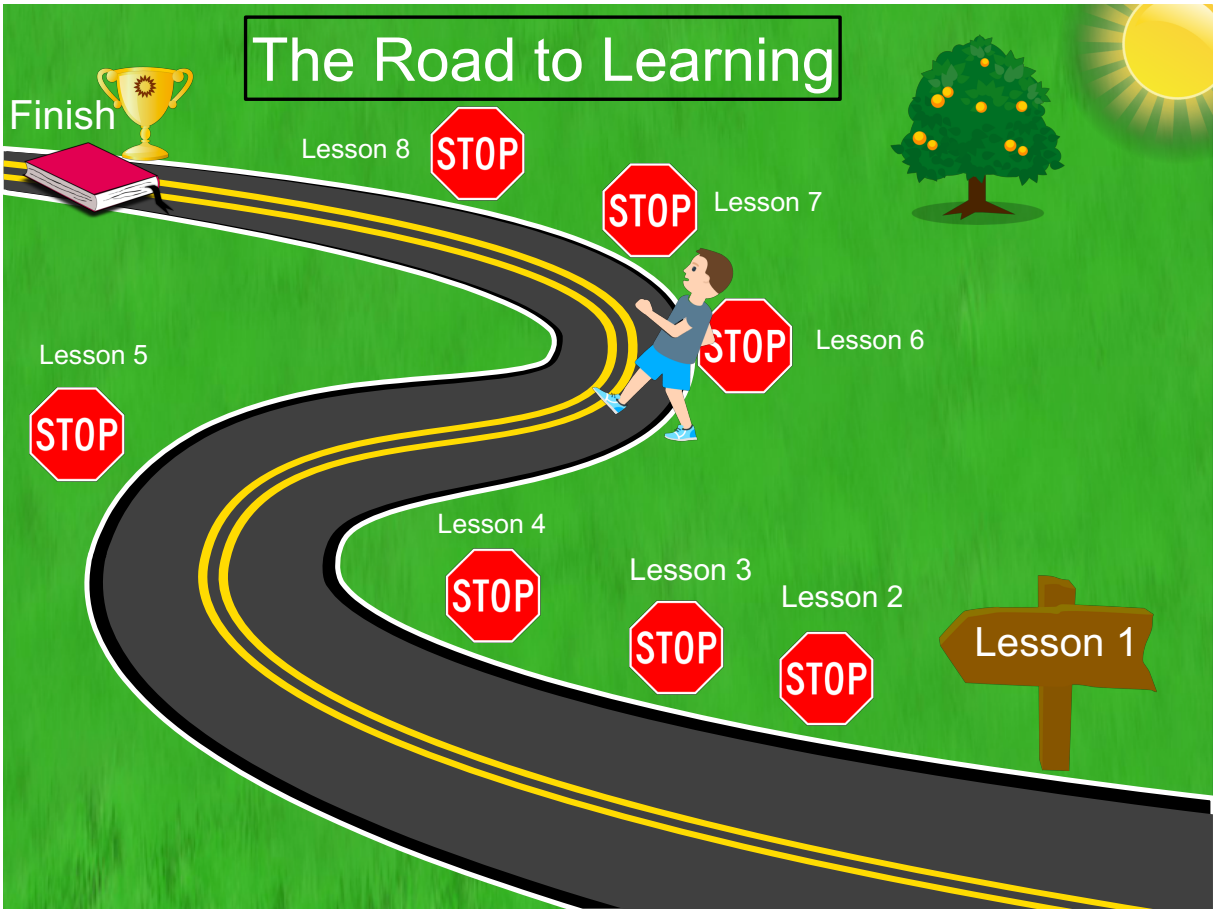
27		0	1
28		0	1
29		0	1
30		0	1
31		0	1
32		0	1
33		0	1
34		0	1
35		0	1
36		0	1
37		0	1
38		0	1
39		0	1
40		0	1
41		0	1
42		0	1
43		0	1
44		0	1
45		0	1
46		0	1
47		0	1
48		0	1
49		0	1
50		0	1
51		0	1
52		0	1
53		0	1
		Overall score:	

Name:		Age:	Date:		
Item #	**Word/letter**	**Attempt pre-test**	**Attempt post-test**	**Score pre-test**	**Score post-test**
1	H				
2	I				
3	Am				
4	On				
5	Yes				
6	Mug				
7	Rib				
8	The				
9	Love				
10	Wind				
11	Do				
12	Help				
13	Bring				
14	Flags				
15	Next				
16	Stay				
17	Come				
18	Eat				
19	Said				

20	Born				
21	Spell				
22	What				
23	There				
24	Ripe				
25	Two				
26	Little				
27	Thrash				
28	Magpie				
29	Better				
30	Ground				
31	People				
32	Chain				
33	Spoil				
34	Few				
35	Watch				
36	Heard				
37	Poking				
38	Pretty				
39	Ocean				
40	Shirt				

41	Branches				
42	Although				
43	Practice				
44	Antique				
45	Beautiful				
46	Chaos				
Hellen Arkell Spelling Test				Score:	Score:
Item #	**Word**	**Pre-test attempt**	**Post-test attempt**	**Pre-test score**	**Post-test score**
47	Are				
48	That				
49	With				
50	And				
51	Have				
52	One				
53	He				
McNally Wordlist Items				Score:	Score:

Appendix H: Lesson Road Map



Lesson plan: 1

Curriculum aim:
use listening and speaking strategies
use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
use basic patterns for orthography, word inflection, sentence and text construction to produce texts

Aim of lesson:
To practice the understanding of sound-letter-correspondence, as well as segmenting and blending phonemes.

Activity number	Activity	Description	Duration
Activity 1:	Alphabet repetition	Repeat the names of the letters through an ABC song, then let the pupils say the English names together.	5 min
Activity 2:	Puzzle	In groups, the pupils are to match the capital letters with their small versions and put the pieces of the puzzle together while saying each letter's English name.	10 min
Activity 3:	Monster mansion alphabet match	The pupils should work individually with headphones while doing this game. Show them how to get the game.	10 min
Activity 4:	Sound-letter correspondence: Pound and Sound	Write "cry" in different colors for each sound on the board and pronounce the sounds of the word while knocking on the board under the letters that make up the individual sounds. Do the same again with "eye". The pupils shall repeat.	5 min
		Hand out the worksheet. Tell the pupils that they should do the worksheet. Play "The Eye of the Tiger" while the pupils work.	15 min
		After they have done so, ask them what sound the words have in common. The pupils should discuss.	5 min
Activity 5:	Sound-letter-correspondence activity part 2	The pupils cut out the dotted words and glue them together with their matching picture.	10 min
Homework:	The online game "Monster Mansion". The pupils should do the letter names memory task or the show task from a-z.		

1. Trace the words in Column 1 three times for each word.
2. Join the dots in Column 2.
3. Color the letters in Column 3 in different colors for each sound.
4. Color the words in column 4 correctly with help from the teacher. Mark the ones in Column 3 that were correct with a green mark.

Column 1	Column 2	Column 3	Column 4
ripe	ripe	ripe	ripe
wild	wild	wild	wild
cry	cry	cry	cry
guy	guy	guy	guy
buy	buy	buy	buy
price	price	price	price

Lesson plan: 2

Curriculum aim:

- use listening and speaking strategies
- use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
- use basic patterns for orthography, word inflection, sentence and text construction to produce texts

Aim of lesson:

To practice the understanding of sound-letter-correspondence, as well as segmenting and blending phonemes and graphemes.

Preparation:

Make sure there's enough color pencils and scissors. Print 1 worksheet per pupil. Print 1 set of grapheme cards per group.

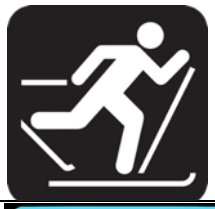
Activity number	**Activity**	**Description**	**Duration**
Activity 1:	Game: Monster Mansion Alphabet Match	Start the session with a recap of the letter names. Let the pupils do the letter sound task in Monster Mansion Match.	10 min
Activity 2:	Sound-letter correspondence 3	Focus sound: the /i:/ sound as in "bee" or "leave". Write the words on the board in different color for each sound. Say the individual sounds for each word. Then, say the words to the pupils at least three times. Tell the pupils that they need to find the sound they all have in common. Walkthrough their findings. Then, everyone in the group should join the dots to form the words and color the letter(s) that make(s) the focus sound. Words to use: ski, freeze, mean, lady, he, thief, deceive, people, eat.	15 min
Activity 3:	Coloring task and matching task	Give the pupils the coloring worksheet. Tell the pupils to do the same as they did in their books with the words on it. Alphabet game for the pupils who finish early.	10 min
Activity 4:	Discussion	What did the pupils discover? Go through the words and their sounds on the whiteboard. Let the pupils help.	5 min
Activity 5:	Grapheme-phoneme blending	Give the pupils the cards with graphemes. Tell them that they should move the cards to build words and that they should say the sounds individually and then the word. They should write down the words they make on the form. Model the activity on the whiteboard.	15 min

Worksheet: Find the sounds

1. Match the words with their pictures.

2. Trace the words with your fingers.

3. Color the words by using different colors for different sounds in the words.

	Freeze
	Mean
	Key
	People
	Eat
	Ski

Cut the cards out. Move the cards around to form words.

f	ee	l
p	ea	t
s	ey	s
k	eo	r
b	ie	z
g	i	e
th	ei	p
s	e	f
l	y	k
d	c	d
m	e	v

Use the table below to write down the words that your group makes. Remember to use different colors for the different sounds and translate the words.

English word	Translation

Lesson plan: 3

Curriculum aim:

use listening and speaking strategies

use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication

use basic patterns for orthography, word inflection, sentence and text construction to produce texts

Aim of lesson:

To practice identifying and manipulating sounds to make words.

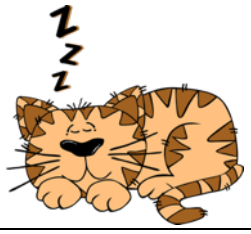
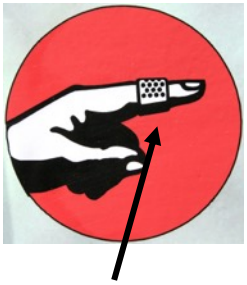
Preparation:

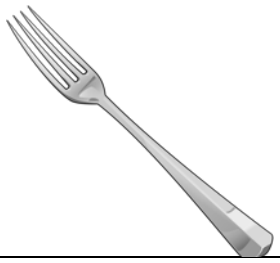
Make sure there is enough color pencils. Post the odd one out activity in Showbie. Print the table for activity 5. Write post-it notes with onsets and rimes.

Activity number	**Activity**	**Description**	**Duration**
Activity 1:	Odd one out activity	Hand out the worksheet. The pupils should find the odd one out; i.e. the word that does not rhyme with the two others. The ones who finish early can do online exercises. Discuss in class after the pupils are done.	10 min
Activity 2:	Make your own rhymes	Give the pupils the Book Creator document with words that rhyme. Tell the pupils that exercise 1 is: a) add a word that rhymes with the other two b) include a picture and c) at home: record your own voice saying the word you added.	15 min
Activity 3:	Ninja Board Game	See game description. Demonstrate the different tasks the pupils are faced with prior to them playing.	20 min
Homework	Record your own voice while saying the words you added in Book Creator. Finish the odd one out activity. Hand in in Showbie.		

Does it rhyme?

Find and circle the odd one out. Color the letters in different colors for each sound.

1.			
	Sleep	Ship	Sheep
2.			
	Jar	Car	Chair
3.			
	Pear	Deer	Bear
4.			
	Sound	Ground	Wound

5.			
	Speaking	Stealing	Feeling
6.			
	Mark	Steak	Bake
7.			
	Cork	Shark	Fork
8.			
	Potion	Ocean	Frozen

Lesson plan: 4

Curriculum aim:
use listening and speaking strategies
use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
use basic patterns for orthography, word inflection, sentence and text construction to produce texts
Aim of lesson:
To practice identifying sounds and spell the /tʃ/ sound.
Preparation:
Bring the onset and rimes strips. Print the moveable cards and the bingo boards.

Activity number	**Activity**	**Description**	**Duration**
Activity 1:	Single word repetition	The pupils write the words on the back of another pupil. Switch after finished. Then, they build the words with the wikki stix. Words to use: antique, next, stay, eat, said, there, what, beautiful	20 min
Activity 2:	Presentation	Present the target sound and the two different spellings featured in this lesson: "tch" and "ch". Say the words one at a time: lunch, match, catch, punch, check. Write them on the board after going through the sounds. Color code the two written variations of the target sound.	10 min
Activity 3:	Moveable cards with the /tʃ/ sound	The pupils should trace the letters on the cards that make up the sound. After tracing and reading, students place cards face up in one of the three piles - words beginning with the /tʃ/ sound spelled with the letters 'ch', words ending with the /tʃ/ sound spelled with the letters '-ch' and words ending with the /tʃ/ sound spelled with the letters '-tch'. Demonstrate the activity prior to the pupils doing it.	15-20 min
Activity 4:	Bingo	Pupils should place some of their moveable cards on their bingo boards, then look carefully at the words on their bingo boards and try to remember their position. Read the words, the pupils flip the cards they have on their bingo boards when the word is read. The first person to flip all the words in one row and one column says 'Bingo!' and is the winner. Continue the game until all the participants cover all the words on their boards. When giving instructions, demonstrate how to perform	15 min

		the activity. Repeat the activity if there is more time.	
Homework	Do the sorting activity at home. Take a picture when you're finished and post it.		

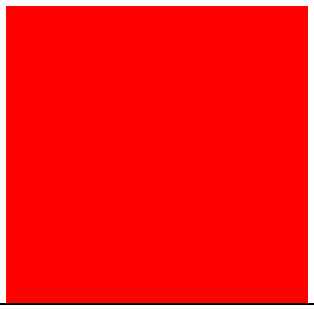
Lesson plan: 5

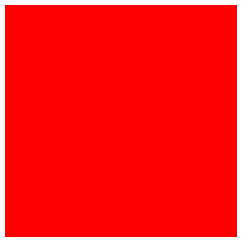
Curriculum aim:
use listening and speaking strategies
use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
use basic patterns for orthography, word inflection, sentence and text construction to produce texts

Aim of lesson:
To practice identifying sounds and spell the /tʃ/ sound.

Preparation:
Bring the moveable cards and the bingo boards, as well as dice. Print and laminate the Ninja Race Phonics Game. Print one player and one "My ninja words" sheet for each pupil.

Activity number	**Activity**	**Description**	**Duration**
Activity 1:	Minimal pairs	Present examples of minimal pairs and explain what a minimal pair is.	5-10 min
Activity 2:	Minimal pairs: distinguishing	The pupils listen to the teacher saying minimal pairs of words. They are to decide whether each word has a long or short vowel sound and fill the answers in the chart. They should trace the words, then color the different sounds the words make along with the teacher.	
Activity 3:	Minimal pairs: odd one out	The pupils are to trace and write in the words under the pictures and find the odd one out from the words that the teacher reads.	
Activity 4:	Minimal pairs bingo	The pupils are given bingo boards. They are also given cards with minimal pairs that they should place on their individual bingo boards.	
Activity 5:	Ninja Board Game	See game description. Demonstrate the different tasks the pupils are faced with prior to them playing.	
Homework	Book Creator task with minimal pairs and distinguishing, plus spelling exercise.		

Sheep		Ship	
	Short vowel Long vowel		Short vowel Long vowel
Fit		**Fight**	
	Short vowel Long vowel		Short vowel Long vowel
Not		**Note**	
	Short vowel Long vowel		Short vowel Long vowel
Read		**Red**	
	Short vowel Long vowel		Short vowel Long vowel

Reach 	Rich 	Eat 
It 	Wait 	Wet 
Sad 	Said 	Cute  
Cut 	Read 	Red 

Lesson plan: 6

Curriculum aim:

- use listening and speaking strategies
- use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
- use basic patterns for orthography, word inflection, sentence and text construction to produce texts

Aim of lesson:

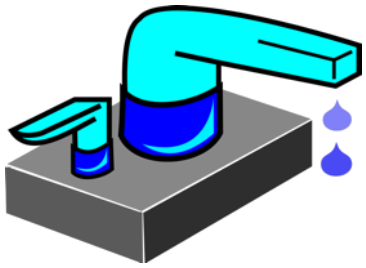
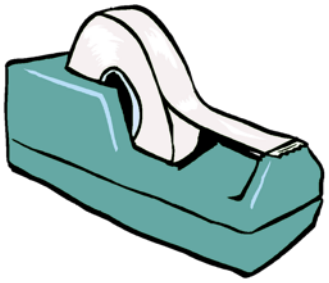
To practice identifying sounds and spelling words with the silent "Power E".

Preparation:

Bring the alphabet puzzle pieces. Make sure every pupil has the Power E ESF lesson. Print one worksheet for each pupil.

Activity number	**Activity**	**Description**	**Duration**
Activity 1:	Bingo	Repeat the minimal pairs bingo activity.	15 min
Activity 2:	Power E: Presentation	Give the rule card. Explain the power of the letter E when it is put at the end of a word.	5 min
Activity 3:	Silent E song	Play the Silent E music video once. Ask what the song title means. Play it once more, however, make sure you stop after words that are mentioned. Write some of them on the board.	15 min
Activity 4:	Power E ESF lesson	The pupils are presented with the English Sounds Fun Power E lesson (17).	15 min
Activity 5:	Auditory practice	The pupils are given a worksheet with words missing one or more letters and are expected to fill them in while the teacher says the words three times.	10 min
Homework	Use the worksheet to make your own vocabulary list with pronunciation in Book Creator. Write them with the keyboard, and by using a pencil.		

Power E Rule Card

Adding **«e»** after a single final consonant of a one-syllable word makes the vowel in the middle of that word long (or say its name). Når man legger til en **"e"** etter den siste konsonanten i et enstavelsesord, sier vokalen i midten navnet sitt.		
Short vowel Kort vokal	+ e =	**Long vowel** Lang vokal
 Mad	+ e =	 Made
Sint		Lagde
 Tap	+ e =	 Tape
Kran		Teip

C_ne	C_n
Stokk	Kan/boks
C_t_	_ _t
Søt	Klippe, kutte
M_ _	M_de
Sint	Lagde
_ o_e	Ho_
Håp	Hoppe
_ a _	T_ p_
Kran	Teip
Sm_le	T_m_
Smil	Tid

Lesson plan: 7

Curriculum aim:
use listening and speaking strategies
use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
use basic patterns for orthography, word inflection, sentence and text construction to produce texts

Aim of lesson:
To practice hearing and saying the "th" sounds and distinguishing between them and other sounds.

Preparation:
Print out worksheet. Bring a ball and download the Smart Labs activity.

Activity number	Activity	Description	Duration
Activity 1:	Walkthrough of the "th" sounds	The teacher writes "th" on the board and its two IPA symbols and voiced/voiceless before the lesson. When the lesson starts, the teacher explains that "th" in English makes two different sounds. The pupils are given clear instruction on what sounds and say them. They practice the unvoiced, before moving on to the voiced.	10 min
Activity 2:	Auditory discrimination	A worksheet is handed out. On this worksheet, the pupils are to place the words in the right bag.	15 min
Activity 3:	Smart Notebook activity	On the Smartboard, there is an activity where the pupils are supposed to move words to the correct boxes. Before the activity, go through how all the words sound. Explain how the "th" words are put in the left box and words with sounds that "th" is confused with are put in the right box. Throw ball to one pupil, who should get up, choose a word, say it, then move it to the right box.	15 min
Activity 4:	Multisensory building exercise	The pupils are expected to build the following words with WikkiStix: the, there, thrash, although, that, with. Then, feel them and take a picture of them, before they put them in Book Creator and record themselves saying the words.	15 min
Homework	If the pupils are not finished with the Book Creator task, they need to put the picture in their book, then record themselves saying the words. Quizlet practice.		

Draw a line from the word to the correct box.

Through

There

Thank

With

That

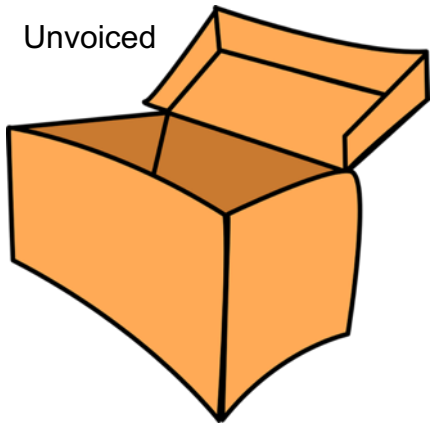
Thrash

Although

Bathroom

Mother

The



Fill in the missing letters

a __ t__ ou ___ ___ ___ ___ ere th__a ___ ___ ___ i ___ h

___ ___ e thr ___ ___ g ___

Lesson plan: 8

Curriculum aim:

use listening and speaking strategies

use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication

use basic patterns for orthography, word inflection, sentence and text construction to produce texts

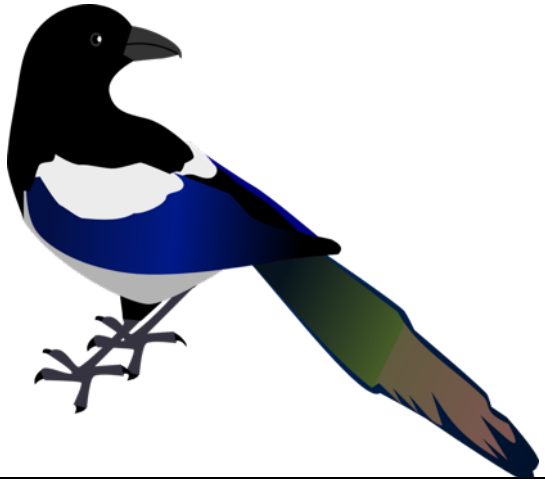
Aim of lesson:

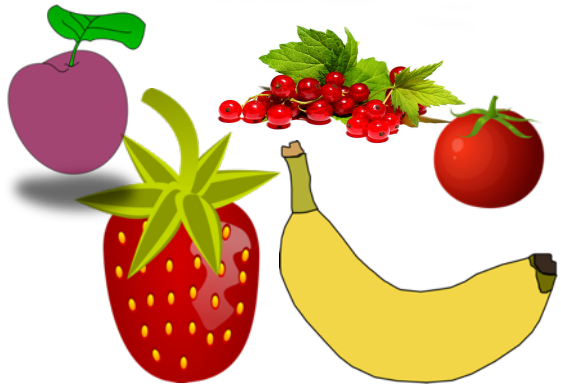
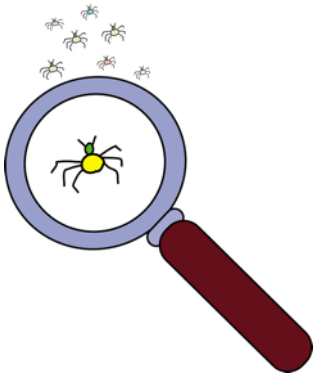
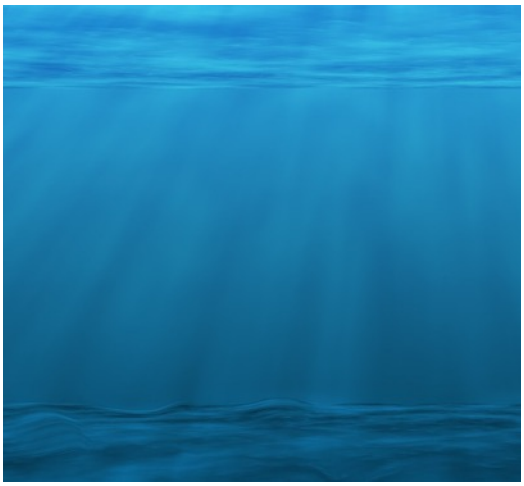
Repetition

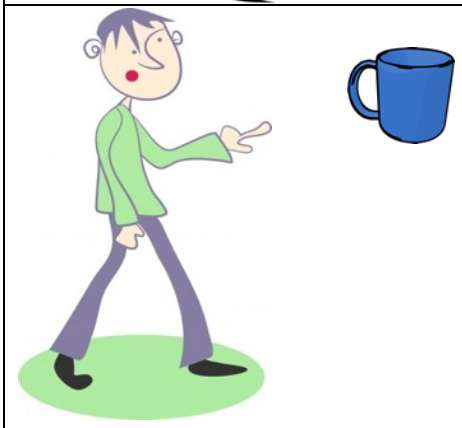
Preparation:

Print out the flashcards.

Activity number	**Activity**	**Description**	**Duration**
Activity 1:	Look-Trace-Cover-Write-Check	The teacher says the word on the flashcard. The pupils read it, say it aloud, and trace the letters. They flip the card around to see the picture. They write the word in their book, then check if it was correct. They mark the correct ones with a green check mark. If incorrect, they write the correct word. Then, repeat. If correct, move on to the next card.	20 min
Activity 2:	Quizlet practice	The pupils use flashcards, match and learn to practice the words.	10 min
Homework			

	Eat
	Magpie
	Ground

	Ripe
	Little
	Ocean
	People

	Beautiful
	That
	Chaos

Appendix J: Initial Intervention Drafts

First intervention plan

Focus	Week	Lesson	Activity description	Purpose
	Pre-intervention		English and dyslexia pre-test	To assess the pupil's English skills to adapt the intervention
Phonological awareness	**Week 1**	**Lesson 1**	Introduction	Researcher gives information about the intervention and their participation
			A brief discussion of previous English experience in school and motivation towards English	To gain insight in the pupil's motivation towards and experience of English.
			The pupils shall write a short handwritten fictional text in English.	Assessment of written English.
		Lesson 2	Alphabet repetition: let the pupils say the names of the letters together	To repeat the alphabet and its letters
			Puzzle activity: in groups, the pupils are to match the capital letters with their small versions and put the pieces of the puzzle together while saying each letter's English name.	
			Sound-letter-correspondence activity part 1: the teacher points to the letters in a word and says their sounds. The pupils all repeat. Example: child, wild, mild/run, fun, bun. The teacher asks which sounds they have in common. The pupils discuss in groups.	To practice understanding of sound-letter-correspondence and segmenting
			Sound-letter-correspondence activity part 2: The pupils should work together to say the individual sounds in words from picture cards.	

	Week 2	**Lesson 3**	Sound-letter correspondence 3: The teacher says the words with the /i:/ sound aloud 3 times. The pupils should write them down. After doing so, they should find the sounds they all have in common in groups. The pupils should individually rewrite the words and color the letters that make the sound.	To practice understanding of sound-letter-correspondence and segmenting
			Coloring task and worksheet. Go through the tasks after the pupils are finished.	
			The pupils are given cards with graphemes that they are to move to make words. They should say the sounds individually and then the word. Activity should be modelled by the teacher prior to the pupils doing it.	To practice phoneme and grapheme awareness (blending)
			Rhymes: the teacher introduces pictures of three words that rhyme (full, pull, bull) and asks the class why the pictures were chosen. Which sounds do the words have in common? The teacher asks the pupils if they can come up with other words that rhyme. The teacher hands out lyrics to a song. The teacher asks the pupils to identify words that rhyme. The pupils work in pairs as they listen to the song and circle the words that rhyme using different colors for each pair. In pairs, the pupils compare their findings. The teacher asks different pairs about their findings.	To practice identifying sounds
		Lesson 4	Repeat the song lyrics activity by using a different song.	Reinforcement of previous task.
			1a) Recognizing rhymes: In groups, pupils name objects in a row and say their names aloud. They circle the picture whose name does not rhyme with the other names. Discuss in class after the pupils are done.	To practice identifying sounds
			1b) Create rhymes: In pairs, students name the pictures in each row and say their names aloud and record. In each row they add a picture whose	To practice identifying sounds and practice manipulating

			name rhymes with names of the other two pictures.	sounds to make words
			Onsets and rimes: Teacher explains. The groups are expected to segment these words into onset/rime: that, ship, dark, bird, boss, rant	To practice segmenting words into sounds
			Pupils are assigned a post-it note of either an onset or a rime. They are to pair up with other pupils to form words. They must write their words down in a form.	
	Week 3	**Lesson 5**	Pupils create rhymes as described in 1b, Lesson 5.	Reinforcement of the rhyming task.
			Teacher repeats onset/rime explanation.	Reinforcement of onset and rimes.
			Board activity: the teacher write examples on the board: true, false, run, bun, make. Then pupils come up to do the same with: fun, shop, sight, cheap, thief.	Reinforcement
			Onsets and rimes: Book Creator task	Reinforcement
			Pair up: post it note activity repetition	Reinforcement
			Onset/rimes slides	Reinforcement
		Lesson 6	Onset/rimes slides: Continue the task from last class	Reinforcement
			Moveable cards with variations of spelling choices with the /tʃ/ sound.	To practice identifying and spelling the letters that make the /tʃ/ sound.
			Bingo with the moveable cards	
	Week 4	**Lesson 7**	Bingo	Reinforcement
			Ninja Board Game	To practice phonics
		Lesson 8	Station teaching with similar tasks to the previously completed tasks: 1. graphemes, 2. sound-letter correspondence, 3. rhymes, 4. onsets and rimes, 5. ninja board game	Reinforcement of phonological awareness of the intervention
Spelling and writing	**Week 5**	**Lesson 9**	Introduction of five words: the pupils are introduced to five words they should be familiar with. The teacher says the individual sounds before saying the word. The pupils	To practice understanding of sound-letter-correspondence and spelling

			are to write the words, using different colors for each sound. Thought, Through, throw, with	To practice writing the th (non-voiced) sound.
			Alphabet cards to form words: pupils are given a word they must work together to spell correctly by putting the cards together in correct order	To practice understanding of sound-letter-correspondence and spelling
			Memory game: the pupils are presented with cards of the practiced high frequency words that they can view once and must try to write correctly. If the pupil gets it correct, they get one point.	To practice spelling
		Lesson 10	Memory game	To reinforce last session's task
			Minimal pairs: The teacher explains what a minimal pair is. The pupils listen to the teacher saying minimal pairs of words. They are to decide whether each word has a long or short vowel sound and fill the answers in a chart. Example: cut/cute, note/not, bit/bite, fit/fight. (ship, sheep/leap, lip) (p. 166)	
			Odd one out: pupils are to find the odd one out from words that the teacher reads. Example: cut, sun, cute, nut.	
			The "ai" sound – task 7. P. 167	
			Minimal pairs bingo: https://myfreebingocards.com/bingo-card-generator	
	Week 6	**Lesson 11**	Power E: The teacher explains the magic powers of the letter E when it is put at the ending of a one syllable word. Rule card p. 167	
		Lesson 12	Morphological awareness	

	Week 7	**Lesson 13**	Grammatical awareness	
		Lesson 14		
	Week 8	**Lesson 15**	Syntactic practice?	
		Lesson 16	Final lesson – consolidation Station teaching	

Written communication
use basic patterns for orthography, word inflection, sentence and text construction to produce texts
Oral communication
use basic patterns for pronunciation, intonation, word inflection and different types of sentences in communication
use listening and speaking strategies
Language learning
identify some linguistic similarities and differences between English and one's native language

Shortened intervention plan

Week	Lesson	Activity description	Purpose	Data collection
Greet the pupils in English, then present the "road to learning" lesson previews at the start of each class.				
Pre-intervention		English and dyslexia pre-test	To assess the pupil's English skills to adapt the intervention	Test results
Week 1	**Lesson 1**	Alphabet repetition: let the pupils say the names of the letters together.	To repeat the alphabet and its letters	Field notes Homework: The pupils are given spoken phonemes in Book Creator on the tablet including the /aɪ/ sound as well as consonants that they are to blend to make new words.
		Puzzle activity: in groups, the pupils are to match the capital letters with their small versions and put the pieces of the puzzle together while saying each letter's English name.		
		Sound-letter-correspondence activity part 1: the teacher points to the letters in a word and says their sounds. The pupils all repeat. Example: child, wild, mild. The teacher asks which sounds they have in common. The pupils discuss in groups.	To practice understanding of sound-letter-correspondence and segmenting	
		Sound-letter-correspondence activity part 2: The pupils should work together to say the individual sounds in words from picture cards.		
	Lesson 2	Sound-letter correspondence 3: The teacher says the words with the /i:/ sound aloud 3 times. The pupils should write them down. After doing so, they should find the sounds they all have in common. The pupils should individually rewrite the words and color the letters that make the sound.	To practice understanding of sound-letter-correspondence and segmenting	Teacher evaluation, Pupil self-evaluation form
		Coloring task and worksheet. Go through the tasks after the pupils are finished.		
		The pupils are given cards with graphemes that they are to move to make words. They should say the sounds individually and then the word. Activity should be modelled by the teacher prior to the pupils doing it.	To practice phoneme and grapheme awareness (blending)	

Week 2	**Lesson 3**	1a) Recognizing rhymes: The teacher says the names of objects in a row aloud and the pupils color the letters with different colors for each sound. They circle the picture whose name does not rhyme with the other names. Discuss after the pupils are done.	To practice identifying sounds	Field notes, pupil tasks, Book Creator, Pupil self-evaluation form
		1b) Create rhymes: In pairs, students name the pictures in each row and say their names aloud and record. In each row they add a picture whose name rhymes with names of the other two pictures.	To practice identifying sounds and practice manipulating sounds to make words	
		Ninja board game	To practice segmenting words into sounds and rhymes	
	Lesson 4	Onset/rimes slides	To practice phonological awareness, searching up and writing words	Pupil self-evaluation form, teacher evaluation, homework
		Moveable cards with variations of spelling choices with the /tʃ/ sound.	To practice identifying and spelling the letters that make the /tʃ/ sound.	
		Bingo with the moveable cards		
Week 3	**Lesson 5**	Bingo	Reinforcement	Self-evaluation, observation
		Minimal pairs: The teacher explains what a minimal pair is. The pupils listen to the teacher saying minimal pairs of words. They are to decide whether each word has a long or short vowel sound and fill the answers in a chart.	To practice distinguishing between and spelling minimal pairs	
		Odd one out: pupils are to find the odd one out from words that the teacher reads. Example: cut, sun, cute, nut.		
		Minimal pairs bingo	To practice distinguishing between and spelling minimal pairs	
	Lesson 6	Power E: The teacher explains the magic powers of the letter E when it is put at the end of a one syllable word. Give pupils the Power E rule card.	To practice spelling words with silent E	Book Creator Self-evaluation
		ESF lesson		

		Auditory practice, fill in letters in charts		
Week 4	**Lesson 7**	The “ai” sound – task 7. P. 167	To practice spelling words with the “ai” sound	
		Introduction of five words: the pupils are introduced to five words they should be familiar with. The teacher says the individual sounds before saying the word. The pupils are to make the words with alphabet tiles and record their words on a form. Thought, Through, throw, with	To practice understanding of sound-letter-correspondence and spelling To practice writing the th (non-voiced) sound.	
		Alphabet tiles to form words: pupils are given a word they must work together to spell correctly by putting the tiles together in correct order.	To practice understanding of sound-letter-correspondence and spelling	
	Lesson 8	Mnemonics: The teacher introduces a mnemonic for the word “beautiful” and asks the pupils if they can tell what word the first letters in the words make up. They should use letter tiles to put the words together. Although: After Lunch The Hunters Of Umbrellas Go Hunting Because: Big Elephants Can’t Always Use Small Exits	To learn methods for remembering spelling patterns of a word	Homework: make mnemonics with words they struggled with
		Flip cards/memory		
		Look-Cover-Write-Check		

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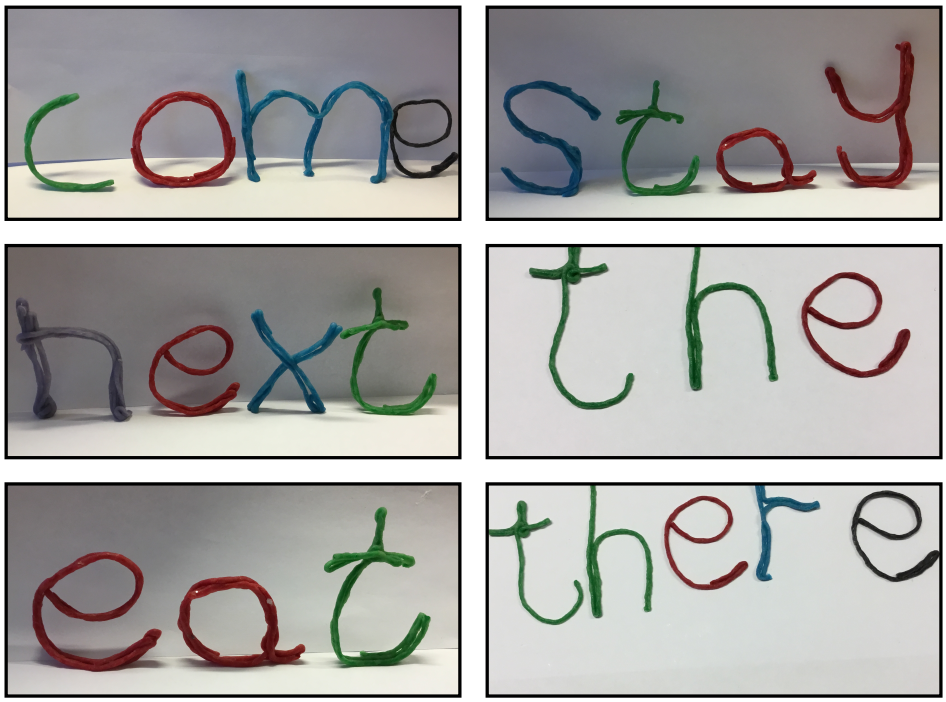
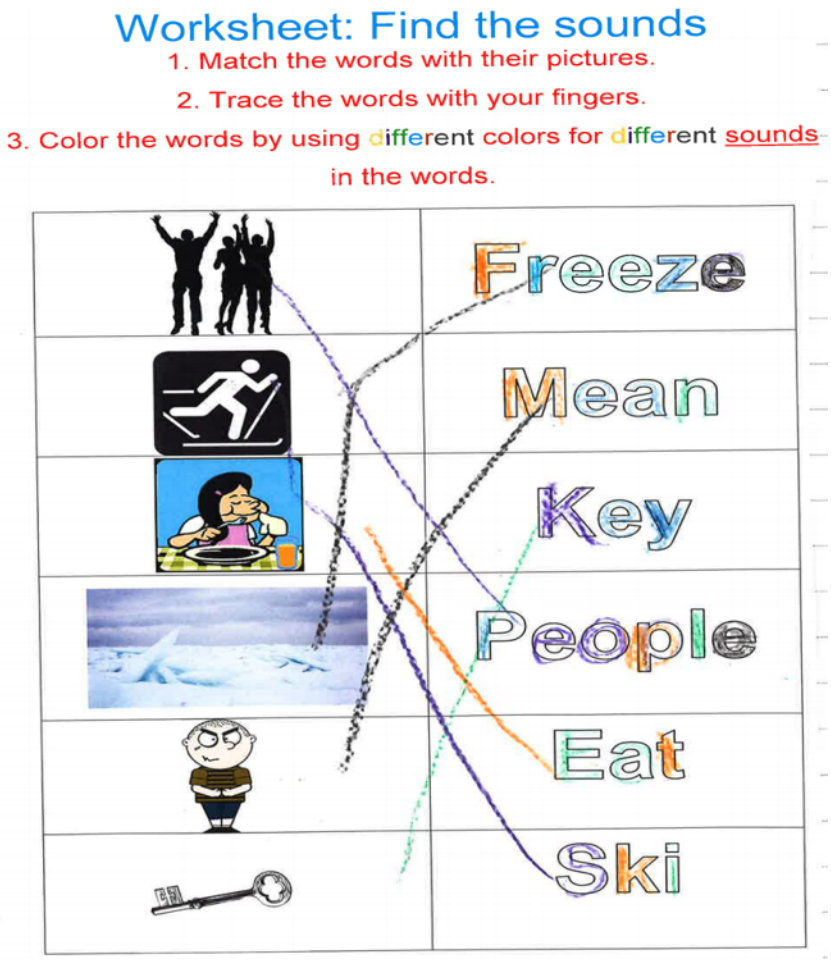
Building Words with WikkiStix

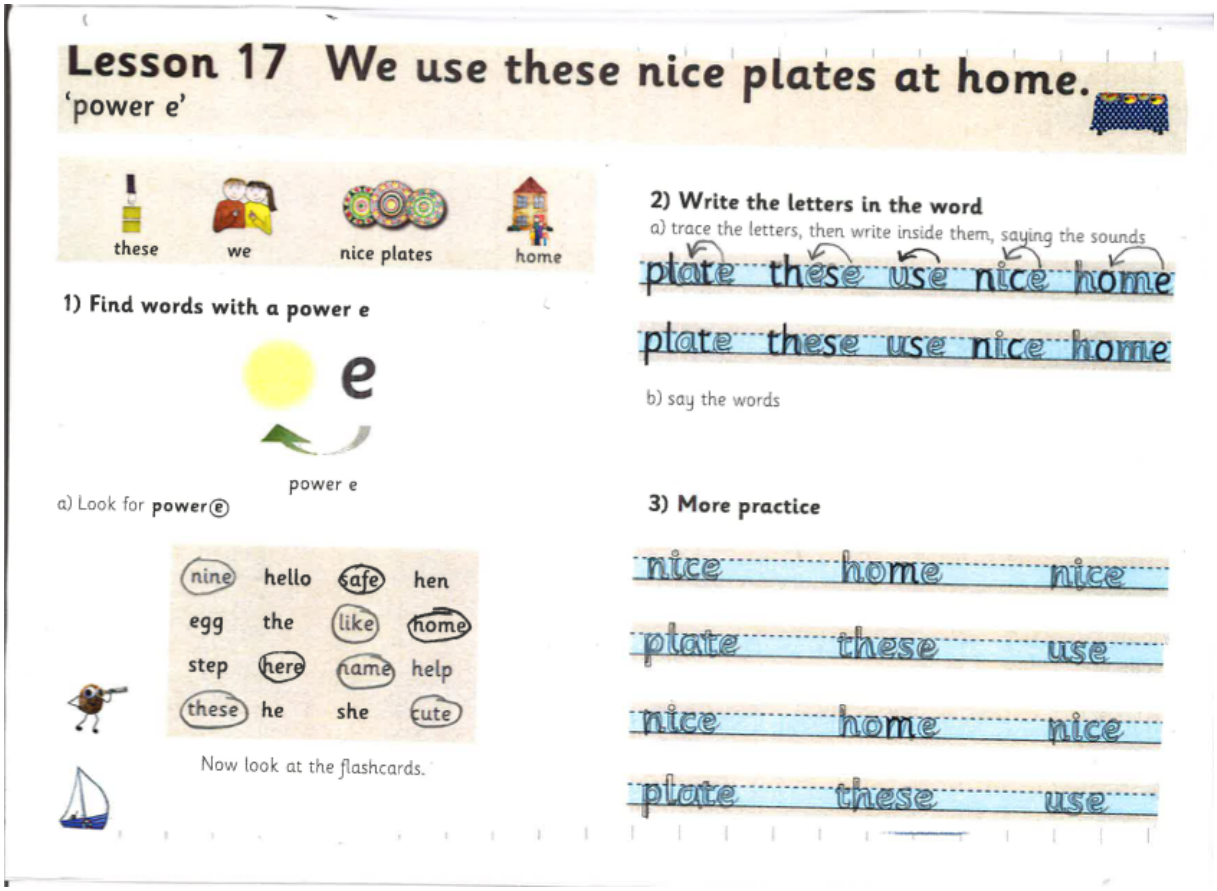




Auditive distinguishing

Painting words

Silent e practice



Lesson 17 We use these nice plates at home.

'power e'

these we nice plates home

1) Find words with a power e

e

power e

a) Look for power e

nine hello safe hen
egg the like home
step here name help
these he she cute

Now look at the flashcards.

2) Write the letters in the word

a) trace the letters, then write inside them, saying the sounds

plate these use nice home

plate these use nice home

b) say the words

3) More practice

nice home nice

plate these use

nice home nice

plate these use

Book Creator task