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Dyslexia and English as a Foreign Language in Norwegian Primary Education: A Mixed Methods Intervention Study

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∞ The current study explored the effect of specific teaching accommodations for English language learners with dyslexia in a Norwegian primary school. Specifically, this single group intervention project investigated the impact of a range of multisensory techniques on spelling skills and motivation. Participants included a special education teacher and five dyslexic pupils from the fifth and sixth grades. Pre- and post-tests were administered to observe development in spelling, while data were also collected via a pupil evaluation questionnaire and a teacher interview after the intervention. The findings revealed that the intervention was quite successful. The group exhibited substantial differences in mean scores between the pre- and post-test. However, there were individual differences in scores and comorbid disorders appeared to impact the effectiveness of the intervention. Nonetheless, all of the pupils reported gains in their motivation and improvement in their attitude towards learning English, which was confirmed by their special education teacher. The paper concludes by offering specific didactic suggestions regarding accommodations for English language learners with dyslexia.

Keywords: dyslexia, English as a foreign language, intervention, multisensory learning approach

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Disleksija in angleščina kot tuji jezik v norveškem osnovnošolskem izobraževanju: intervencijska študija kombiniranega raziskovalnega pristopa

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☞ Ta študija je preučevala učinek posebnih učnih prilagoditev za učence angleškega jezika z disleksijo v norveški osnovni šoli. Natančneje, eno-skupinski intervencijski projekt je raziskoval vpliv nabora veččutnih tehnik na črkovanje in motivacijo. Udeležence predstavljajo specialni pedagog in pet učencev petega in šestega razreda z disleksijo. Pred- in potesti so bili izvedeni z vidika opazovanja napredovanja črkovanja pri učencih, pri čemer so bili podatki zbrani tudi prek vprašalnika za ocenjevanje učencev in intervjuja z učiteljem, ki je sledil fazi intervencije. Ugotovitve so pokazale, da je bila intervencija precej uspešna. Pri izbrani skupini so bile zaznane bistvene razlike v povprečnih rezultatih pred- in potesta, vendar pa je prišlo tudi do posameznih razlik v rezultatih, pri čemer se zdi, da pridružene motnje vplivajo na učinkovitost intervencije. Kljub temu so vsi učenci poročali o povečanju motivacije in izboljšanju odnosa do učenja angleščine, kar je potrdil tudi njihov specialni pedagog. Na koncu članka so podani konkretni didaktični predlogi glede prilagoditev za učence angleškega jezika z disleksijo.

Ključne besede: disleksija, angleščina kot tuji jezik, multisenzoren pristop k učenju

Introduction

Dyslexia refers to “difficulty in learning to read and write by the methods normally used in the classroom” (Montgomery, 2017, pp. 1–2). This statement implies that if appropriate teaching methods are offered, the difficulties can be remedied. Moreover, dyslexia is a universal condition independent of the language one speaks, e.g., dyslexia has been observed in writing systems with ideographs, such as Chinese, in addition to alphabetic systems, like Norwegian and English (Montgomery, 2017). Dyslexia can be comorbid with other neurodevelopmental disorders (Snowling et al., 2020): developmental language disorder (DLD), attention deficit hyperactivity disorder (ADHD) and Tourette Syndrome, among other disorders, can appear in comorbidity with dyslexia (see Aas, 2021; Cravedi et al., 2017; Hulme & Snowling, 2016; Snowling et al., 2020). Comorbid disorders can affect behavioural patterns of dyslexics and impact the effectiveness of interventions (Snowling et al., 2020).

Dyslexia and EFL teaching and learning is not as thoroughly researched as dyslexia and first language learning (Nijakowska, 2010). The consensus is nonetheless that learning a second/foreign language, e.g., English (EFL), presents dyslexic learners with an overwhelming task (Helland, 2012; Kormos & Smith, 2012; Nijakowska, 2010). However, research has shown that an alarming number of EFL teachers seem insecure in their abilities to accommodate the language needs of their dyslexic pupils and have expressed a need for training and support (Kormos & Nijakowska, 2017; Nijakowska et al., 2018).

Norwegian EFL teachers face similar issues. Teachers are obliged to address the challenges of accommodating dyslexic learners, e.g., identifying reading and writing difficulties and adapting their teaching for dyslexic pupils (National Council for Teacher Education, 2016), in accordance with the Norwegian educational law § 1-3 (Opplæringslova, 1998). Research on the effect of various educational methods on Norwegian dyslexic EFL learners is limited, and the few studies and interventions that exist focus mainly on reading (Montgomery, 2017). Consequently, spelling is generally overlooked in intervention research in Norway (Helland, 2012).

Motivated by the current situation, the present study investigates the effect of an intervention that aimed to develop the spelling skills of a group of Norwegian dyslexic learners. The paper does not provide a full systematic literature review, nor does it offer a comprehensive answer to how dyslexic EFL learners should be supported in their EFL learning, but rather presents and discusses an attempt to accommodate dyslexic pupils’ spelling needs through a specifically designed intervention. We hope more studies will be undertaken in

the Norwegian education system and elsewhere to help children with specific learning difficulties (SpLDs, Nijakowska, 2010).

Dyslexia and English language learning

The ability to communicate in a foreign language is essential in a multitude of contexts (Kormos, 2018). As such, English plays two important roles: it is the most widely taught foreign language (Crystal, 2012) and it serves as a lingua franca between speakers of different first languages (Seidlhofer, 2008).

In Norway, English is taught in schools from the first grade onwards (Helland & Morken, 2015). In addition, as part of extramural learning (Sundqvist, 2022), Norwegian learners are exposed to English through films, TV series, games and music (Dahl & Vulchanova, 2014). Despite the strong presence of English in Norway, Norwegian learners face several obstacles in learning EFL (Helland, 2012), e.g., the irregular nature of English orthography, which leads pupils to apply their L1 phonology when spelling English words (Helland & Kaasa, 2005; Kristoffersen, 2000), the frequent confusion caused by the English and Norwegian alphabet, etc. (Kristoffersen, 2000; Nilsen, 2010; Simonsen, 2018).

Despite the difficulties associated with learning English, dyslexic pupils who learn English as an additional language have an advantage over L1 learners. Having a different L1 helps dyslexic learners achieve advanced language skills within their L1, too (Siegel, 2016). With English as a compulsory subject in the Norwegian school curriculum, dyslexic learners may need proper interventions and accommodated teaching (Kormos & Smith, 2012). Furthermore, it is suggested that about 5–7% of the Norwegian school population is dyslexic, and that there is at least one dyslexic learner per class (Aas, 2021). These pupils have a legal right to accommodations in education, and this has implications for EFL practitioners in terms of teacher accommodations.

Nevertheless, a substantial number of educational contexts seem unprepared to accommodate the needs of dyslexic learners. Nijakowska et al. (2018) found that teacher education programmes in Cyprus, Greece and Poland, for example, were inadequate in training teachers for integrating dyslexic pupils, and participants in their study programmes expressed a need for more information regarding effective EFL teaching methods for dyslexic learners. The authors conclude that the EFL teacher development programmes that train teachers in including dyslexic learners in their classrooms need improvement. Kormos and Nijakowska (2017) report similar findings in the context of an international four-week online course for EFL teachers of dyslexic pupils. The massive number of participants illustrates the high demand for training in EFL teaching for dyslexic learners.

In general, dyslexic students require specific interventions to develop their literacy (Nijakowska, 2010). While reviewing and analysing an extensive list of previously conducted intervention studies, Galuschka et al. (2020) found that children who took part in spelling interventions improved their spelling skills substantially compared to children who attended regular lessons. The relationship between phoneme and grapheme should be made explicit in any intervention (Montgomery, 2006), while special emphasis should be placed on spelling, which seems to be a persistent difficulty for dyslexic learners, including those in Norway (Helland & Kaasa, 2005). Ideally, each programme or intervention should be adapted to each pupil's specific needs (Snowling & Hulme, 2011). The suggested remediations for dyslexia often include phonological interventions, as these have proven successful for reading accuracy and spelling development across orthographies (Ferraz, et al, 2018; Helland, 2012; Lim & Oei, 2015; Nijakowska, 2010; Torgesen et al., 2010). In fact, interventions that include phonological training seem to be the most effective treatment option to date (Snowling et al., 2020). Furthermore, multiple intervention studies have presented evidence that interventions consisting of 'multisensory' teaching activities can be beneficial for dyslexic learners' reading and writing skills (Nijakowska, 2010).

The Multisensory Learning Approach (MSL)

The Multisensory Learning Approach (MSL, also referred to as the Orton-Gillingham approach, see Kormos & Smith, 2012) is a teaching method that is often encouraged when teaching dyslexic learners. MSL techniques are meant to compensate for impairments in auditive or visual sensory channels through the stimulation of other senses (Høien & Lundberg, 2012). Teaching must be direct and should involve several senses at once, such as the tactile (touch), kinaesthetic (movement), auditory and visual senses (Nijakowska, 2010).

Words are stored in the lexicon with phonologic, articulatory, orthographic, semantic and motoric identities. For learners with dyslexia, the phonologic and orthographic identities of vocabulary items are unspecified. Using MSL to teach EFL establishes kinaesthetic, tactile and articulatory identities for words (Høien & Lundberg, 2012). Phillips and Kelly (2016) state that engaging many senses at once aids 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 and can help transfer information from the short-term memory to the long-term memory (see Da-loiso, 2017 for practical suggestions). Finally, movement is suggested because it can stimulate sight, hearing and touch. The Total Physical Response (TPR)

method (Daloiso, 2017) in MSL can accentuate intensity and repetition (Richard & Rodgers, 2014) and increase the possibility of learners recalling learning objectives.

MSL research has been implemented in many contexts. Nijakowska (2010) conducted a small-scale MSL-based intervention study in Poland to examine whether dyslexic EFL learners could improve reading and spelling skills on the word level. The researchers reported that the experimental group performed substantially better than the control group in the reading and spelling post-tests.

In Singapore, Lim and Oei (2015) conducted a year-long MSL intervention study on 39 Singaporean dyslexic English language pupils, aged 6–15 years. The analysis of the pre- and post-test data showed that the dyslexic pupils improved significantly in spelling and reading after one year of intervention. The authors suggest that early identification of dyslexia and early intervention is crucial to the individual's literacy.

Use of technology

Various researchers and practitioners stress the importance of Information and Communication Technology (ICT) for dyslexic pupils, as it can be beneficial for learning EFL and can improve motivation (Galuschka et al., 2020; Helland, 2012; Kormos & Smith, 2012; Pfenninger, 2016). ICT was found to be useful for pupils while practising spelling (Philips & Kelly, 2016). Certain software or apps, such as spellcheckers, have been used as learning support, while others provide practice for reading speed or orthography practice (Lyster, 2012). Moreover, ICT provides an opportunity for more intensive practice and repetition. When the teacher is unable to provide dyslexic pupils with the amount of overlearning that they require, ICT can be beneficial. Dysleksi Norge (2017), for instance, strongly recommends that Norwegian EFL teachers of dyslexic pupils use iPads and recommends apps such as Book Creator with a font specifically designed for dyslexic learners (OpenDyslexic), as it can serve as a substitute for notebooks with multimodal functions. Finally, in a recent study, augmented reality (AR) proved effective in teaching English vocabulary for pupils with intellectual disability (e.g., Rapti et al., 2022). Thus, AR might be effective for self-practice at home. AR in spelling interventions could be a great focal point for future research with dyslexic learners.

To conclude, the aforementioned studies highlight the importance of phonological awareness and support utilising MSL as well as ICT when working with dyslexic learners. However, EFL teachers express concerns regarding their preparedness to support their dyslexic pupils, resulting in a high demand for training on the subject. Given that, at least to the knowledge of the current researchers,

there are no Norwegian evidence-based studies that focus on the impact of specific English didactics for dyslexic learners, the present study explores the use of MSL techniques combined with the use of ICT tools in the context of a Norwegian primary school. The study addresses the following research questions:

1. Does teaching EFL through MSL combined with ICT improve the spelling skills of Norwegian dyslexic pupils in the fifth and sixth grades?
2. What implications does the MSL spelling intervention have for dyslexic pupils' motivation and learning?

Method

The study has a single-group before-and-after design (Check & Schutt, 2012), whereby participants are exposed to an experimental treatment and are tested prior to and after an intervention.

Participants

The participants of the study were five Norwegian primary school pupils officially diagnosed with dyslexia from grades five and six. These years are critical because learners often experience failures with respect to learning outcomes and their struggles become more apparent (Høien & Lundberg, 2012). The sample was chosen purposively because they were relevant to the study.

For reasons of confidentiality, only basic information regarding the pupils will be shared in this paper. Three of the participants were 10 years old and recruited from the fifth grade (two boys and a girl), and two were 11 years old and recruited from the sixth grade (a boy and a girl). The male participants were diagnosed with comorbid disorders, as well, as seen in Table 1.

Table 1

Overview of the dyslexic pupils

	P1	P2	P3	P4	P5
Gender	Female	Male	Female	Male	Male
Grade	6th	6th	5th	5th	5th
Comorbidities	-	Comorbid DLD	-	Comorbid Tourette Syndrome	Comorbid ADHD

The Norwegian Centre for Research Data approved the data handling procedures used in the study. The head teacher of the school was informed of the project and gave permission, while the participants' parents received a

consent form including information about the project and notifying them of their right to withdraw their consent at any time.

A female special education teacher (SpEd) was invited to participate in the study. She had over 10 years of experience as an SpEd teacher and was therefore an asset to the study. The SpEd teacher was informed about the aims of the study and was invited to implement the intervention and help recruit pupils who were known to have dyslexia at her school. Before the pre-tests were administered, the SpEd teacher was presented with the intervention curriculum and rationale in detail. She agreed to implement and execute the intervention as designed. This helped maintain the researchers' roles as observers.

Nature of data collection

The present study was carried out as a mixed-methods approach (Ellis, 2012). When statistics (quantitative data) are combined with stories and personal experience (qualitative data), the data collection gives a better understanding of the topic ('convergent' design, Creswell, 2015). Furthermore, an intervention study with quantitative and qualitative data is powerful in investigating language teaching because it allows the researcher to investigate the process (Ellis, 2012). As such, it is possible to explain the results of the pre- and post-tests. Collecting qualitative data was particularly important because it showed how our participants experienced the activities and helped us to modify the intervention.

- The quantitative and qualitative data collected in the study are summarised below:
- Quantitative: results of pre- and post-tests of spelling, pupil evaluation questionnaire (see Appendix 1 and 2)
- Qualitative: semi-structured interview with the SpEd teacher (see Appendix 3).

Table 2

Overview of the research design and analysis

Pre-intervention	Intervention	Post-Intervention	Type of analysis
Pre-tests of spelling (n = 5)	A series of lessons based on MSL and ICT (see Table 3)	Post-tests of spelling (n = 5)	Descriptive Statistics
		Pupil (n = 3) post-questionnaire interview	Descriptive Statistics and Content analysis
		Teacher (n = 1) interview	Content analysis

The results of the pre- and post-tests of spelling comprised the main data. These tests aimed to measure the intervention's effect. The spelling test consisted of a selection of high frequency words from the McNally Wordlist (McNally & Murray, 1962), a collection of 250 high frequency words. Some 70% of the texts that children and young adults read in English are composed of these 250 high frequency words (Holmberg, 2019). To ensure that the test was not too long, only 16 items were chosen from the McNally Wordlist. These were considered sufficient to display spelling development. Since the pupils seemed insecure in their alphabetic knowledge, an additional focus point of the intervention was the alphabet. Therefore, two test items were letter names (see Appendix 1).

Testing and administration procedures

The tests were administered by the SpEd teacher in collaboration with the researchers as 'dictation', e.g., each word was read aloud once followed by a supporting phrase with the word. Finally, the word itself was read aloud one last time. The pupils were given clear instructions not to write anything until after they had heard the word a final time.

Measures were taken to ensure valid test results. Factors such as the time of the school day, the physical surroundings of the testing environment, including the temperature of the room, noise and the level of formality, were all considered (Cohen et al., 2011; Helland, 2012). The pre- and post-tests were administered in either the first or second period of the pupils' daily school programme when their attention and concentration was still strong (Raviv & Low, 1990). Moreover, the participants took both tests individually in a separate room and were given the opportunity to take a break, as well.

In the analysis, the results of the pre- and post-tests were calculated for the whole group as well as for individual pupils. A qualitative interview with the SpEd was conducted to obtain detailed descriptions of the intervention's implementation and to explain the spelling development of each pupil (Kvale & Brinkmann, 2015).

The intervention

The spelling intervention was designed and executed in the form of a series of lessons. The intervention was also aligned with the English subject curriculum and its competence aims (Ministry of Education, 2020), for example:

- use simple strategies for language learning, text creation and communication;
- follow rules for spelling, word inflection and syntax.

The spelling intervention maintained a multisensory approach featuring a focus on letter names through auditory and visual presentation and practice through hands-on and online training. Phonological awareness was practised through explicit instruction, worksheets and sorting activities. In the more explicit spelling-oriented activities, the pupils were expected to colour, build or paint words in their distinct sounds. The pre-test results helped adapt the intervention materials to the needs of the participants.

The implementation stage, as in many other intervention studies (Domagała-Zyśk & Podlewska, 2018; Liontou, 2018), was met with challenges. The school that had originally offered to participate withdrew just before the intervention was set to launch and a new school was not arranged until after the intervention was scheduled to commence, which delayed the project. The process of acquiring new consent forms signed by parents caused a further delay. Consequently, the intervention had to be reduced from 16 to 8 lessons. Table 3 presents an overview of the eight intervention lessons used in the study.

Table 3
Intervention Overview

Lesson number	Activities	Purpose
Lesson 1	Alphabet song with visuals Small and capital letter puzzle Monster Mansion Alphabet Match	Repetition of the alphabet and letter sounds.
	Sound-letter correspondence explanation and worksheet	To practise understanding of sound-letter-correspondence.
Lesson 2	Monster mansion match	Repetition
	Sound-letter correspondence explanation and worksheet Colouring worksheet Painting words	To practise understanding of sound-letter-correspondence and segmenting.
	Rhymes instruction Odd one out activity Book Creator rhyming task Ninja Board Game	To practise identifying and manipulating sounds.
Lesson 4	Guessing activity: writing words on each other's backs Building words with WikkiStix Book Creator: WikkiStix pictures, text and recording of words	To practise spelling explicitly.

Lesson number	Activities	Purpose
Lesson 5	Explanation of minimal pairs	To practise distinguishing between and spelling minimal pairs.
	Distinguishing worksheet	
	Odd one out worksheet	
	Minimal pairs bingo	
Lesson 6	Power E: presentation through rule card	To practise spelling words with the silent E spelling pattern.
	Silent E song	
	English Sounds Fun: Power E worksheet	
	Auditory practice	
Lesson 7	Silent E song writing task	To practise distinguishing between “th” sounds and other sounds and spelling words with “th”.
	Explanation of the two “th” sounds	
	Th sounds instruction and practice	
	Auditory discrimination	
Lesson 8	Smart Notebook sorting activity	To practise spelling explicitly.
	WikiStix/Painting activity	
	Look-Trace-Cover-Write-Check	
	Quizlet practice	

Validity and reliability

The current study had a sample of five participants, so it was important to investigate whether the data complied with prior relevant evidence in order to ensure the validity of the study (De Winter, 2013).

Convergence of evidence collected through various methods is likely to enhance validity of research data (Biesta, 2012). 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. This triangulated study sought to explain the complexity of human behaviour by studying the phenomenon from various angles (Cohen et al., 2011). The differences in scores between the pre- and post-tests were analysed and compared. The findings from the pre- and post-tests were supported and explained through the evaluation interview and the pupil questionnaire results.

Another way of enhancing validity is to check the reliability of the test results, e.g., to analyse internal consistency (Cohen et al., 2011). In the current study, we determined that our spelling test yielded reliable results. We calculated Cronbach’s alpha, which was estimated at 0.919, a very high value. Muijs (2010) states that a measure of 0.7 and above implies that the test is internally consistent and thus reliable.

The results from the triangulated data collection are presented and discussed in the following subsections.

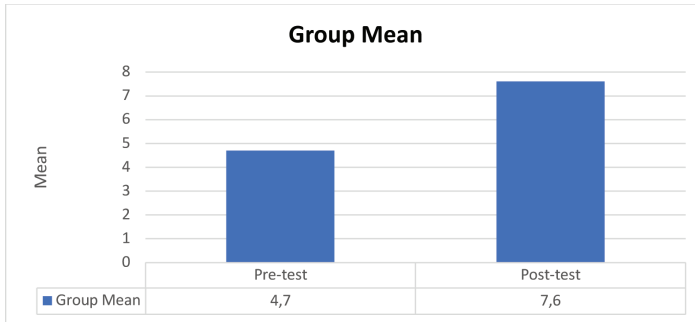
Presentation of the results

Pre- and Post-test analysis

Figure 1 shows the group mean value from the pre- and post-tests of spelling (i.e., before and after the intervention).

Figure 1

Group Mean Development

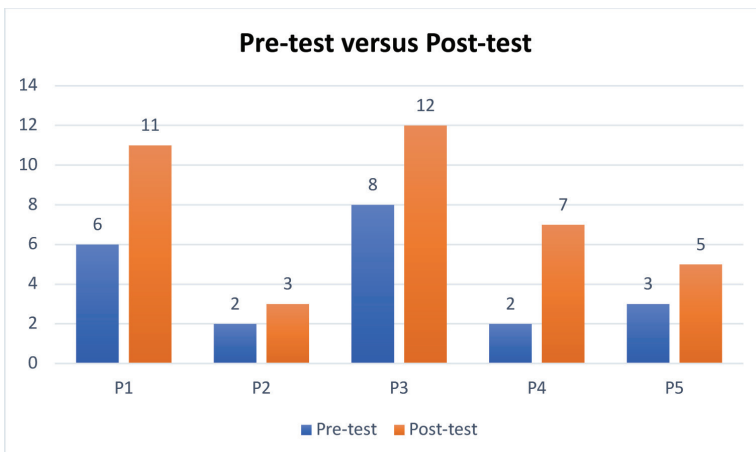


The pre-test mean was 4.7, compared to 7.6 in the post-test. This represents a 2.9 point difference in means, or a 38% increase, indicating a positive development in the group overall after the intervention.

Further analysis of the test results showed individual differences in development (see Figure 2).

Figure 2

Pre-test vs post-test scores of individual pupils



The finding presented in Figure 2 corresponds with prior studies that have found individual differences between dyslexics (Helland & Kaasa, 2005; Nijkowska, 2010). Despite individual variation, all of the participants exhibited positive development.

Qualitative analysis of the differences between the pre- and post-tests for individual dyslexic pupils yielded interesting findings. Overall, the participants seemed to be facing different challenges and produced different spelling representations of the same vocabulary items.

Table 4

Representative performances

Words	P1		P2		P3		P4		P5	
	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
letter: H	A	H	A	H	H	H	E	H	L	H
letter: I	I	I	I	I	I	I	A	E	A	I
on	ond	on	on	ån	an	on	å	one	on	on
the	the	the	ve	ve	the	the	de	de	de	dhe
do	do	do	du	do	do	do	do	du	du	du
come	kom	com	km	kon	kam	kom	kam	komm	kam	kom
said	sed	ced	sed	sed	shed	sedd	ced	sed	-	sed
what	whot	watt	vat	vt	hvat	hvat	wat	what	wat	vat
there	wher	ther	VL	dr	ther	there	der	der	-	dher
two	to	to	to	to	two	two	to	too	tu	to
little	litel	litol	llt	tlo	lidle	litle	litor	little	litol	lital
are	are	are	rar	ar	are	are	ar	are	ar	ar
that	thet	that	VT	dat	thot	thet	det	det	det	dat
with	fif	fif	vit	vit	hvish	hvish	vis	vecos	vits	vith
and	eand	and	ed	æd	and	and	end	end	and	and
have	hav	have	hev	hvd	heav	have	hev	have	hav	hev
one	one	one	VN	one	von	one	one	one	one	von
he	he	he	hei	hi	he	he	hi	he	hei	he

Although all of the items in Table 4 (first column, left) should be familiar to any pupil in the sixth grade, P1 misspelled many of them in the pre-test. In the post-test, the spelling of some of the words was closer to the English orthography than in the pre-test. Although the pupil improved, her spelling attempts of words like “with” illustrate that she was still not completely aware of how the sound is spelled. This could be explained by the fact that she was absent

during the latter half of the intervention consisting of a lesson targeting specific sounds. However, her overall development in spelling skills is quite positive considering the fact she only received half of the intervention.

Assessing the development of P2 is difficult, because no significant development is evident, especially quantitatively. P2 struggled particularly in comparison to his peers. He seems to lack a basic knowledge of English and Norwegian orthography and phonology. Although he showed some improvement in getting letter names correct, he struggled with spelling words and demonstrated his difficulties with English orthography by using Norwegian letters (e.g., *å* and *æ*) in the post-test.

Unlike other pupils, P3 did not use Norwegian letters in the pre-test, but struggled with spelling several words, such as “have” and “one”. After the intervention, however, P3 spelled these words correctly. She seemed more aware of the silent ‘e’, as shown by her correct post-test spellings of the words “there”, “have” and “one”. Evidently, there was a positive development in her spelling skills after the intervention.

Pre-test spellings of the words by P4 were adjusted to Norwegian phonology, e.g., the Norwegian letter *å* was used. In the post-test, he did not use any of the Norwegian letters and his spelling was closer to that of the English orthography. He was also more aware of sound-letter correspondence, as well as the silent *e* in words like “are” and “have”. However, he still struggled to spell words with the /θ/ and /ð/ sounds, both of which are absent in Norwegian phonology.

P5 showed the least development. He omitted words in the pre-test but attempted to spell all of the words in the post-test, which is positive. However, as is apparent from the examples of his attempts, he still struggled with the English orthography and some of the words that he had written correctly in the pre-test were written incorrectly in the post-test. During the post-test, he even struggled with writing the letter *p* and asked how it was supposed to be written.

The following section summarises the results from the semi-structured interview with the SpEd teacher conducted after the post-test in the teacher’s native language, i.e., Norwegian. Her exact words have been translated into English.

Semi-structured interview

When asked for her overall opinion of the intervention, the SpEd teacher spoke very highly of it, e.g., “the lessons contained varied and very interesting multisensory tasks”. She added that even though most of the learners within the group struggled with their attention, the tasks motivated them. As for the level

of difficulty of the tasks, she stressed that these were appropriate. The teacher explained that in terms of task activities, the WikkiStix tasks were the most useful, because “the pupils have to use their creativity and use vocabulary that was presented beforehand”. She further explained that the pupils “learned a lot from instruction when they coloured and became familiar with the sounds”.

The teacher also described each pupil and elaborated on their development. She noted: “I think everyone made huge progress, especially P4. This was a surprise. He had the greatest development, which was surprising because of a lack of focus due to his disorder”.

Furthermore, the teacher observed an increased awareness in sound-letter correspondence among the sixth graders. Regarding P5, the teacher added “He makes a lot of mistakes because of his dyslexia and his ADHD”. The teacher further described P5 as quite thorough in his work and creative, e.g., “he learned a lot and is very interested in the connection between sounds and letters”. Notably, P5 asked the teacher for more similar lessons.

The SpEd teacher also explained that P2 “developed his skills a lot but, in a way, he was the most difficult case. He had a lot of specific language impairments in addition to dyslexia”. However, the teacher reported positive development in terms of phonological awareness: “I noticed that after the first lesson, he thought more about where the sounds came from. He did not do that in the other lessons where I worked with him.”

Overall, the teacher stressed that there was positive feedback regarding the intervention. She felt that there was an enormous development in motivation, especially for P3. She said that the pupil “feared English lessons before, but now she looks forward to them”. In addition, she said “for Pupil 4, they were the best lessons he has been in for a long time”. This surprised her, because P4 is rarely positive towards English classes and tends to describe them as “boring”. The teacher added that P4 does not put much effort into regular classes, so she was surprised by his encouraging efforts during the intervention.

Finally, the teacher proposed that the intervention activities could be employed in a whole class setting, as well. As the lessons were clear and structured, she suggested that many pupils could respond well to the activities regardless of whether they have SpLDs or not.

Questionnaires

The group completed the questionnaire after the post-test was administered.

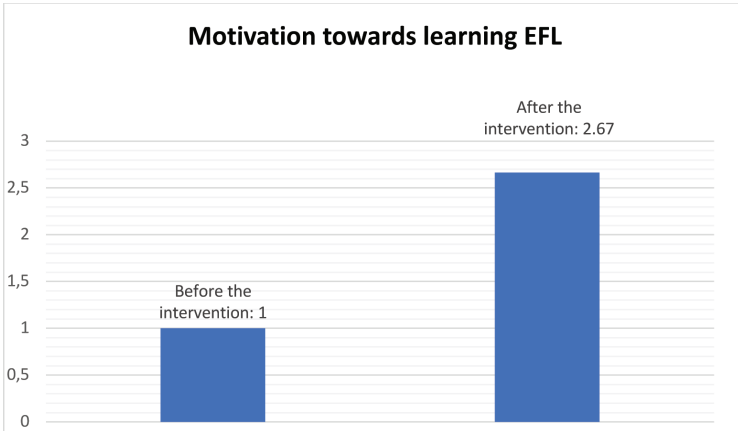
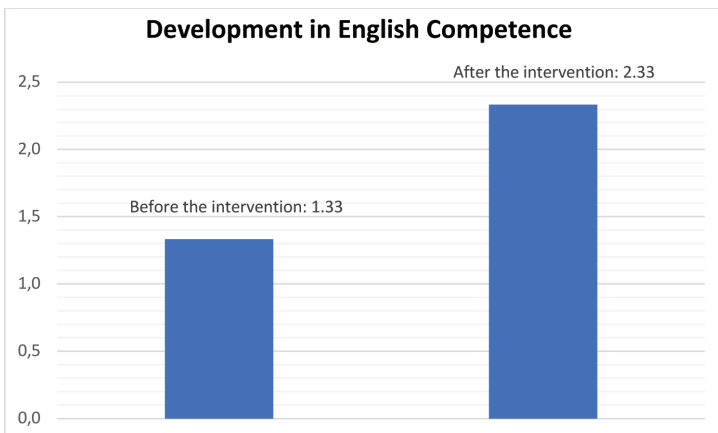
Figure 3*Motivation towards learning EFL*

Figure 3 shows positive responses towards the intervention. Evidently, all of the participants reported improvement in their motivation towards English after the intervention. Given the positive responses, it is fair to say that the intervention tasks were interesting and motivating.

The participants' evaluation of their level of competence in English before and after the intervention is illustrated in Figure 4. There was an increase from 1.33 to 2.33 in means, which indicates that the group thinks that they benefited positively from the intervention.

Figure 4*Development in English competence*

Finally, each pupil was asked to rate the intervention. All of the pupils were positive towards the lessons, as they chose the 'happy face' option (see Appendix 2), which further supports the success of our intervention.

Discussion and concluding remarks

The current study, undertaken in the interface between English didactics and special education, investigated the benefits of a multisensory spelling intervention for dyslexic learners, as reported in prior studies (Lim & Oei, 2015; Nijakowska, 2010). The overall group score of the statistically reliable spelling pre- and post-tests yielded a 38% increase in mean scores, improving from 4.7 in the pre-test to 7.6 in the post-test. Considering the relatively short duration of the intervention (only eight lessons), it can be concluded that this evidence provides a positive outlook for incorporating MSL methodology while teaching dyslexic students. Other studies that have investigated the use and effects of MSL and phonological interventions in spelling skills strongly indicate that dyslexic learners can increase their spelling abilities (Galuschka et al., 2020; Lim & Oei, 2015; Nijakowska, 2010; Snowling et al., 2020). The findings are also in agreement with the consensus that dyslexic learners require specific interventions to compensate for their deficits (Kormos, 2017, p. 118).

Although our dyslexic participants improved their performance after the intervention, they exhibited individual differences. Their scores on the pre- and post-tests were quite dispersed, as was the detailed analysis of individual performances (also in Helland & Kaasa, 2005). This might be due to several factors. In the current study, three of our five participants experienced comorbidity of dyslexia and other learning inhibiting disorders, which is in accordance with previous research (Snowling et al., 2020). The pupils with the highest spelling scores exhibited no comorbidities. Comorbid disorders seem to alter the behavioural patterns of dyslexia and render intervention more complicated. As such, it seems reasonable to suggest that dyslexic learners require specific tailored interventions based on their learning difficulties (Snowling & Hulme, 2011). Nevertheless, individuals with comorbidities can benefit from MSL as well, as multisensory techniques had a positive impact on their motivation. The motivation and sense of achievement generated by the current intervention is particularly encouraging. The pupil questionnaires and the interview with the SpEd teacher corroborated the fact that the intervention positively impacted aspects such as motivation and attitude towards learning EFL. This is an accomplishment, since all of the learners reported reluctance to engage in EFL prior to the intervention.

Another aspect of the study was the use of technology, which was also encouraged through prior studies (Torgesen et al., 2010; Pfenninger, 2016). ICT can be successful in providing an opportunity for the overlearning required by dyslexic learners when practising spelling (Lyster, 2012; Philips & Kelly, 2016). It can also be a useful alternative or supplement to individual or small-group interventions (Galuschka et al., 2020). Our study employed technology, e.g., Book Creator, Quizlet, an alphabet game, and a smartboard activity, and the pupils seemed positive about this. However, it was not employed as extensively as originally planned, so future research and experimentation may be needed to provide a more detailed account of this aspect.

Finally, despite the unexpected challenges faced during the implementation of the study, there is strength in the diversity of the data material. The triangulation of the data enhanced the validity of the current study and provided an extensive inquiry into the effect of the intervention. The data also seem to align with findings from previous studies, which further validates the findings of the current study.

The very promising evidence in favour of an MSL spelling intervention supports further inquiry into its effectiveness. The pupils involved in this project exhibited a significant increase in correctly spelled words after only eight lessons, which is quite promising and encourages longer and larger future studies. In addition, the results appear to confirm the success of technological intervention, much as in previous studies (see Pfenninger, 2016; Torgesen et al., 2010).

Conclusion

The main purpose of the study was to explore how EFL teachers can support their dyslexic students. As such, the study has several implications for EFL teachers.

Lim & Oei (2015) argue that early identification and intervention is crucial for literacy development of learners with dyslexia. Dyslexia should accordingly be diagnosed during the first years of schooling and an intervention should be implemented as early as possible. Norwegian dyslexic students struggle with EFL acquisition (see Helland & Kaasa, 2005). Unless these learners receive proper, explicit instruction, they will undoubtedly suffer extensive academic failures, especially in EFL. It is therefore vital that dyslexic learners are identified properly throughout these formative years.

Dyslexic learners should be accommodated and supported properly, as well. The current study showed that interventions based on the MSL approach can yield significant positive results regarding spelling development, while

motivational and emotional aspects can also be impacted positively. We therefore recommend that teachers of EFL teach spelling explicitly through MSL by practising phonological awareness and spelling patterns. In their interventions, teachers should not encourage their pupils to simply write vocabulary items; pupils should colour, build or paint words in their distinct sounds to make them more aware of the spelling patterns and sound-letter correspondence. Additionally, pupils should practise phonological awareness through worksheets and sorting activities, as well as through distinguishing tasks, such as bingo with the /f/ and /tʃ/ sounds. Hands-on activities, such as moveable cards, could also prove helpful, while technology such as Quizlet could provide dyslexic learners with a necessary opportunity for overlearning.

Despite the fact that the current study investigated an important area, there are some limitations that need to be addressed, especially in future research. For example, even though the current investigation is an in-depth study based on case studies, the group of five learners is admittedly a small sample. Future researchers need to collaborate with larger numbers of participants. Moreover, in future research and practice, the age of the children and age-appropriate training need to be considered rather than grade level. Furthermore, an ideal future intervention study should carefully consider the dynamics within the group and adopt a mixed method approach orientation, as the triangulation of data collection can confidently validate its results. Finally, intervention studies with SpLD students present the need for an age-matched dyslexic control group to account for external variables in order to be able to compare the effect of multisensory and phonological instruction with common EFL teaching methods.

Although the factors impacting on an inclusive learning environment should not be underestimated, dyslexic learners will likely require extra support outside the classroom, as well. The environment in which the extra support is executed should also be considered, as dyslexic learners require a peaceful environment to enhance their learning, so distracting factors should be avoided, if possible. Moreover, learners with severe spelling problems would probably benefit more from assistive technologies such as word processing, spell-checkers or speech-to-text technology.

The role of EFL teachers and teacher trainers in facilitating and supporting learning development for dyslexic learners is very important. The Norwegian educational law clearly establishes that all students have a right to adapted education. There is, therefore, a high demand for training of EFL teachers to accommodate the learning needs of dyslexic learners. Consequently, teacher students enrolled in teacher education programmes should be trained to identify dyslexic students and adapt education to their SpLD learners.

Finally, we would like to invite future researchers from the field of dyslexia and foreign language learning to further investigate the effects of MSL and phonological training, as well as the benefits of using technology for the teaching of spelling and other language skills to dyslexic learners in order to accumulate evidence that will help accommodate and support learning for this special group of learners.

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Appendix 1

		Age pre-test:	Age post-test:	Date of pre-test: Date of post-test:		
Item #	Word/letter	Attempt pre-test		Attempt post-test	Score pre-test	Score post-test
1	H					
2	I					
3	On					
4	The					
5	Do					
6	Come					
7	Said					
8	What					
9	There					
10	Two					
11	Little					
12	Are					
13	That					
14	With					
15	And					
16	Have					
17	One					
18	He					
					/18	/18

Spelling test

Appendix 2

Self-assessment

Tick the box for what you consider as correct



Attitude and motivation	Before the intervention, this was my attitude and motivation towards English:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	After the intervention, this is my attitude and motivation towards English:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The activities I participated in were motivating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Learning development	How was your competence level in English before the intervention?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	How is your competence level after the intervention?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



What is your opinion of the intervention?

<input type="checkbox"/>	<input type="checkbox"/>
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Appendix 3

Interview Questions with the Special Education Teacher

1. What is your opinion of the intervention's success?
2. What do you think of the activities and their difficulty?
3. How would you describe the development of each pupil?
4. What is the feedback from the pupils and their parents?