MASTER'S THESIS

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Students with dyslexia learning English using digital learning aids

Engelskspråklig læring for elever med dysleksi ved bruk av digitale hjelpemidler

Scientific article

30 credits assignment

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Abstract

Over the last years schools have become more digital, in form of students having their own digital device, example computers or tablets. As a teacher you will experience having students in class who struggle with reading- and writing difficulties. The purpose of our study is to gain a broader knowledge on how digital learning aids can function as a learning tool for students with dyslexia in the English classroom. Our research question for this study is:

What are teachers' perceptions on the role of digital tools in supporting English learning for students diagnosed with dyslexia?

Our research question and interview guide focus on the teachers' experiences and reflections on the subject. Therefore, we have chosen to use a qualitative research strategy. In this study we have interviewed three teachers and one special educator, with the use of a semi structured interview as our method.

We have found research that sheds light on the use of digital learning aids in the classroom, dyslexia as a diagnosis and the teachers experiences on using digital learning aids.

We have chosen to present our findings in three categories, which are: Knowledge of dyslexia, organization of adapted teaching and affordances of digital tools. Knowledge about dyslexia as a diagnosis is something all our participants would wish for more knowledge about during their education and when they are working. Our participants all have a positive attitude towards using digital learning aids in the classroom, but a common wish amongst them for more training and instruction on how they can use it to improve the students learning.

Keywords: Dyslexia, digital learning aids, teachers' digital competence, adapted teaching

Sammendrag

Gjennom de siste årene har flere skoler gått over til å bli mer digitale, i form av at elever får hver sin iPad eller PC til skolebruk. Som lærer vil man oppleve å ha elever i klassen som sliter med skrive og lese vansker. Hensikten med vår oppgave er å få bedre kunnskap om hvordan digitale verktøy kan fungere som et hjelpemiddel for elver med dysleksi i det engelske klasserommet. Vi endte derfor på problemstillingen: What are teachers' perceptions on the role of digital tools in supporting English learning for students diagnosed with dyslexia?

Vår problemstilling og intervjuspørsmål er knyttet opp mot lærernes erfaringer og refleksjoner. Med bakgrunn i dette har vi valgt en kvalitativ forskningsstrategi. I vår studie har vi intervjuet tre lærere og en spesialpedagog, hvor vi har benyttet oss av semistrukturert intervju som metode for innhenting av data.

Vi har funnet forskning som belyser bruk av digitale verktøy i klasserommet, teori som belyser diagnosen dysleksi, og læreres erfaringer om bruk av digitale verktøy.

Vi har valgt og presentere våre resultater innenfor tre kategorier som er følgende: Knowledge of dyslexia, organization of adapted teaching and affordances of digital tools. Kunnskap om diagnosen dysleksi er noe alle våre deltakere savner i utdanningen deres, samt i arbeidslivet. Det kommer tydelig frem at de har selv måtte ta initiativ til å tilegne seg denne kunnskapen. Det kommer og frem fra deltakerne at det er et positivt syn på bruk av digitale hjelpemidler i klasserommet, men et sterkt ønske om mer opplæring og instruksjoner om hvordan de kan bruke det for å forsterke elevenes læring.

Sentrale nøkkelord: Dysleksi, digitale læringsverktøy, læreres digitale kompetanse, tilpasset opplæring

Preface

We are now sitting here at the end of our 5-year degree, and soon to be educated teachers. Working with this thesis has been challenging, interesting and now that our master thesis is complete, there are some people that deserves gratitude in this process.

First, we would like to express our gratitude to our supervisor, Ingrid M. Rodrick Beiler, for her guidance during this project. Thank you for all the feedback you have given us on our drafts, and always being available. Without you we would not have been able to finish our work.

We want to acknowledge our participants as well, for taking time to share their experiences, and to help us gain a broader insight into the topic. Without them there would not have been a study.

We would like to express our gratitude to our family, friends and dear ones for the support you have shown us during this process. Whenever we needed motivation to keep going, you were always there to cheer us on, so thank you.

Lastly, we would like to thank each other. When one of us were feeling down, the other one stepped up and motivated and believed in each other. We could not have done this alone.

Content

1.0 Introduction

The topic of this master's thesis is the teachers' perception of the role digital tools has in the English classroom for students diagnosed with dyslexia. We would like to gain an overview of teachers' experience with students who have dyslexia and receive reading and writing support in digital learning aids regarding English learning. Through this research project we want to shed light on the topic of dyslexia, digital learning aids, and the teachers' experiences when learning English as a second language, since it is considered challenging for dyslexic students to learn English (Bogdanowicz & Bogdanowicz, 2016).

Over the last years, more schools have started implementing digital learning aids in classes. A study conducted at the University of Oslo shows that 81% of students in primary school in the 100 biggest municipalities in Norway have their own digital device (Utdanningsdirektoratet, 2021b). When it comes to digital learning aids as a support for students with dyslexia in school, it is either in the form of a tablet or a PC which is used as a pedagogical teaching and auxiliary tool. Utdanningsdirektoratet (2021b) points out that digitalization creates new ways to learn, new ways to assess and new opportunities to use different resources at school, and for the students to use at home as well (Utdanningsdirektoratet, 2021b). In LK20 it is stated that digital skills are one of the five basic skills and being considered as a necessary skill to have to be able to learn in school, work later in life and in the daily life.

According to Lyster (2019), the digital world has changed many of the requirements set for our communicative competence, both orally and in writing. Students with dyslexia are able to receive better support, both orally and written in a digital classroom, but also at home when they are using the opportunities the digital learning aids can give them. Communication and learning do not only happen through reading books or writing texts, but now it is also happening through photos, emojis, and videos. There is not that much research on what is involved in being a student with dyslexia in a primarily digital classroom. There might be an advantage to having texts that read out loud for the students, having programs that can correct mistakes, or having the ability to have a program that can translate texts for them in different languages (Lyster, 2019). Information and communication technology empowers us to perform tasks that were impossible only a few decades ago. Students are familiar with browsing on the internet, and able to keep in touch with their friends on social media through Facebook, Snapchat, and Instagram. Reading and writing are necessary skills to have to be an

active participant in many aspects of life. Almost all learning at school assumes that students can read or write (Høien & Lundberg, 2012). In Norway about 5% of the population has been diagnosed with dyslexia, and students with this diagnosis can have problems acquiring writing and reading skills to a sufficient degree (Dysleksi Norge, 2013) (a Norwegian organization who focus on the rights students with dyslexia has). St. Meld nr 16 (Kunnskapsdepartementet, 2006-2007) is highlighting the use of ICT and early intervention. Meld.st. 16 points out that everyone has the potential to learn and that having an early intervention will help to prevent the students lacking behind academically due to their learning difficulties. This means that the education system will give everyone an equal opportunity to use digital technology in school.

There are several schools in Norway that implement digital aids for students, which has been received with positivity but also concerns. The discussion has primarily concerned whether to use digital technology rather than how to use it. Digital technology can be seen as a contradiction opposed to traditional learning resources. What has been discussed the most is the use of the keyboard versus a pencil. Later throughout the years, the discussion has changed, now the research is more about how digital tools can be implemented and anchored in a new pedagogical practice that springs from the uniqueness of the tools (Michaelsen & Palm, 2018).

There are many students that struggle with dyslexia, and they are considered to need special education. The reason for this is because they have or might have satisfactory benefits of ordinary teaching in school. The right to adapted teaching is anchored in both The Education Act (2022) and in The Knowledge Promotion (2019). Adapted teaching means that every student shall have learning goals that they can reach, the teacher needs to know what the student can knowledge and adapt tasks based on what the student can reach (Bjørnsrud & Nilsen, 2011). Adapted teaching takes place within the framework of regular teaching. That means the student is not entitled to special arrangement, as for example one to one-education. Adapted teaching should not require extra resources or support measures (Utdanningsdirektoratet, 2012). In cases where adapted teaching is not offered, special education needs to be mapped out. For students who do not get satisfaction out of the teaching, can special education be relevant (Opplæringslova, 1998, §5-1). Special education is more extensive in relation to individual adaptation than adapted teaching is. In special education, one may, among other things, have the opportunity to deviate from content in "Læreplanverket" for The Knowledge Promotion.

1.1 Background of the choice of topic

Since we are going to be English teachers, the use of digital sources is relevant for us when we are teaching a class. The term "English as a lingua franca" has over the last few years developed as a manner of referring to communication in English between speakers of different first languages (Vera, 2017). In LK-20 digital skills refer to the fact that the students can use a variable range of digital tools, media, and resources to strengthen language statements, communicate in English and acquire relevant knowledge in English subjects (Utdanningsdirektoratet, 2021a).

The topic that we would like to learn more about is what the teachers' perception is of using digital tools and how this supports students with dyslexia in an English classroom. We find this very interesting because many schools in Norway use iPads or computers in most classes, but is this what is best for each student? Schools also use different digital tools, for example, iPad, Chromebook, or computers. Each of these tools uses different apps, so students around Norway will learn in different ways. During our education we have been out in several practices where we have met students who struggle with word decoding. Some students did not want to speak out loud in the classroom due to their difficulties. This made us aware of the various challenges students have with dyslexia, and we began to think about what we could to alleviate these challenges the students faced. As mentioned above, students with dyslexia may have problems learning English, and one reason for this is that it is a language with a deep orthography, which we will explain more thoroughly in 2.4.4 (Seymour et al., 2003). This is one of the main reasons why we chose to focus on English and dyslexia and relate this to the digital learning tools the schools provide, since more schools implement digital tools in their learning each year. The reason we have chosen this topic is because we want to highlight an important theme. We believe that students with dyslexia have the opportunity to achieve good learning, as long as they get the right adaptations and facilitation in teaching. We quickly noticed that there is a lot of research in relation to dyslexia as a diagnosis, but that there was not so much research on dyslexia and the use of digital tools. We have also grown up during these years where digital learning aids have been more and more implemented. The generation of teachers graduating now might have more knowledge about these tools than others who have worked for many years.

1.2 Research question

In a classroom, the teacher will be an important supporter for the students, especially for the students who are diagnosed with dyslexia. The teacher is the one who helps the students to use the digital tools in an appropriate manner, not only about mastering the use of digital tools in class, but also what the students' learning outcome will be in these situations. There are several factors that come into play here, so we have decided that we want to take a closer look at the teachers' perceptions of the role digital tools have in the English classroom, for students diagnosed with dyslexia.

Our research question for this master thesis will be: What are teachers' perceptions on the role of digital tools in supporting English learning for students diagnosed with dyslexia?

We will try to answer this question based on interviews with different teachers in Norway, previous research on this subject and relevant theory for the topic.

1.3 Structure of the thesis

We have divided our thesis into six chapters with subchapters.

Chapter 2 looks closer at relevant theory on dyslexia, sociocultural theory, adapted teaching, and digital learning aids in the classroom.

In chapter 3 we present the method we have used in our study, and the process from finding participants, to analyzing our results. We also consider the reliability and validity of our study, as well as ethical considerations.

In chapter 4 we present the findings we have collected from our interviews, and our analysis.

In chapter 5 we discuss our findings up against the theory and previous research.

In chapter 6 we will try to answer our research question by highlighting our findings. We will also look at limitations of the study, and suggestions for future studies.

2.0 Theory and previous research

In this chapter we will look at relevant theory for our thesis, as well as previous research that has been done on this topic. We have divided this chapter into five sub-chapters.

In the first sub-chapter we will look at dyslexia as a diagnosis, difficulties revolving reading and writing skills and digital learning aids connected to dyslexia. In sub-chapter two we look at sociocultural theory, which focuses on what the students manage on their own, and what they manage with help. Sub-chapter three looks at digital learning aids in a sociocultural perspective, where we focus on didactics in school, and digital learning aids since this is a part of the basic skills in school. Sub-chapter four looks at how students with dyslexia learn English as a foreign language, and why this can be challenging. Sub-chapter five shows the previous research we have found, regarding teachers' digital competence, dyslexia and digital learning aids.

2.1 Dyslexia

There are similarities in the definition to what dyslexia is, which Dysleksi Norge has taken into account when they have made their definition.

"Dyslexia is a specific learning problem that makes it difficult to acquire functional literacy skills. Typical characteristics are therefore extensive difficulties with the word- coding and spelling, as well as difficulties with other language-related skills. The most common problems are phonological processing, rapid termination, and phonological short-term memory. Some also have difficulty with capabilities. This disorder differs from the person's other cognitive skills" (Solem & Dysleksi, 2017, p. 10).

Students who struggle with such difficulties can gradually fall behind the class development of reading and writing skills. They can gradually lose motivation and the desire to learn. The use of the Wechsler test can help to map specific language difficulties with language tests. The cognitive structures that are fundamental to language development are mapped, such as memory, attention, cognitive activities like problem-solving, and organizing the mind (Wilson et al., 2010).

"Statlig Spesialpedagogisk Tjeneste" (2019) (from now on referred to as Statped) divides reading difficulties into four sections. Group A is dyslexia, whereas the students have difficulties decoding words, which makes it inaccurate and slow. This will affect their understanding of what they read also. So, for this group they have trouble decoding words, but their language understanding is still good. Group B is students with good reading skills and language understanding. Group C is students with dyslexia and language difficulties. These students will have troubles with decoding words as well as the language understanding. Statped claims that developmental language disorders and dyslexia are two diagnoses that often appear together, as often av approximately 50% of students diagnosed with dyslexia also have developmental language disorder. Group D is students who can decode words and read well, but have a weaker reading understanding (Statped, 2020).
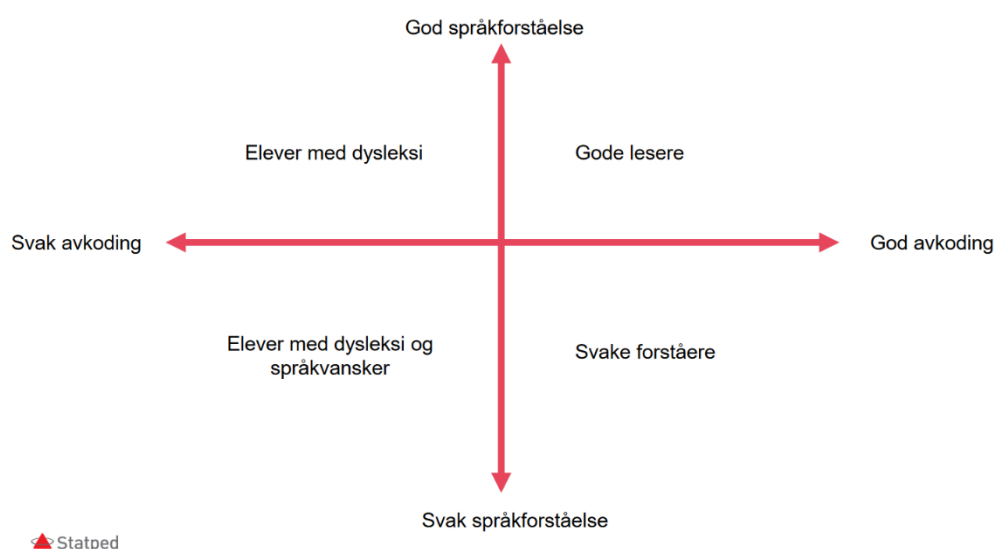
Figure 1. Ulike typer lesevansker

2.1.1 Reading and writing

To understand the students with dyslexia, it is crucial to know central theories about the normal course of reading and writing development. Høien and Lundberg (2012) distinguish between two components in reading: decoding and comprehension. Decoding is the technical side of reading, here it is important to be able to utilize the principle of written language so that one understands what one reads and gets content based on what is written. This process

requires both phonics, spelling, and syllable reading. To understand what a reader needs, cognitive resources are required. Here one should link what you read to your own experiences and frames of reference, draw conclusions, make interpretations, and so on. The principle is the same kind as the drawing that happens when one listens to a text that others read. One challenge students with dyslexia might encounter when reading English, is problems with spelling. English has a deep orthography and can be difficult because the spelling often is not straight forward, like languages with a shallow orthography (Seymour et al., 2003). Therefore, spelling might cause problems for dyslexic student, and cause them to perform less in writing tasks in English.

Good readers have developed well-functioning decoding skills. Automated word decoding is a prerequisite for understanding what is written. Students who are diagnosed with dyslexia are unable to develop safe word decoding. The reading becomes what it is like to swim against the current. Anyone who has tried to swim against the current knows how difficult and heavy it can be.

Høien and Lundberg (2012) write that reading using digital learning aids requires the students to continuously monitor their reading. Most students who have challenges with reading do not have a developed strategy, they skip difficult words and hope that it will work out. This presents challenges for the students because they must learn to practice being able to make the best possible use of the speech aid. This way of practicing can stimulate the reflective ability, which can have an impact far beyond the current reading task (Høien & Lundberg, 2012).

Roe (2014) refers to that when children learn to read, word decoding is at the center. For students to understand what they are reading one need to have a phonological awareness, this means that the students must be able to distinguish the letters as representatives of sounds we have in the spoken language. When students have understood how this goes and they manage to spell through words and sentences, we say they have cracked the reading code. The first reading training should lay a good foundation for good word decoding, reading fluency, and comprehension (Roe, 2014).

2.1.2 Writing

For students who have dyslexia, it can be difficult to express themselves in writing due to repeated typos. According to Bruck (1990), one can say the reading difficulties one finds in

dyslexia are always accompanied by spelling difficulties. Adapted teaching, if done properly, can in some cases help the reading difficulties of dyslexics, while the spelling difficulties persist. This constitutes that the distance between literacy and spelling increases with age (Bruck, 1990). Høien and Lundberg (2012) claim that spelling difficulties are found in dyslexics very often. For example, one can see that a word is misspelled somewhere in the text and that the same word is written correctly elsewhere. When the writer does not have lexical knowledge of how words are written, the word can be written using the phonological strategy. It can easily make mistakes in the writing, but misspelling is phonologically acceptable. Specific deviations from the written language norm are typos where errors use of uppercase or lowercase letters, misspelled letters, deviating punctuation and wood compilation or special writing. Composition means when one refers to two or more words that are rewritten into one word. Special writing is the division of one word into several words (Høien & Lundberg, 2012).

Many students with dyslexia have poorer handwriting than other students. This can in part be because those with dyslexia have delayed fine motor development. Another factor as well can affect handwriting is that letters are associated with something negative, as they prefer to try to avoid. Students with dyslexia learn early on how to avoid writing. One other reason may be that the student is trying to hide his uncertain spelling through obscurity handwriting. A main characteristic of dyslexia is severe phonological difficulties, this is included to help students with dyslexia often fall short early in reading instruction in connection with the grapheme-grapheme transcoding. One can still see that students with dyslexia use phrases or spelling when decoding unknown words (Høien & Lundberg, 2012). Although the diagnosis of dyslexia can not be completely cured, there are still many measures that can be implemented, and which have shown very good results. Digital aids are one of these measures. The digital revolution and increased access to technology have provided students with dyslexia ever-increasing access to PCs and word processing programs with correcting software, as well digital glossaries, and other digital and multimedia teaching aids.

2.1.3 Digital tools, dyslexia and more learning opportunities

Lyster (2012) states that digital learning aids will provide digital competence in addition to strengthening reading and writing for students. The use of digital learning aids for dyslexics

can be motivation, and repetitions will be able to be experienced differently because the context in which the training is carried out is different than training without digital learning aids.

Today there is a large selection of digital learning aids that can be helpful for students with both getting a text read for them but also writing. In earlier surveys, it has been shown that if the diagnosis is detected at an early stage, one can get good help in the form of individual adaptations about the student's prerequisites and abilities (Roe, 2014). Early diagnosis of dyslexia requires broadness and in-depth knowledge of dyslexia. This opens for individual adaptations for the individual student, among other things through training in various digital learning aids.

According to Lyster (2019), various computer programs provide training for reading skills and spelling skills, which support spelling in several ways. One of these programs is Lingdys, which is specially designed for students with reading and writing difficulties. This tool gives the student a combination of spelling, dictionaries, word completion, screen reading, and artificial speech that provides comprehensive and effective help with both reading and writing. Lingdys is a support tool for writing and is approved for use during exams (Lyster, 2019).

Statpeds website highlights several digital learning aids, of which both Norwegian and English voices. This tool gives the ability to check your text by IntoWords reading aloud the text that has been written. IntoWords provides auditory support to letters, words, and sentence levels. Each time a letter key is pressed, the letter sound is downloaded (Statped, 2020). Another digital learning aid Statped's (2020) website highlights is a program called CD word, which is a writing support program for PC that provides both visual and auditory support. Statped (2019) also offers audiobooks for students with reading and writing difficulties, these audiobooks provide access to non-fiction and fiction for students who have difficulty reading printed books. These audiobooks are made in DAISY format which means that they are read by a person or using artificial speech. It is the school, the person in charge of training, or the PP service who must order these audiobooks from Statped (Statped, 2019).

 Brøyn and Schultz (2005) claim that digital learning aids with the use of educational software stimulate action and activity. This is not something that is activated with passive observation but only because of one's motivation and own efforts. Fast response from digital learning aids on own performance both promote and motivate for further activity and learning. Digital

learning aids can give immediate feedback on the task performed, this can work as it can motivate the students and it helps that they do not have to wait for the teacher to come and evaluate the task. Furthermore, it can also give expectations that mastery is important for the effort and the activity. Motivation is what controls and gives energy to external actions and activities in the person's interior, such as memory and thinking. Motivation can often be influenced by mastery and experiences of success (Brøyn & Schultz, 2005). Krumsvik (2007) states that these digital learning aids have given the dyslexic students a sense of mastery and that they master the writing better using these digital learning aids. He also comments that digital learning aids can help facilitate this adapted education and that students become more independent in their schoolwork. This is precise because they can rely on the correction programs, which means that the experience of failure is less frequent (Krumsvik, 2007). Brøyn and Schultz (2005) write that digital learning aids themselves can also have qualities that are special attention-grabbing because it presents stronger stimuli than what the students get from textbooks. The light intensity of the digital learning aids and changing images that contain movement, colors, and sounds attract the student's attention more than textbooks. The use of digital learning aids for dyslexics opens new possibilities. But we must keep in mind that digital learning aids are only aided in meeting dyslexics. If the students have difficulties associated with neurological disorders, the problems will not go away just by using a computer (Brøyn & Schultz, 2005).

2.1.4 Pedagogical use of digital learning aids

According to Erstad (2005), the most significant challenge with digital learning aids is to integrate the pedagogical practice in a way that promotes students' learning. The challenges teachers might face can be anything from mastering information processing, word processing programs, to didactic use of digital learning aids, communication, and creativity as the use of a varied range of digital learning aids. A national digital competence development will therefore involve a strengthening of the learning environment in the school, to create new conditions in the education for the students. It is also important to develop good indicators of what digital competence is so that teachers get a common understanding and know what to look for. They must also know how to assess the student's digital competence beyond purely technical skills. The obligation for digital competence lies in the Knowledge Promotion. That

is why it is important to put in place the necessary competence so that teachers see how the use of ICT can strengthen learning in school (Erstad, 2010).

Erstad (2010) mentioned that a prerequisite for being able to use ICT in school is that teachers have competence in the use of ICT. The same applies to the choice of digital learning aids for students who are diagnosed with dyslexia. It is important to know the student's interests and academic level. In this context, teachers need knowledge about which digital learning aids are available and how these can be used (Erstad, 2010). Brøyn and Schultz (2005) say, like Erstad (2010) that when digital learning aids are to be chosen, the teacher must be aware of what the student needs practice in. Many students with dyslexia have stopped reading developments at an early age phase of learning, thus lacking the skills that can make them good and effective readers. Based on this, it is appropriate for the teacher to choose digital learning aids that can participate in helping the student to learn to decode words accurately. So that the students after this can learn how to write.

In this context, it is important to emphasize that great effort is required from the student. But with good assistance from the teacher, digital learning aids will be one good aid that can help most dyslexics to improve their reading and writing skills (Brøyn & Schultz, 2005).
Høien and Lundberg (2012) point out some good points that can contribute to one successful introduction of digital learning aids. They point out that the program for students should be relevant and varied. This is because the use of relevant computer programs that promote the student's reading and writing skills helps to strengthen the student's schoolwork. They also show that one can make use of activities that promote better-written language skills, which are related to work in class. Conversations about books read by other classmates or teachers are also something that can capture the student's interest in reading (Høien & Lundberg, 2012).

2.2 Sociocultural theory

According to Vygotsky, at each stage of development, there are certain problems that the child is on the verge of being able to solve him- or herself. The Zone of Proximal Development is the area where the student can not solve the problem alone but can succeed under the guidance of a teacher or cooperation with fellow students. The socio-cultural approach to motivation assumes that the students are motivated to learn when they are at

school, where teachers and students manage to see the value of learning (Lillejord et al., 2013).

Students with dyslexia may face some challenges with the simultaneous use of different learning skills. For this reason, it needs to be structured, clarified, and preferably focused on the student's stronger areas of learning. Students with dyslexia are often stronger visually or kinesthetically than auditorily. That means that initial learning will be more meaningful if presented visually or through the experience of learning (Reid, 2016).

Based on Lev Vygotsky's sociocultural theory of learning (e.g. 1978, 1986), the learner doesn't learn unless he or she engages in a social and cultural experience in which the learning is supported by others in the learning environment (Vygotsky, 1986). The process of learning is thus not an individual activity, but rather involves social interaction in dialectic relations between the personal and the cultural. First it is experienced on a social (intermental) level, followed by an individual (intramental) level, being shaped by the practices that learners inhabit, but also forming them. Language is one of the mediating tools that mediate the connection between these two (Vygotsky, 1986). Based on Vygotsky's theory of learning, the learner is active and actively involved in the task at hand, applying what he learns to his own individual consciousness (Brevik, 2015). In other words, the learner does not acquire knowledge by receiving information from the teacher or more competent peers. Brevik (2015) points out that instead learners actively engage in absorbing this information, externalizing it, and using it to further their own learning and development.

Taking Vygotsky's Zone of Proximal Development (ZPD) into account is essential for understanding this dialectic process. This is a key construct in his theory, and it emphasizes a learner's developmental process in a social situation (Chaiklin, 2003). The ZDP is defined as follows:

"The distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

Thus, even though the learner is actively engaged in the learning process, there is a limit to what is possible to attain without assistance (Dysthe, 1999). As illustrated in Figure 2, there is a gap between a learner's actual level of development (current understanding) and his or her

potential development (understanding with assistance). ZPD can be seen as the middle circle, which illustrates what a learner can understand with the help of their peers and teachers.
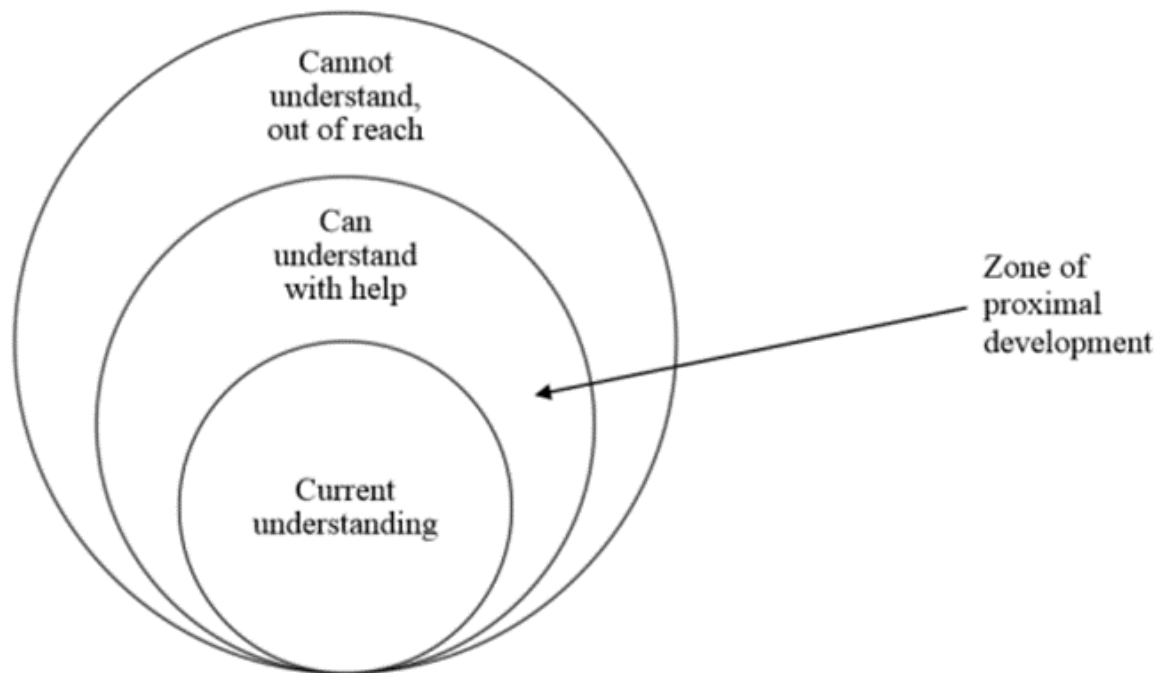

Figure 2. Zone of proximal development

In social interaction, through receiving guidance from others, the learner's ZPD expands, allowing him or her to progress to the next stage of development (Dysthe, 1999). Knowledge and understanding are developed in this zone of social interaction, and the learner is better equipped to solve the given problem.

Vygotsky believed that humans can not be separated from historical and social contexts, that both material and mental tools form premises for development, and that collective processes have a lot to say for learning. In short, can one say that learning in a sociocultural perspective focuses on knowledge and development as something that is created through interaction and interaction with people, objects and environment in different contexts. Interaction and collaboration are therefore important keywords for learning and understanding in sociocultural learning theory (Dysthe, 2001; Erstad, 2004; Säljö & Moen, 2001).

The term situated learning refers to the potential for children and adults to reinforce learning effect and development through collaboration with others. This can, for example, occur in school class, where students meet others with different levels of knowledge and experiences,

such as teachers. Students can with the help of the teacher's high competence develop knowledge in the community of practice that is the class (Wells & Arauz, 2006). If we draw this towards a digital teaching situation where the teacher has low digital competence, however, it will be more difficult for students to learn in the community because the teacher's lack of competence can reduce student's opportunities for collaboration.

Lyster (2019) believes that measures for students with dyslexia are not just about working with difficulties directly but to strengthen the student's skills. It is also important to strengthen the student's faith in themselves, their motivation, and their opportunities to manage to compensate for the difficulties they struggle with. Learning difficulties, and especially dyslexia, threaten the student's self-image and motivation. This threat might lead students to develop various defense mechanisms to avoid schoolwork. If students experience support and the school understands their challenges, it is easier to prevent them give up and using unfortunate strategies to safeguard their self-image. It can happen by when the student refrains from reading, making noise, or wandering. It will be the school's responsibility to support the students as far as possible, support the student's self-image and the student's belief in themselves, and prevent the motivation for reading from being destroyed. That both school and parents are aware of the student's challenges is important. It is also important that both parents and the school have expectations of the students. this expectation should stand up to what the student can achieve. The use of digital learning aids can be a motivation for students with dyslexia, as different programs support reading and spelling in different ways (Lyster, 2019).

2.2.1 Artifacts

As mentioned above, material, and non-material tools are important for development from a sociocultural perspective. These tools contribute to what Vygotsky (1978) calls mediation, namely that a subject interacts with the outside world indirectly through a medium. The tools were referred to as mediating tools, but a common term for both material and symbolic tools are the concept of artifact (Østerud, 2018). In a classroom, artifacts can be for example physical objects such as computers, iPad, books and boards or mental tools such as language and drawing systems. Artifacts can be classified into three main levels:

1. *Primary* artifacts are tools that provide for production or reproduction in everyday life by assisting people to work in their surroundings. A modern example of a primary artifact can be a PC (Østerud, 2018).

2. *Secondary* artifacts are knowledge, skills and practices that add and maintain the primary artifacts while gaining connections and applications. The secondary artifacts deal with knowledge of which practices the primary artifacts belong to. If we start with the PC as a primary artifact, we will at a secondary artifact level have knowledge of how we can use the PC in practice, such as the internet or the knowledge of how operating systems work (Frantzen & Schofield, 2013; Säljö & Moen, 2006).

3. *Tertiary* artifacts are overarching perspectives in culture and society. The tertiary level involves understanding about the other artifact levels in order to create overall systems, paradigms or businesses based on them. The example of the PC above, the information society itself can be a psychological abstract tertiary artifact because it is based on knowledge of practices around use of the PC, which in turn is a continuation of the PC as a primary artifact itself (Frantzen & Schofield, 2013).

Teacher's attitude toward digital artifacts will not only be important for the teachers' holistic experiences of the digital school, but also for the quality and effectiveness of teaching (Erstad, 2010). Without adequate understanding of digital artifacts, it will be difficult for teachers to be helpful to the students in the nearest development zone, which weakens the possibility of situated digital environment (Lave & Wenger, 1991; Wells & Arauz, 2006).

2.3 Digital learning aids in a sociocultural perspective

"A sociocultural perspective sees all human psychological processes as social in nature, human development as emerging through social experience and language as the essential tool for development" (Meskill, 2013, p. 2).

The internet has changed drastically over the years. What started out as a network to gather and exchange information, has now become a social network for everyone (Meskill, 2013). She points out that education has until recently been limited to classrooms, countries, and cultures. This has also changed and now a lot of teaching is done on the internet with no borders, but this also needs norms and practices. As digital tools are now a part of the basic

skills students are supposed to learn in school and in every subject, it is important to know how to use it, and this is something the students can not learn themselves. So, both students and the teachers need to have a high competence on how to use it properly (Otnes, 2009).

2.3.1 Digital didactics in school

Otnes (2009) writes that through the process of "Program for digital competence 2004-2008", "The Quality recommendation", "Report to the Storting no.30 culture for learning", The school reform and the Knowledge Promotion have been able to use the digital tools as part of the five basic competence that will be included in all subjects. The digital investment has resulted in a new standard for ICT in schools. It naturally requires an extended and more competent teacher role (Otnes, 2009).

The new Curriculum for the Knowledge Promotion 2020 (LK20) continues digital skills and provides clearer descriptions of what characterizes digital skills in the individual subjects. Here, the competence goals orient themselves a lot around the four mastery areas presented in the Framework for Basic Skills. Among other things, students will develop abilities to read and write digitally or to acquire reflection on digital interaction (Utdanningsdirektoratet, 2021a). Although these goals specify what students should learn from digital knowledge, they are described on a more general level. However, there are goals that are more specific in the descriptions, such as those aimed at the use of specific digital tools and programs. These are goals such as being able to do accounting on spreadsheets or using digital tools in 6 creative processes in arts and crafts. Nevertheless, they have a degree of openness which means that teachers have a significantly greater degree of method freedom (Utdanningsdirektoratet, 2021a). This freedom gives teachers a lot of room for maneuver, which presupposes that the future teachers have a good digital and media pedagogical understanding and are able to utilize the digital resources (Utdanningsdirektoratet, 2021a).

 The teacher's digital competence is very important to realize the use of technology in school. Therefore, both teacher education and school must go through skill development to have good benefits of the digital skills (Otnes, 2009). Krumsvik (2007) indeed supports this and says that digital learning aids provide new opportunities for dyslexics if teachers are sufficiently digitally competent to be able to support students in their use. Otnes (2009) has concluded that the digitalization of Norwegian schools has led to teachers having to reflect on many new

issues. As the digital learning aids work, whether students get the digital help they need and whether students get access to the programs that can be used. Based on the concerns, teachers today must deal with didactic challenges related to technology and be able to incorporate these into planning and instruction. A good number of teachers in today's school have not learned through their teacher education how to handle digital tools educationally. As a result, teachers today must reflect on how digital communities and schools can meet in the best possible way. Pedagogical issues are, for example, related to how the teacher should handle the new situation where it becomes common to use digital tools. This can create new pedagogical challenges in digitized classrooms, such as classroom management, learning impressions, peace, and order, and learning climate becoming more complex in digitalized classrooms. Because of this, the teacher must incorporate a reflection on these points in their practice theory, who not only need competence development but pedagogical didactic models for the digitized learning environment and good knowledge sharing in the teaching staff (Otnes, 2009).

2.4 Students with dyslexia learning English as a second language

When it comes to learning English as a second language for students with dyslexia, this may be difficult. Bogdanowicz (2016) refers to previous research and practitioners reports where it is claimed that students with dyslexia or students with the risk of dyslexia can have difficulties in foreign language learning, especially English. The reason for this is that English has a deep orthography and is non-transparent, which makes it harder to read and spell (Bogdanowicz & Bogdanowicz, 2016). In Norway students start learning English the same time they start school, and they have learning aims after year 2, 4, 7 and 10 (Utdanningsdirektoratet, 2019). After year 2, one of the learning aims for the students is: Listen to, read and talk about the content of simple texts, including picture books. As Bogdanowicz (2016) mentions, students with dyslexia can have difficulties reading and spelling in English, which this learning aim does both of. This article also points out that if students who are diagnosed or students with the risk of having dyslexia are exposed to live language, such as songs, stories, that this can help them gain a deeper knowledge of the structure of the language (Bogdanowicz & Bogdanowicz, 2016).

Bogdanowicz (2016) has looked at how much English should be spoken during an English lesson. Teachers often switch back and forth between English and their native language, which is shown in this study that may not be the best thing and might not serve the language learning. She believes teacher does this because they are told that communicating only in a foreign language is too difficult for the students to understand. She points out in her conclusion that using live language is a great thing for students with dyslexia, but that the tasks given to students needs to be adapted to their needs. This is because everyone diagnosed with dyslexia still learns in different ways and needs things on their academic level. Therefore, this is a good way to work, and also to revise the tasks often, and by doing this you will lay the groundwork of learning to write and speak English (Bogdanowicz & Bogdanowicz, 2016).

2.4.1 Linguistic coding deficit hypothesis

It has been shown that students with dyslexia have more difficulties learning a new language than any other learning difficulties (Kormos & Smith, 2012). Students with this learning difficulty often find strategies to use, but these are not effective when working with a new linguistic system, such as English for example. It is also pointed out that teachers working with other languages than their mother tongue can have problems noticing the symptoms of dyslexia, and seeing it as difficulties learning a new language itself is the problem (Olagboyega, 2008). Helland and Kaasa (2005) conducted a study that looked at how Norwegian students learn foreign languages, in which they found significant differences between how students with dyslexia learn language and students without dyslexia (Helland & Kaasa, 2005).

Ganschow and Sparks (1998) presented the most successful predictors of learning a new language, after researching the relationship between native language learning and learning a new language. They pointed out that the problems one may face when learning their native language will also be problems when learning a foreign language. The three main findings they found were difficulties in phoneme-grapheme correspondence, syntax and semantics, which will occur in both languages. The other one was sound-symbol relations and syntactic processing skills, and the last one was that it can cause low motivation and self-esteem for students (Ganschow et al., 1998)

2.4.2 Psycholinguistic grain size theory

This research concentrated on the English language, not only because it is one of the most commonly taught languages in schools, but also because of the difficulties it is said to bring for dyslexic students (Ziegler & Goswami, 2006). It has been established that some languages are more difficult to learn than others (Ziegler & Goswami, 2006). The psycholinguistic grain size theory (PGST), introduced by Ziegler and Goswami, explained the disparities in reading fluency and speed between languages (Ziegler & Goswami, 2006).

According to the above-mentioned idea, the degree of reliance between sound units and their visual representation varies among languages, and these variances translate into changes in the difficulty of learning to read from one language to the next (Ziegler & Goswami, 2006). Psycholinguistic grain size refers to the ability of visual symbols to convey sound units of varied sizes. To put it another way, grain size refers to the amount of letters that make up a phonological unit (Ziegler & Goswami, 2006). In the Japanese language, for example, a symbol represents an entire syllable, whereas Chinese symbols represent entire words (Ziegler & Goswami, 2006).

A one-syllable word is made up of two parts: onset, which is a single consonant or a group of consonants at the start of the word, and rime, which is the rest of the word (Nijakowska, 2010). Readers of languages with shallow orthography, such as Italian or Spanish, rely on the grapheme-phoneme relationship to understand words, according to PGST, because the sound-letter correspondence is very trustworthy. Readers of languages with deep orthographies, where phoneme-grapheme correspondence is erratic, can not rely on smaller grain sizes because the smaller reading units that represent a phoneme (such as a single letter or cluster of letters) are even more inconsistent than the larger units (rimes and syllables) in these languages (Nijakowska, 2010).

When it comes to students with dyslexia and grain size theory, it's been determined that the level of difficulty they have reading a language is determined by the nature of the language and its spelling (Nijakowska, 2010).

2.4.3 Orthography

Studies have been conducted that have shown that basic decoding skills can be less effective in English, than other languages since English is considered a language with deep orthography, and it has many inconsistencies and complexities (Seymour et al., 2003). Seymour et al. (2003) states that recognition of written words is far less effective, because the grapheme-to phoneme correspondence is inconsistent. Miller et al. shows an example of this, which is the letter <A> in English. If you read the words "case", "cat", "car" and "call", these words all consist of the letter A, but the sound of the letter is different in each word. English as a language is one of the most difficult languages to read and spell due to the orthography (Van der Leij, 2004). Due to the orthography, Norwegian students learning English can struggle with spelling, reading and comprehension. In Norwegian, which has a shallow orthography, it will be easier to recognize words, and make the learning easier. In Norwegian, one letter is mostly pronounced the same, and there is a sound-symbol relationship. This is because the grapheme-to-phoneme correspondence is more consistent (Miller et al., 2014). As Norwegian having a closer sound-symbol relationship, English does not. One sound in English can be spelled by different letters, and the other way around, with one letter can be more than one sound, in both reading and spelling (Nijakowska, 2010).

The article "It's difficult since there is no rhyme or reason": Spelling relevance in an EFL context points out that English spelling is complex for numerous reasons (Saban & Kahn-Horwitz, 2021). They use the example of the words heal and health. These words are written similarly but pronounced differently. To be able to read and speak properly one need to understand the knowledge of grapheme-phoneme and phoneme-grapheme correspondence. To acquire this, it is important that the teachers have the linguistic knowledge of phonemic systems and the orthographic representations, to be able to teach the students how to read and how to spell (Saban & Kahn-Horwitz, 2021).

2.5 Previous research

In this sub-chapter we will look at previous research that has been done on this topic. We have divided it into two sub-chapters, the first one is research on teacher's digital competence, and the second one is research on students with dyslexia and digital learning aids.

2.5.1 Research on teachers' digital competence

Krumsvik et.al (2013) has conducted a study which looks at the connection between the use of ICT and learning outcomes in upper secondary school. This is a report from a study that was completed in upper secondary school. The main goal of the study has been to investigate the teacher's pedagogical use of ICT and students' learning outcomes when ICT is used. The study has also examined school leaders' ICT strategies, teachers' class management and digital competence, students' digital competence, and how teachers' use of ICT can promote learning outcomes for students. The study indicates that three of four teachers express that they do not have continuing education in ICT. They suggest a long-term, systematic, and well-founded investment in digital competence development for teachers in most counties and municipalities (Krumsvik et al., 2013).

The study shows that teachers learn from each other in everyday school life. Colleague-based guidance can mean a lot, but it is often perceived as random and reserved for the few. Furthermore, this study says that teachers who have continuing education in ICT have higher digital competence than those who do not. The SMIL study shows that teachers have high elementary skills, but lower pedagogical ICT competence. The teacher in the study experienced that they did not master to guide the student's digital learning strategies and digital judgment. Over half of the teachers in this study, however, state that they use ICT in a way that promotes the student's learning outcomes more than if they were to use only textbooks. The study also shows that to succeed with ICT in school, the school owner and school management must have a certain digital school management competence in their staff as well (Krumsvik et al., 2013).

School management should be a competent driving force for the use of ICT in schools and have clear plans and strategies for raising teachers' digital competence. The study says that people should be appointed to work systematically with competence development, that time is set aside for competence development for teachers in everyday school life, targeted work should be done continuously with ICT, the measures must be relevant to the teachers and that their wishes and needs are considered. Two out of three teachers in the study express that good ICT follow-up from school owners are important for how they use ICT in teaching (Krumsvik et al., 2013).

Krumsvik et.al (2013) says that the study shows that the introduction and use of ICT in schools requires a change in educational practice, this is something that will take time. There are large variations in teachers' digital competence. Teachers often must take responsibility for becoming digital competent role models for the student's academic use of ICT. An important factor for success in this work is school management. Together with teachers, they must provide training in ICT and digital learning aids, so that the necessary training measures and continuing education are implemented. Another important factor in succeeding at ICT in schools is, according to this study, that teacher education should take responsibility for providing future teachers a broad and good knowledge within pedagogical ICT use (Krumsvik et al., 2013). The study also points out that ICT makes it possible to adapt teaching in several ways. This allows teachers to be closer to the students now than before. It opens up to give individual guidance, in this way vulnerable students can get help with homework even during school hours, then teachers can help the students in the classroom (Krumsvik et al., 2013).

In a study done by Yunus (2013) there were teachers who reported that there were some advantages using ICT when teaching reading skills. He refers to in his article that using ICT improves education and provides more teaching and learning support for the teachers and the students. When using ICT in class this allows for more effective peer feedback, giving positive interactivity within the teaching and learning, allowing user collaboration and the publishing of work and the students will improve their vocabulary and enable them to find out the meaning of words in the text they are reading (Yunus et al., 2013). Lastly, Yunus (2013) reports that the use of ICT is an advantage in terms of getting suitable reading materials online.

Another finding from this research is that teachers found it more difficult to regulate the class while using ICT to teach reading skills, according to reports. When ICT was introduced, students became overly enthused, which produced challenges for teachers in terms of maintaining class control. Teachers will also spend a lot of time if they run into technical difficulties. It was also noted that when teachers utilize ICT, they are unable to provide much input, and there is a risk that the students would not understand what their teachers are attempting to teach

 Furthermore, when students utilize the internet, they may be distracted by other components on the website. Aside from the distracting problem, teachers were concerned about the

contents that are available for the students online, because there were so many articles available and student's might not read what they were supposed to (Yunus et al., 2013).

Egeberg et.al (2016) has written a report called Monitor school, this also supports several of the findings that have emerged from the SMIL study. Monitor School's report (2016) shows that teachers' competence is crucial for good and appropriate use of ICT in schools. Their surveys show that as many as 60% of the teachers who participated in the survey, answered that the school does not have a systematic approach to skills development for teachers in the school, in digital competence. Here it was also revealed the teachers have little time to run peer-based mentoring. The main impression from this report is that competence development for teachers has a modest presence in many schools' plans (Egeberg et al., 2016).

Gudmundsdottir and Hatlevik (2017) start their article by saying: "Like other professionals, teachers have experienced increased access to digital tools, media and digital resources in recent decades". One of the biggest findings in their study is that newly qualified teachers report that the quality of and contribution from ICT training during the education to be a teacher is poor. It also shows that newly qualified teachers are positive towards using ICT, but critical to the fact that it can cause distractions in the classroom. But by being positive, their competence will also rise (Gudmundsdottir & Hatlevik, 2018).

2.5.2 Research on students with dyslexia and digital learning aids

According to Lyster (2019), over the last ten years the technology has developed rapidly, in terms of development and use of technological aids. She refers to e-books, audiobooks, tablets, and speech synthesis. She points out that there are several benefits to using digital learning aids. This is because the programs can be easily adapted to the individual student's needs, and then the programs can provide an immediate response on whether the student is right or wrong when working on assignments. Another positive effect of digital learning aids is that students can get help without it becoming so visible that they struggle with some tasks. Various apps and software can allow students to practice specific skills. On-screen reading using speech synthesis can have a positive effect on the student's vocabulary that they might otherwise have missed, due to lack of reading (Lyster, 2019).

Lyster (2019) has concluded that there is not a "hocus pocus" for reading and writing development to use digital learning aids. She thinks it might be more about how we use ICT, and in what way and contexts ICT can be contributed to influence written language development. Digital learning aids, such as speech synthesis, can be beneficial help for students who struggle a lot with reading comprehension. Lyster (2019) believes that we should still be aware that reading comprehension seems to be better when one reads on paper than on-screen (Lyster, 2019).

Wood et.al. (2018) have done a meta-study that can provide more insight into the effects of digital learning aids for students' language and reading development. This study indicates that it has a moderate effect on reading comprehension of using speech synthesis for students with reading comprehension difficulties (Wood et al., 2018). There are other meta-studies to come to uncertain results related to whether ICT affects reading development (Archer et al., 2014). Another study that turns out to be in line with Archer (2014) is Thiessen and Lookers' (2007) data analysis of 15-year-olds' use of ICT in Canada and how their reading development evolved. This analysis indicates that we do not yet know the effect of PC use, and how it affects reading development (Thiessen & Dianne Looker, 2007). A study conducted by Delgado (2018) finds clear benefits of reading on paper, rather than reading on screen when it comes to reading comprehension (Delgado et al., 2018).

Beacham and Alty (2006) conducted a study on the effects that digital media can have on the learning outcomes of individuals who have dyslexia. This study was done as early as 2002. In the study the participants were students with dyslexia as well as non-dyslexic students. It was shown that dyslexic students obtained poorer scores, which they found unexpected. The reason why they found this so unexpected was because the learning materials used were both verbal and non-verbal (Beacham & Alty, 2006). Most of the students with dyslexia preferred the text and diagrams presentation but found the sound and diagram presentation the easiest to follow. Some participants also mentioned that the text-only presentation was dull, and Beacham and Alty points out that this can be why some dyslexic students have difficulties in lessons where students only have access to one thing of information (Beacham & Alty, 2006).

Anestis (2015) has done a study to see how using ICT instead of paper-based during exams will affect students with Dyslexia. 20 6th-grade students participated, whereas 10 of them were diagnosed with dyslexia, and 10 of them were not. They were to solve two tests, one digital and one paper based. The aim of the study was to see how dyslexic students respond to

ICT when doing a test. At the end of the study, it was shown that using ICT during examinations had a positive effect on the students' achievement. It also showed that there was a need for expansion of ICT from the process of teaching to the process of examining (Anestis, 2015).

3.0 Methodology

In this chapter we will present the method we have used for our study. We will present our interview guide, the data collection process, and the analyzing work. We will present the issues of reliability and validity, as well as ethical considerations of our study.

For our master thesis we have conducted an interview-based qualitative study where we interview English teachers who work at lower secondary school or have experience from these grades. We have interviewed three teachers and one special educator, from different schools. We have done semi-structured interviews because this will give us as interviewers the chance to go more in depth regarding different questions. Three out of four interviews were conducted in Norwegian, but in this thesis, we have chosen to translate the question and answers from our interviews into English.

Overview of the data collection is composed of qualitative and quantitative collection methods. Postholm and Jacobsen (2014) point out that the qualitative method can be seen as an inductive, where the researcher goes out into the field with an open mind. When we started this study, we accepted that as researchers we can not be completely objective, therefore have an open mind to what we found. The objective of qualitative research is that the researcher seeks qualitative knowledge and not quantification (Kvale & Brinkmann, 2015).

3.1 Justification of method

The purpose of this thesis is to shed light on the learning outcomes of students who have been diagnosed with dyslexia in relation to the use of digital tools. When choosing a method, it is important that this is done based on how one can obtain information in the best possible way to answer the research question. We have chosen to use a qualitative method, as we considered this to be the best method for this study.

Before selecting a method, Kvale and Brinkmann (2015) says that the researcher should investigate the topic of what and why questions. We worked on formulating a research question we wanted to investigate. Based on our research question we came up with the idea that qualitative data collection is the right method to choose, on behalf that we wanted to have

an open mind on what the results would be. According to Postholm and Jacobsen (2014) the qualitative interview can be categorized into three categories: the structured interview, the semi-structured interview, and the unstructured interview. As the best way to illuminate our research question we chose to use the semi-structured interview. In advance the researcher is having several questions formulated, but also the researcher is able to be more open to receiving topics that were not planned in advance and therefore get a more honest answer and a deeper insight (Postholm & Jacobsen, 2014).

3.2 The qualitative interview

According to Kvale and Brinkmann (2015), qualitative research interviews are structured and purposeful conversations. In an interview, the structure is determined by the roles of the individuals present. A researcher's primary objective is to describe or understand something. Depending on the issue, the focus of the interview will differ. As pointed out by Johannessen (2010), interviews are one way to collect qualitative data. Interviews provide the data about what the participants conveys during the interview.

In qualitative surveys, interviewees are usually presented as text. Those texts are then used to collect data. This information is advantageous because it registers conditions that are often difficult to capture in a text, such as the tone of voice, pauses, movements, and facial expressions (Johannessen et al., 2010). Additionally, according to Kvale and Brinkmann (2015) the objective of the qualitative interview is to present the participants description of the phenomenon to be able to interpret its meaning. Registration of answers to the researcher's questions, forms the data in qualitative interviews. Audiotapes, digital Dictaphones, mini-disks, or other electronic tools with recording capabilities are typically used to record interviews, which are then printed. It is common for the researcher to take notes during the interview (Kvale & Brinkmann, 2015).

"What are teachers' perspectives of the role of digital tools in supporting English learning for students diagnosed with dyslexia?" is the research question we wanted to try to get an answer to. We needed to talk to participants because we needed to hear about their experiences with the topic we were researching. The objective of an interview, according to Thagaard (2013), is to obtain thorough and comprehensive information on how people experience their life

situations. These interviews provide information on how the participants interpret their own life experiences and occurrences. This technique provides a solid foundation for understanding the informant's experiences, thoughts, and feelings. This strategy is unique in that it provides us with information about the events. They retell recent occurrences, as described. This will provide us with information on the participants perceptions of the events they have witnessed. Interviewers are thought to be recounting incidents from the participants' life. According to Thagaard (2013), this isn't completely problem-free because the interview is defined by a relationship between the researcher and the participant. As a result, it became critical for us as researchers to consider what constitutes a relationship and how relationships develop between us and the participant as we evaluate data and report results. This starts a basic ethical conversation regarding the difficulties of qualitative research (Thagaard, 2013).

The question of how many participants would be required surfaced soon. According to Dalland (2017), the option is based on the thesis's problem and the amount of time available. The qualitative interview is distinguished by the difficulty of delving deeply into the topic under investigation. As a result, the number of participants available for our study could be limited. We decided to interview four participants separately for our study project. Good interactions between two or three participants can provide a lot of material for a task (Dalland, 2017). You can start with a modest number and expand it if the information you acquire from the interviews becomes too fragile. We found that two or three participants were too small in our study, so we decided to increase the number.

A semi-structured interview, according to Johannessen (2010), has an overall interview guide as a beginning point for an interview. Questions, themes, and sequences can all be changed here. This allows the researcher to navigate back and forth via the interview guide. Qualitative interviews are distinguished by the fact that the questions are usually open-ended, — in other words, no answer possibilities have been pre-formulated. The participants come up with their own answers. The researcher has less control over the content of the interview. The responses of the participant reveal how they addressed the questions (Johannessen et al., 2010). This, according to Thagaard (2013), allows the participant to express how they perceive their own situation.

3.3 Interview guide

This study aims to look closer at teachers' perception of the role digital tools have in the English classroom for students with dyslexia. Therefore, we decided to interview three English teachers who have experience of having students with dyslexia in the classroom, and one special educator who mainly works with students diagnosed with dyslexia.

We divided our interview guide into four sections with different themes, so in total it was 16 questions, whereas the last two was if the participants had any questions or something else, they wanted to say. The first section included some general questions, for example what type of education they have and how long they have worked for, this is to get some general information about them. After this we went further into dyslexia, different learning aids they use and so on.

An interview guide describes the order of the topics that are being brought up during the interview (Thagaard, 2013).

In our interview guide we have prepared four main topics:

1. General

2. Dyslexia

3. Adapted teaching

4. Learning aids

We have chosen to thematize the interview guide to create a clearer overview of our questions, so that we can categorize them. The first category we chose because our participants are mainly teachers or working with children. So, we were looking for what type of education they had. In this way we could get an insight into their background. We also asked our participants when we asked them to participate if they had some experience with teaching children who were diagnosed with dyslexia and using digital learning aids in the classroom. This is because we wanted them to have some sort of experience using digital learning aids with students who are diagnosed with dyslexia.

In category 2 we have chosen dyslexia, so we can develop a clearer insight on what knowledge the participants have on the diagnosis and what experience they have working with students who are diagnosed with dyslexia. In category 3 we chose adapted teaching, where we focus on how they as a teacher adapt the teaching for students with dyslexia but also to gain an insight on how the school is working with the adapted teaching as well. In category 4 we wanted to dive deeper into the different learning aids the students have access to, but also wanted to know what the teachers' perceptions are of the use of digital learning aids in the classroom. And lastly their experience using the different types of learning aids the students have access to.

After we created our interview guide, we decided to do a pilot test. We did this to see if our questions were formulated well, how long the interview would last, and if we received the information we wanted from these questions. It has been recommended to do a pilot interview before conducting the interviews with the participants, also to practice being in this role and situation (Dalen, 2011). We conducted our pilot interview with a friend, who has worked at a school for a few years, and have relevant experience of how dyslexia work in the English classroom. By conducting our pilot interview together, we discussed afterwards how we felt it went, and how our questions were answered. We also listened to the interview after, and realized it is important to give the participants time to think as well, which Kvale (1996) points out as very important. Overall, we did not make any significant changes to our interview guide between the pilot interview and the real interviews, except for changing the wording of some questions, to make sure we did not end up with yes/no answers.

3.4 Data collection

When the project was approved by NSD, the work of finding participants for the study started. We sent out emails to many different junior high schools. In this email we included information about the project, and about the interview that they would participate in. This process took quite a bit of time, due to the fact that many schools did not reply at all, some schools replied that they unfortunately could not take the time to do this now, due to the workload at their school. After finding enough participants that wanted to participate in this study, we sent out the information letter and the interview guide, so they could prepare for the

interview if they wanted to and asked in the email if they had any requests for when the interview would be conducted.

In the information letter the interviewers received there was information about the study, the reason why they were asked to participate, and important information regarding the anonymity of their identity. We also informed them how the sound recording would be stored, and the fact that they can withdraw their consent at any point with no negative consequences.

All four of our interviews were conducted on Zoom, due to the Covid-19 pandemic. We started our interviews by introducing ourselves and explaining how it would work. We decided beforehand that one would take responsibility to conduct the interview, whilst the other made sure the sound was good and the recording worked. During the interview we tried to get the participants to talk as freely as they could, and to engage in the conversation and also listen to what they were telling us during the interview without interrupting as much. This is because their self-understanding was important to us (Thagaard, 2013).

3.5 Participants

Our criteria for the participants that we wanted to interview was that they had to be working as a teacher in lower secondary school, teaching English and be familiar with using digital learning aids in the classroom. In total we have interviewed four people, three of them have or are working at a secondary school as an English teacher and one of them as a special educator.

All the participants have been given pseudonyms, as the table below shows.

Table 1. Participants

Pseudonyms	Degree	Experience
Alex	-5 years of communication studies -2 years of teacher studies in USA -One year of English in Norway -"Praktisk pedagogisk utdanning, Norway	-8 years working as a teacher in Norway -Worked as a tutor for students with dyslexia prior to this
Bill	-Studied literature -Studied "Praktisk pedagogisk utdanning"	-Worked as a primary school and secondary school for 14 years -Worked in higher education for almost 5 years
Camille	-Bachelor's degree in animation and visual effects -Master's degree in special education	-Finished studies in 2017 -Worked for 5 years as a special educator
David	-"Lektor" education in English and history (5-year degree) -One year of Norwegian	-Worked as a cultural schoolteacher - Worked full time since August 2021

Some of our participants have a lot of experience working in a classroom, and some of them have not been working as long, but still have experience of working with students diagnosed with dyslexia in the English classroom. 3 of our participants work as teachers, and they all

teach English as a subject. Camille, who is a special educator focuses a lot on English, since she herself is dyslexic, and knows how challenging it can be to learn English due to the diagnosis.

3.6 Transcription

The interviews lasted for approximately 30-45 minutes each, which makes for a lot of written text. All our interviews for this study were conducted on Zoom, due to the Covid-19 pandemic. Most of our interviews had good quality on the sound recordings, which makes the process of transcribing easier. We did fear that the recordings would be of lower quality because the interviews were done digitally, but this was not a big problem after all. When transcribing the interviews, Kvale (2018) says that the initial analysis starts here already, when transcribing.

 The transcript shows an abstraction which means that the voice guidance, intonation, and breathing is lost. It is emphasized by Kvale and Brinkmann (2015) that there should be no excessive focus on the transcription as it may cause the analyses to be broken. When we have transcribed the audio files from oral to written language, we have tried to write down all the details that have been said in the audio files, and relate them to the easiest language.

When transcribing interviews, there is no standard for how it needs to be done, but there are some choices that need to be made (Kvale, 2018). Here it is mentioned that you need to think about if you want to transcribe word by word, all repetitions, laughter, and pauses. Another choice you can make is to transcribe more formally, whereas you just include the important texts, not the laugh or other sounds, and none of these are wrong. In our transcriptions we have chosen to transcribe word by word, including pauses and so on, to get the material as concise as possible as to what the informant meant.

To check the reliability of the transcription it can be a good idea to listen to the audio again after transcribing, to see if you have misheard something, or misunderstood something. This is also a process that takes time, but by doing it you make sure that the results you have found are as correct as possible (Kvale, 2018).

It is required to transcribe the dialogues in order to do a more in-depth study and interpretation of the information gathered during the interviews. This is a part of the analysis itself and depending on a number of criteria such as the quality of the recording, the researcher's typing skills, and the level of detail desired, it could consume a lot of time (Kvale & Brinkmann, 2009). Transcribing immediately after the interviews helped to recall still-fresh memories of the non-audible signs, such as smiles or blushing, that we could not hear on audio.

It was a time-consuming and occasionally demanding procedure, which should be an argument for transcribing as soon as possible rather than being faced with all the gathered material to transcribe at once. The period between each interview was usually one week, which allowed us to organize our thoughts and ideas before the following one. The more detailed analysis procedure began after the interviews were transcribed. In addition, keeping some sort of a diary helped as means of writing thoughts after each interview, summarizing the important points and information acquired, and brainstorming new interview topics.

It is a useful strategy since it allows you to see certain trends and connections, as well as differences that may arise in the next interview (Kvale & Brinkmann, 2009). It should also assist the researcher in reflection on what he or she needs to clarify in the next interview, as well as recommend some changes to the interview guide. Work-journals, according to Kvale (2009), can aid in the analysis process by offering "a platform for analyzing and commenting on the process and changes in knowledge generation during an interview enquiry (Kvale & Brinkmann, 2009).

3.7 Analysis

According to Postholm and Jacobsen (2014) the purpose of analyzing is to create a system, a pattern and an option in the "mass". The way we have thought our analysis will be, is similar to a descriptive analysis. Which is by structuring the data material, for example categorizing the material together and separately (Postholm & Jacobsen, 2014).

The reduction of research data, data visualization, and formulating a conclusion are all aspects of data analysis (Miles & Huberman, 1984). It aims at "selecting, concentrating, simplifying, abstracting and changing the "raw data", as Miles and Huberman (1984) put it (p.21).

According to the authors, data minimization is a process that begins even before the data collection. It includes deciding on the questions one wants to ask, as well as theoretical frameworks and data collection methodologies (Miles & Huberman, 1984). When the real data collection process begins, coding is used to reduce the amount of data collected. The data reduction process is followed by data presentation, which Miles and Huberman (1984) characterize as "an orderly assemblage of information that facilitates conclusion-drawing and action taking" (Miles & Huberman, 1984). According to Kvale (1996), the analysis process includes interviewees' behavior, physical reactions, and listening to their responses, which already generates some ideas (Kvale, 1996).

3.7.1 Hermeneutics and phenomenology

The hermeneutical technique was used to analyze the data material. The interpretation of the meaning of what one hears or reads has been accorded major importance in hermeneutics (Kvale & Brinkmann, 2009). Without understanding what the teachers were saying, it would be nearly impossible to characterize how they perceived English learning for students with dyslexia using digital tools as support. Our lives and how we comprehend them are contextual from a hermeneutic standpoint. The adoption of a hermeneutic method allows for a greater comprehension of the material gathered from the respondents. This means that the interviewer must consider the context in order to fully comprehend the message received (Dalen, 2011). However, interpreting the interview material entails not only looking for the understanding of each part by placing it in a larger context. The scholars refer to this as the hermeneutic circle (Dalen, 2011). It indicates that one can not comprehend texts by reading them in their entirety or in their component sections without making cross-references (Dalen, 2011).

In our study, we thought it would be useful to discuss phenomenological interpretation in addition to hermeneutics. Phenomenology is a theory as well as a research approach that tries to get an understanding of the world through the participants' perspectives and the way they experience it (Kvale & Brinkmann, 2009). Both phenomenology and hermeneutics rely heavily on the lived world (Kvale & Brinkmann, 2009). Phenomenology focuses on how participants in the study feel the environment they live in and the phenomena they are a part of, and this is how the data is presented by the phenomenological researcher (Kvale &

Brinkmann, 2009). As a result, the reader gains a better understanding of the research participants' lives.

Hermeneutics, on the other hand, focuses on the interpretation of the meaning stated by the interviewees, and these two techniques, in our opinion, are complementary and work well together. As a result, phenomenology underpins the necessity of attempting to see the world through the eyes of our participants, seeing and understanding their point of view, and presuming that the significance is what our participants say it is (Kvale & Brinkmann, 2009). Furthermore, phenomenological researchers look for similarities in how different people perceive comparable situations, which are referred to as "commonalities of perception" (Fraenkel et al., 2012).

3.7.2 Coding

"The operation by which data is broken down, conceived, and put back together in new ways", is according to Strauss and Corbin the definition of coding (Strauss & Corbin, 1990). Coding is used to connect concepts, not just to apply a label to a phrase, sentence or fragment of discourse: "It leads you from the data to the idea, and from the idea to all the data relevant to that idea" (Richards & Morse, 2007). The coding process can assist in identifying patterns and creating categories based on these patterns (Richards & Morse, 2007).

This study's codes were used as a technique for generating essential categories while also clustering the rich data material into smaller chunks, making analysis easier. Codes might change depending on the level of analysis and help to discover how various respondents related to the same idea (Rubin & Rubin, 2005). As a result, descriptive codes can be used, which do not involve interpretation but rather specific division of an evaluated text. It is also a good idea to employ interpretative code, or even better, explanatory codes (Miles & Huberman, 1994). A portion of the codes in this study was produced prior to the start of the analysis, some were based on the research questions, and the others were invented and used afterward in the analysis process. You can also create codes based on those created and used by another researcher in similar research (Rubin & Rubin, 2005).

In this study, the Rubin and Rubin (2005) coding approach was used, with the first stage being a thorough rereading of the transcribed interviews to gain a basic image of the data

material. During the second reading, the emphasis was on the themes and concepts that had been pre-planned and represented in the interview guide's questions. As a result, the specific code was applied each time it appeared in the text. Some fresh emergent notions were identified while reading and marking down the themes planned ahead of time. As a result, the new codes were added, but it was also necessary to reread the original transcript and categorize the material pieces that "now correspond to the new categories" (Rubin & Rubin, 2005). After the coding was completed, the data was organized into categories to give a clearer picture of what the different teachers had to say about the same theme and how they interpreted different concepts. The data was then compared both inside and across categories.

The final codes we ended up with are presented in the table below.

Table 2. Codes

Code	Description	Quote (example)
1. Knowledge of dyslexia	The teacher's knowledge about dyslexia as a diagnosis	
1.1. Professional experience	Participants experience of working with students diagnosed with dyslexia	"Yeah, I wish I could use it more in the classroom for each student. There is one class that I have, where like 6 students have dyslexia, and each has a different degree of dyslexia and needs help with different aspects of the dyslexia, and you don't have time to sit down 1:1 with each one to help. So I have the experience but it is useless "
1.2 Feeling of incompetence	How teachers feel about not having enough knowledge about the diagnosis and how to work with it	"I got in, I failed every single class which involved writing"

2. Organizations of adapted teaching	How the school and teachers adapt the teaching for students with dyslexia	
2.1. Subject competing	How some subjects might seem less important than other subjects	"It is often, oh you do well in social studies! Then we take you out of this class and teach you English! The problem then is that you will perform less in social studies as well, which is creating an evil spiral"
2.2. Teacher-student relation	The importance of a teacher-student relation when looking at learning possibilities	"As soon as the teacher knows what each student needs, that is when it is possible to learn"
2.3. Students feeling about adapted teaching	How the teachers feel the students react to adapted teaching in the class	"So, a lot of them will have an IOP and some of them will have a supporting teacher in the class. But a lot of students don't want to be out of the classroom, or don't necessarily need to because the only place they struggle is with writing, not necessarily with language learning."
3. Affordances of digital tools	Possibilities and challenges digital tools can provide in the English classroom	
3.1. Teacher digital competence	Teacher's use of digital learning aids learning English	"I have little experience with the use of digital tools. I never worked with Chromebook before I started here. And the apps that they

		use, they are relatively newly developed in fact, at least in Norway"
3.2. Learning possibilities	Learning possibilities that digital learning aids can provide	"So it is clear that there are a lot of positive sides with digital learning aids, both that you in one way or another can become a larger part of the class community, and that you can more easily integrate the help in a way where it is not that visible"
3.3. Challenges of digital learning aids	What challenges teachers might face when using digital learning aids in class	"Yes, as a teacher I have to say that I have experienced problems with the use of digital learning aids. So, do things work? Does the PC work? Does the internet work? All those things, it gets incredibly vulnerable to that kind of things"

3.8 Ethical considerations

Prior to our study there are some specific guidelines that each researcher needs to follow in order to produce a study that does not violate the moral code. Our study's ethical considerations are followed by the recommendations presented in the Norwegian guidelines (NESH, 2021).

During our preparation of finding participants for our interview, we started by sending in a form with our research question and our interview guide to "Norwegian center for research data" (NSD), who approved our implementation plan. When working on a master thesis it is important to safeguard the privacy of all participants that contribute to the project. Therefore, we asked all our participants for consent to use the app Nettskjema-diktafon before we started our interviews, something all of our participants agreed to.

According to Kvale (1997) confidentiality is where one does not publish personal data to avoid exposing the participants identity. Thagaard (2013) writes about three principles of ethics guidelines that are important: the principle of informed consent, the requirement of

confidentiality and that the participants know what it means to participate in this survey (Thagaard, 2013). When we started the process to find participants, we sent out information letters where we gave an in-depth text about what our research was about. In our information letter we wrote that we were going to preserve the school and the participants' anonymity. We also wrote that it was voluntary to participate in our project and that the participants could withdraw at any time without any consequences.

After we had made contact with the participants and they had accepted to participate, we gave them the option to get the interview guide beforehand if they wanted. All the participants got the interview guide before the interview. The advantage of handing out the interview guide beforehand is to prepare the participants, so that we can get thoughtful answers to the question we are asking.

All our interviews started with us giving the participants the information about how we were going to maintain their anonymity and all of our materials were going to be deleted after the project was finished. For us it was important to appear as credible and meet the participants with respect. We wanted to maintain the participants integrity, by doing this we took into account the participants assessments, motives and self-respect. We were aware in advance that what came out during the interviews was the participants' self-understanding, it was important to us that we would not make them doubt their self-understanding, and instead listen to what they told us during the interview, and show interest (Thagaard, 2013).

3.9 Reliability and validity

When it comes to reliability and validity this study would not necessarily correspond with all English teachers in Norway considering that we only interviewed three teachers and one special educator. It still gives some insight into how teachers work with dyslexia and the role digital learning aids holds in the classroom. It is important to remember that the findings from this study are their opinions on the subject. Kirk and Miller (2011) point out that reliability and validity are not symmetrical. It is possible to have perfect reliability without any validity, but not the other way around, if you have perfect validity, you would also have perfect reliability (Kirk & Miller, 2011).

3.9.1 Reliability

Kvale and Brinkmann (2015) emphasizes that reliability relates to the credibility of research results. It is important that the researcher reflect on their own work because reliability can not be guaranteed 100% (Postholm & Jacobsen, 2014). The research data, what data is used, how these are collected, and how they are handled are all aspects of reliability (Johannessen et al., 2016). It is about the research's dependability; can other researchers conduct the same study and achieve the same results? To accomplish this to some extent, it becomes necessary to make the entire study process transparent to others (Silverman, 2014). That is, the researcher describes the complete research process in-depth. The trustworthiness of qualitative interviews enhanced by detailed descriptions of the project (Johannessen et al., 2016).

We did audio recordings of our interviews, to make sure we did not miss any important information our participants had. When we started the work of transcribing the interviews we listened to the audio file multiple times, to get the content as correct as possible, as well as noting any pauses or laughter for example. If we would have chosen to take notes instead of doing audio recording, the chance of missing important points and reflections from the participant would be greater probability.

Thagaard (2018) points out that the knowledge of the field and of the participants can characterize the reliability. In one way it can strengthen our understanding of a phenomenon, but on the other hand it can lead to important aspects being overlooked. When we were looking for participants to participate in our study, we wanted people whom we knew nothing about and who knew nothing about us. We wanted this since we did not want to go in knowing anything about their practice or school, just basic information that they are using digital learning aids in their classes. Also, we wanted the participants to come from different schools so that they all did not have the same school culture and practices.

The choice of participants in this study, given the reason for the choice of data collection and how we have been working with the analysis has earlier been explained. To ensure the quality of the assignment these factors are important (Postholm & Jacobsen, 2014). To ensure a high level of quality in interviews is difficult, as the answer we get from the participants can be influenced by us as interviewers and the situation. It is important to process the information accurately and to be accurate in processing the data to ensure high reliability (Larsen, 2007).

Another point we would like to discuss that helps to influence the reliability in our research, is the interview form we chose. We wanted a qualitative interview with one-to-one, and we saw that would be most appropriate for our research question. Though there are pros to this type of interview, there are also some cons as well. Because there are only us, two researchers and the participant in the room, the participants benefit from tranquility and security. They are allowed time to ponder on their own experiences and ideas about the subject without being affected by others. There was a possibility to conduct a group interview, which can be positive. The participants have the opportunity to elaborate on each other and encourage each other to share their experiences and thoughts. A problem that can arise in a group interview is the one who speaks the loudest often can control the interview situation (Johannessen et al., 2016).

3.9.2 Validity

As Kvale and Brinkmann (2009) says, validity is how true and correct the material and conclusions we have drawn are. To ensure the validity of the study it is important to check if what you are researching is what you are supposed to research, for example when it comes to the participants. We had some challenges with finding participants, since a lot of teachers did not have the opportunity or time to participate. We did eventually find three teachers, and one special educator who had the opportunity to be interviewed. The participants we have interviewed have experience of working with students diagnosed with dyslexia in the English classroom, as well as using digital learning aids. One of our participants is also diagnosed with dyslexia, which is relevant for our study.

When we talk about validity, it is important to look at the importance of the researcher. Asking good questions that allow the informants to come up with their knowledge, helps strengthen the validity of the data material (Dalen, 2013). Dalen (2013) refers to that the technical equipment should include high quality, and that poor quality will affect the transcription. When we were working on the interview guide, we were clear that we wanted to ask open questions during the interview, by doing this the informants could have the chance to include good information. Because the interviews were conducted over zoom, there is a chance that the audio files sometimes can be difficult to hear what the participants are saying. The reason for this can either be poor internet connection or not a good enough microphone to

catch what the participant is saying. All our participants are working at different schools, so this will help our validity since we are not focusing on one school but getting a more overall perspective on the teacher's perception of the role of digital tools in supporting English learning for students diagnosed with dyslexia.

During our data collection process, we faced some challenges. The first one was coming up with good questions, to make sure that we received good information regarding our study. Here we also had to make sure that the questions were easy to understand, and that the participants knew what we meant. We had a bit of experience doing interviews, but not for a thesis like this. Another challenge was transcribing the interviews. We read through the interviews first, deciding what was relevant and what was not, and then coding it to see the similarities and differences. The whole process from starting to look for participants, until having coded the results has been very rewarding for us, and a learning process.

4.0 Results

In this chapter we will present the findings of this study, that we have gathered by conducting four interviews with teachers and a special educator. We have organized our findings into subchapters, and these are: knowledge of dyslexia, organization of adapted teaching and affordances of digital tools.

In this chapter we will use the analyzed transcriptions we have to answer each question, and when we have a direct quote from the participants these will be written in quotation marks.

4.1 Knowledge of dyslexia

There is a common experience among our participants that the knowledge they have of dyslexia, they have gained by doing research themselves, and from working with students with the dyslexia diagnosis. The knowledge they have will differ due to their own understanding, but Camille also differs because of her own experience having dyslexia, as well as her working as a special educator and therefore mostly working with students with dyslexia. The other participants in our study have classes whereas some have dyslexia, and others do not. With Camille having the experience working as a special educator as well as having dyslexia, she might see the students in a different way than the teachers can do. Since there is not a focus on dyslexia in the teacher's education, there might be a risk that teachers have different understandings of what dyslexia is, and how to work with it. This can be a challenge, if teachers at the same school have different understandings, and therefore different methods of working with it.

4.1.1 Professional experience

None of the participants has had any particular insight into what dyslexia is or how to work with it during their education, and all of them wished it would have been a bigger focus on it. They mentioned this is not just applying to dyslexia, but more knowledge on learning difficulties in general. Camille also points out that she herself did not receive any help when she was diagnosed in 5th grade. She had to teach herself what the diagnosis was, and what type of help she needed.

"I realized that if I am going to survive school, I need to learn this. No one else can teach be these things, I need to do it myself" – Camille

Since teachers feel they lack knowledge about dyslexia, students will also lack knowledge, and this might harm their teaching. In Camille's case, she decided to teach herself, but this might not be the same for each student with dyslexia. Bill expresses during the interview that he wishes he could have received more information and knowledge about dyslexia but mentions he has been able to master it well. Even though he has mastered it well, he still would wish for more knowledge. Not just for him, but in general. Bill feels that there are mainly the special educators who have knowledge about different learning difficulties, but it should be a higher level of knowledge amongst all teachers.

David mentions the same as Bill here, he feels that he knows very little about the diagnosis and wished there had been a greater focus on it. Instead of the workplace or education having this integrated for the employees or students, he has now chosen to take the initiative to take courses himself to acquire learning about dyslexia. Overall, the participants express that there is too little focus on learning about Dyslexia as a diagnosis, both when it comes to work situations but also through studies.

Alex, Bill and David all have students in their classes who have dyslexia. It depends on which area one is working, but there has been a discussion about the size of the classes. If you work in a big city, you might end up receiving a class with 30 students. Having the opportunity to help each and every one during a class is almost impossible because of the time limit one has.

"Yeah, I wish I could use it more in the classroom for each student. There is one class that I have, where like 6 students have dyslexia, and each has a different degree of dyslexia and needs help with different aspects of the dyslexia, and you don't have time to sit down 1:1 with each one to help. So, I have the experience, but it is useless "- Alex

In a classroom, the teacher is not able to sit down with each student and help them. For students with dyslexia, who might need more help, as a teacher might not be able to help due to the time, and therefore these students might end up sitting there for one lesson, not doing anything.

Camille talks a lot about knowing how the students feel, because she has been one of these students herself. She gains an insight in a completely different way than what the teachers have, because she can relate to them differently. She hears their stories, which she feels is very motivating, but at the same time very painful, because it is so personal, and the students carry a lot of baggage. She mentions that some students with dyslexia do not dare to speak in the classroom for example, and by working with them, listening to them, and having a dialogue, she can make them speak in front of the whole school.

"Because I talk to them, and I say: You know what? You are not stupid! You just need things a different way!" -,Camille

Both from our participants, theory we have found and previous research it has been shown that some students with dyslexia might struggle with low self-esteem, motivation and feeling incompetent, and both as Camille mentions in this quote, and as Bill also mentions in the interview, you need to work with the students' self-esteem and make them understand that they also can achieve what they want to, they just need to learn how to do this.

Bill has experienced over the years that we are slowly moving towards being more open around dyslexia, ADHD, and other learning difficulties, which he feels is a very positive thing. By being more open to it, it is easier to gain knowledge and to find new and interesting ways to work with it, he strongly believes.

Overall, it seemed like our participants wishes for more knowledge about the diagnosis in general and also how to bring this knowledge into the classroom when teaching English.

4.1.2 Feelings of incompetence

As mentioned in 4.1, all our participants have gained the knowledge they have about dyslexia on their own. David has the least experience out of our participants, and he says he has very little knowledge about the diagnosis, so he has taken the initiative himself and signed up for courses to be able to learn more. At the school where he works there are several students who have not been diagnosed with dyslexia, but who should have been. One of the ways to check if a student has dyslexia is to do a "Logos-test" which is a way to test the students' reading

skills. At his school there are only two people who are certified to do this test, and they have classes themselves, so they are never available, which David feels is unfortunately for the students. One of the examples he provided is about a student who was enrolled in third grade and was diagnosed with severe dyslexia at the end of seventh grade. Over these years the student has not received the help he/she should have had, because there was not set a diagnosis officially. One of the main problems that could occur is that because it takes this long to get a diagnosis, it can cause that the student may not feel the sense of mastery and get the feeling of failure.

Camille has also had the feeling of incompetence when she has been around on different schools and seen students who has almost given up on school, and she sees this because she has experienced the same herself. Sometimes she feels as if she can not change their mind, which she feels is extremely heavy. She has talked to students in different ages who has been told by counselors at school:

"Yeah, you can be a janitor! That is a good job for you!" - Camille

As mentioned in 4.1.1, students with dyslexia can struggle with motivation, and Camille points out that by giving students these feedbacks, you only make them less motivated. You need to make them feel strong, to be able to learn, and Camille here criticizes the Norwegian school system for being narrow.

When you are told this, she says that a lot of students lose motivation, and she tries to get them motivated for school again, by giving them examples of other things they can do. Study abroad! Camille herself did not feel like the Norwegian school system was what she needed, and decided to study in England, even though she knew it would be challenging.

"I walked in there and convinced the teacher that you need me on this course, no doubt. I know what I am doing, I have made a movie, I have lived this. At this time, I worked with Dysleksi Norge, which I still do. And there is no doubt, I am doing this! And they said it would be tough, but that is my life. It is hard, that is just what it is. I got in; I failed every single class which involved writing. But that year, in England a master's degree was done in one year, and I learned how to write English. I wrote about three essays a week. Woke up

super early, used every learning aid there was which I had learned over time. And I passed, even though they said I was too far behind and would not make it" - Camille

As the last quote pointed out, you need to build your students' confidence, and believe in them. Camille experienced the feeling of not having support, but she managed to get through it, but is also afraid that some students might give up, instead of fighting on their own.

Camille points out that it is not always adapted teaching that will help, but the students' knowledge about their own diagnosis needs to be present before you can find what the student needs. She believes that most teachers try as well as they can to gain knowledge, by attending courses and reading, but that this is often not enough.

It is pointed out that if the teachers do not have enough knowledge about dyslexia, they can not teach the student what it is either, which can cause challenges for learning.

4.2 Organization of adapted teaching

It will vary among the different schools how they adapt teaching for students with dyslexia. All our participants pointed out that they focus on providing audio files or the opportunity to listen to the material for each student with dyslexia. Due to the schools being more digitalized, Camille points out that she believes that many teachers now have become better at giving assignments that students can have read or enlarges writing. Though, she believes that in theory, the students should not be taken out of the class, instead one should be able to adapt the teaching for everyone.

4.2.1 Subjects competing

One finding we saw related to adapted teaching is that subjects can sometimes compete with each other, such that dyslexic students are given less time to focus on English. During a school day a student will have many different subjects, English, mathematics, Norwegian and further on. Camille states a problem when it comes to dyslectic students which is:

"It is often, oh you do well in social studies! Then we take you out of this class and teach you English! The problem then is that you will perform less in social studies as well, which is creating an evil spiral" - Camille

Camille and David have both experienced that students get pulled out of classes they perform well, to teach subjects you might not perform as well in. As Camille describes this, it is a down going spiral, because then you lose the opportunity to learn in the subject you master, and then you will fall behind there as well.

In David`s school there has also been some difficulties when it comes to the subjects. The programs the students with dyslexia have access to are quite new, and it has focused primarily on Norwegian, not English, so it is not fully developed to use in English yet. The program suggests different words to use in a text, but for English it often suggests words that should not have been suggested. On the other hand, it seemed like it worked well when working with Norwegian.

Our main finding here is that some subjects in school might seem less prioritized. As for example at David's school where the digital learning aids they are using are mainly developed for Norwegian but does not work as well in the English subject.

4.2.2 Teacher-student relations

 As a teacher you form relations with your students, and Camille points out the importance of a good relation as the key to improving the teaching. When you have a strong relation, it may be easier for the students to be honest, and to have a dialogue on how to adapt the teaching for the students.

"As soon as the teacher knows what each student needs, that is when it is possible to learn."- Camille

David agrees with Camille as he also tries to map out what the student wants and what the student needs through conversation. Alex also says that they have a support teacher in the classroom, but that this does not necessarily help, maybe because the students are too proud to

accept the help, or the relation between the support teacher and the student is not at a level where they can talk about what the students need.

Bill has had students who has not been diagnosed until lower secondary school, which he feels is extremely sad, because these students might have felt stupid because they struggle with something everyone else does easily. Here he tries to talk to the students, creating a bond to build their confidence again. When the diagnosis is set this late you need to work a lot, not just with the subjects, but with creating motivation and learning new ways to work.

Alex wants to make her classroom a place where all students feel seen and heard, and she does this by providing visual, auditory and written resources, because she knows what each student likes to work with. Alex is a visual learner herself, so she tries to change the learning environment often, for all her students.

If the teachers have a good relationship with, he students, they can gain a better insight into what the students need. So, a good teacher-student relation opens up opportunities for learning.

4.2.3 Students feelings about adapted teaching

It is very individual how the schools are working with organizing adapted teaching for students who are diagnosed with dyslexia. As the participants point out in the interviews, it varies from student to student if they accept the help and actually use the digital learning aids that are offered to them. Alex feels like the students often choose not to take advantage of the adapted teaching the schools provide and says that there might be different reasons for this.

"So, a lot of them will have an IOP and some of them will have a supporting teacher in the class. But a lot of students don't want to be out of the classroom, or don't necessarily need to because the only place they struggle is with writing, not necessarily with language learning."- Alex

As Alex points out here, the students will have an individual learning plan (IOP) to define the students' academic, personal and employment goals. Some of them will also have a support teacher in the classroom. The school where David works are doing primarily the same. His

school has a system called two-teacher and three-teacher system. Those students who have special difficulties with reading and writing have their own plan. Though, Alex points out that having a support teacher in the classroom doesn't necessarily help. She expresses her thoughts about the student's might be too proud to accept the help they are receiving. Camille points out a similar issue, before the student can receive adapted teaching, you need to know that the students has learned about dyslexia. This can be the student's own education about what dyslexia is, or lack of knowledge. As mentioned in chapter 4.1 there are many teachers that try to gain knowledge about dyslexia in the form of participation in courses and so on, and Camille feels it is very differently as to how eager teachers are to learn more about the diagnosis.

"So, it is very individual. It is like bingo. You can go to the right school, but somehow have the wrong teacher." - Camille

In this quote, Camille points out how she feels adapted teaching for students with dyslexia works. She travels around to different schools, so she has seen a lot of different ways of organizing it, and she feels that it differs a lot. You can get lucky and have a teacher who understands what you need and how you need it, or you can get a teacher who does not have the same knowledge about the diagnosis, and therefore not be able to adapt the teaching the way the student needs it.

Our participants seem to agree on the fact that students with dyslexia want to be treated the same way as other students, and not being taken out of class, or having an extra present. Camille points out that if the teacher has enough knowledge as to how to adapt the teaching, it can be easier for the student as well.

4.3 Affordances of digital tools

As mentioned in 1.0 more schools have implemented digital learning aids in classes, either in the form of computers or different tablets. This gives greater opportunities for new and creative ways to learn. Our participants had experience from using different programs, some used Lingdys and others used CD-Ord, for example. Even though these are implemented to help the learning process, our participants pointed out the issue of not receiving enough

training in how to use them. With more frequent courses, teachers will be able to acquire more knowledge and feel more confident in the use of these digital learning aids.

4.3.1 Teachers digital competence

The three teachers we have interviewed for this study all have experience from working with digital learning aids in school. Camille also works with different digital learning aids, so all of them have some competence as to how to use it, but they express that it is not enough.

During our interviews with the participants, they all express that they are familiar with the program, Lingdys. Other programs that have been brought up as well are CD-ord. Though there are some differences on how much they are using it. David on the other hand uses a Chromebook.

"The only competence I have is what I have taught myself, by using them with my students. We never really had a good course in it and definitely did not have anything at university level." -Alex

Alex has been interested in learning how to use the digital learning aids, to be able to teach her students it as well, but she has never had anyone teach her, neither in university or at her current school. Our participants all mention the lack of knowledge to use the digital learning aids that are available for the students. As Alex is mentioning here, the only competence she has is what she has taught herself. Bill also experienced the same, he went to a course for one or two days where he really got the opportunity to dive into it. He says he experienced it as difficult back then and would like to be able to have more courses regularly. Though he mentions that it is certainly better than nothing, because there are teachers who do not receive any training at all. David on the other hand is using a Chromebook at the school he is working at. They are using it to write texts in Google Docs and they have access to correction programs, which he expresses are not really that good. In addition, they have apps and text analyzes.

"I have little experience with the use of digital tools. I never worked with Chromebook before I started here. And the apps that they use, they are relatively newly developed in fact, at least in Norway." -David

As David mentions, the school he works at uses Chromebook which he is not familiar with, and programs which are relatively new in Norway, and therefore there are not any courses available for these, which means he has to gain knowledge to them on his own, to be able to teach it to his students.

Overall, the participants express that they have some experience and knowledge with the use of the digital learning aids that are available. Though, there is a clear sense that more training is needed in the various programs. In our interviews it is brought up a wish for more repeat courses in these programs and not just a one-time event. Because, with more frequent courses, teachers will be able to acquire more knowledge and feel more confident in the use of these digital learning aids.

4.3.2 Learning possibilities

Our participants pointed out different programs that can create learning possibilities for students with dyslexia, such as the possibility of dictation, speech-to-text and writing programs. As mentioned in 2.1.2 students with dyslexia can have problems expressing themselves in writing, due to spelling mistakes, as Camille points out here.

"And then you sit there, and it is torture. The word you read, does not correspond with how it is pronounced or written" - Camille

This is one of the problems of learning English for students with dyslexia. Since it is a language with deep orthography and therefore how it is written does not match with how it is pronounced, and therefore harder to learn (Seymour et al., 2003). Camille has experienced how this feels herself, due to being dyslectic, and she says that learning English was the hardest for her, and she did not learn how to write until writing her master's degree.

By having the opportunity to use dictation, it makes it easier for the students to produce texts, and to do different types of tasks in school. Camille tries to make the students she meets to focus on understanding and talking English, more than writing, because writing you will learn eventually. David believes digital learning aids create a lot of learning possibilities, if the students are engaged in using them, and know the programs well enough. By having access to audio files of different texts they are going to read, it makes it easier for them to participate in the class he thinks, which is what we hope for. Bill feels another positive side to digital learning aids in the classroom is that the students who need adapted teaching blend more in. As mentioned in 4.2.3, our participants pointed out that some student might not want adapted teaching, because they then stand out from the other students in class.

"So, it is clear that there are a lot of positive sides with digital learning aids, both that you in one way or another can become a larger part of the class community, and that you can more easily integrate the help in a way where it is not that visible". -Bill

Digitalization is mentioned as a positive side for the students diagnosed with dyslexia. They do not stand out by using computers, because everyone is using them. And this points back to Bill's comment as well, that it has become easier for students to integrate the digital learning aids in a way where it is not that visible. Students who are diagnosed with dyslexia just want to be on the same line as everyone else in class and learn like everybody else. Using digital learning aids can increase the student's motivation, independence, self-esteem and also communication skills. This is something the participants are mentioning during our interviews as well.

The students have access to different tools such as audio books, word lists that come with alternatives to correct words, and helping to pick up grammatical errors such as sentence and comma mistakes for example. These learning aids can improve the students learning.

4.3.3 Challenges of digital learning aids

It is not always easy when using digital learning aids in the classroom and there will be times when these tools do not work correctly. Teachers can experience problems during their

classes. Our participants often mention that the problem that occurs is that students forget their charger or headset and then struggle to use the program for what it is meant for.

"Yes, as a teacher I have to say that I have experienced problems with the use of digital learning aids. So, do things work? Does the PC work? Does the internet work? All those things, it gets incredibly vulnerable to that kind of things" - Bill

When using digital learning aids, you depend on everything to work properly. If you have problems with the internet, it will be difficult to work with the task online or use the programs that are available. As Bill mentions, it is very vulnerable. So, if one thing does not work, then it creates problems for the rest. As a teacher, you must then be able to readjust and have an extra plan to do in class instead. It can be demanding if this is to happen quite often, and it will go beyond the students' learning in class. Though, the problems that occur with digital learning aids are more general, and not with the program itself.

Another problem that is highlighted is that when using writing programs, you often have words suggested for you. The main problem is that students often tend to choose words that normally they are not using, and then the meaning of the text disappears. One reason for this can be that the students might not understand how to properly use the digital learning aids, or as Camille points out, that they might not understand what dyslexia is for them.

"If the person has not recognized what dyslexia means to that person, then they will not use the tool. He/she will not understand why they should use it. And then they will never ask the teacher for help, or even say if the teacher comes up with a program, if the program works for them." -Camille

It is not just about having many digital tools available if the students have not acknowledged their diagnosis. As a teacher, it can be difficult to interpret whether the student needs help or not when one does not ask for help as Camille emphasizes.

Having all these digital learning aids available can be overwhelming, especially if the students do not know how to use it. As Camille mentions during the interview, she needed to focus on how she can transform everything around her so that she can use the tools. And she also focuses on that when she is teaching her students when she travels around. Because an aid can

be everything to a student, but you need to own it. You need to know how you are learning and how you as a student with dyslexia can apply it in a way you need in your everyday life. Without acknowledging what dyslexia is for you, or not wanting to learn the digital learning aids that are provided for you, it will be difficult. Bill feels that iPads and computers now a day is the main learning device in school. This worries him, as shown in the quote below.

"What I am skeptical to is that you look at an iPad or a computer as anything more than a tool. I often hear: We do not use textbooks because we are an iPad-school. Then I feel well I work at a PC-office, but that does not say anything about what I work with, because iPad is just a tool" - Bill

As Bill points out in this quote the iPad or computers the students use is nothing more than a tool. You can say that the iPad itself provides teaching, it is how you use it in the class that will determine the learning outcome.

Without accepting the diagnosis and understanding the learning aids then it will only work as a tool, and not help the students learn. It is important that the students want to use them, and understand why they are important, and to do this, the teachers also need knowledge on how to use the learning aids.

4.4 Summary of results

This study was investigating the teacher's perception on the role digital tools have in the English classroom for students with dyslexia. Our analysis revealed that our participants seemed to agree on the fact that digital learning aids are a good tool for students with dyslexia in general. The problem they all pointed out was not about the learning aids themselves, but that they did not have enough knowledge about the diagnosis, or the programs, to use it to the fullest. If the teachers do not have the knowledge needed about the diagnosis, they can not teach the students what this diagnosis means, and therefore it can cause challenges for learning.

When it comes to adapted teaching, one thing all our participants pointed out was that they try to provide audio files for the student, so they can listen to the material, instead of having to read it. Camille believes that the students with dyslexia does not need to be taken out of class,

but that it should be possible to adapt the teaching in class to fit everyone. Another main finding, we found was that English in some cases might seem down prioritized, especially in David's case. The programs his school has for students diagnosed with dyslexia, is not fully developed, and does not provide as good learning possibilities for the students. Another challenge all of our participants mentioned is that they feel students with dyslexia often do not want to take advantage of the different tools and adaption they can receive. One of the reasons for this is because they do not want to be any different than the other students in their class, or they might be to proud. This can also cause challenges for learning.

As mentioned, previous in this summary, our participants feel they do not have enough knowledge to use the different learning aids as well as possible. They all wished for more training, to provide better learning possibilities for the students. All of our participants pointed out audiobooks, writing programs with correcting software and words lists as good learning aids to improve the students learning. Lastly, it is pointed out that it is important that the students know what their diagnosis means and know how to use the tools. If the students do not acknowledge their diagnosis, they will not want to use the tools, and therefore the tools will not serve as a learning aid.

5.0 Discussion

In this chapter we will discuss our results in light of theory and previous research. The findings are discussed and presented with the following headings like we did in the presentation of our results: knowledge about dyslexia, organization of adapted teaching and affordances of digital tools.

5.1 Knowledge of dyslexia

All the participants agreed on the fact that the knowledge they have about dyslexia is what they have taught themselves. David mentions that during his education there was only one lecture about this topic, and Camille has dyslexia herself but experienced that no one told her what it really was. Both Alex and Bill gained their knowledge by working with students who were diagnosed with dyslexia. Roe (2014) refers that today there is a large selection of digital learning aids that can be helpful for students with both getting text read for them but also writing. In earlier surveys it has been shown that if the diagnosis is detected at an early stage, students can gain good help in the form of individual adaptations to students prerequisites and abilities (Roe, 2014). For this to happen, Bill feels it is important that the teachers have enough knowledge about dyslexia to be able to detect the diagnosis. Therefore, he wishes for it to be a bigger part of the education, as well as when one start working. If teachers would have more knowledge, it would make the process of detecting the diagnosis easier. David has experience with this himself. He has had students at his school who have been suspected of having dyslexia in the third grade, but who have not been diagnosed until seventh grade. This is because there are only two people at the school who can perform the test to see if they have dyslexia, but they never have the time, which could be different if more teachers had enough knowledge about the diagnosis.

Teachers' connection to institution that serve students with learning disabilities seems relevant for the degree of knowledge they describe having about dyslexia. In our study David and Camille both have connections to "Dysleksi Norge" where they have gained most of their knowledge about the diagnosis which we defined in chapter 2.1. Considering both David and Camille have connections to the same organization, there is a good chance they have the same

understanding of what dyslexia is. Though there is a definition to what dyslexia is, to what degree the student is diagnosed with dyslexia can vary from person to person. Statped (2019) divides reading difficulties into four different groups, whereas Alex also points out that each student with dyslexia is different. The diagnosis itself does not mean that each student with dyslexia learns the same way. Some have a stronger dyslexia than others, and will need a different type of adapting in the classroom than others (Statped, 2019). Due to Camille's background, she had some experience working with students while having dyslexia herself. This might make her see the students in a different way than a teacher does. This can be connected to what Høien and Lundberg (2012) state, that to understand the students with dyslexia, it is crucial to know central theories about the normal course of reading and writing development.

As Høien and Lundberg (2012) claim, most students who have challenges with reading do not have a developed strategy, which Alex also mentions seeing in class. When her class is reading, she often chooses to read out loud herself, because she knows some of her students are not comfortable reading out loud in the classroom. These students with reading difficulties as Høien and Lundberg (2012) discuss about, often skip difficult words when they are reading and hope it works out, which can cause problems with understanding the text. Instead of pushing her students to read out loud in the classroom, she gives them the text to look at, and asks them to follow as she reads, so they can hear her say the word, and see how it is spelled at the same time.

As mentioned in 4.2.1 some subjects compete with each other, which can cause for some subjects to be less prioritized. David points this out as a challenge students with dyslexia can face, which he has experienced at his school. If students struggle with learning English, but perform well in Social Studies, they can often be pulled out of these classes to learn English. Wilson (2010) claims that students with learning difficulties can gradually fall behind the rest of the students, and therefore lose motivation and the desire to learn. David here also points out that when the student is being pulled out of a class where they perform well, they will also start falling behind in this subject as well. This will become a down going spiral, where the students lose motivation in more subjects than before. As Wilson (2010) claims if the student's loose motivation in subject, they can also loose the desire to learn.

It has been said that students with dyslexia will have more difficulties learning English, than other learning difficulties (Kormos & Smith, 2012). One of the reasons for this, as Kormos and Smith (2012) presents, is that teachers might not have enough knowledge about the diagnosis and how to adapt their teaching. All our participants described not receiving enough information both in their education, and when they have started working. And through our previous practices, and teachers we have met through our education we can see that this is something that regards many more teachers than the ones we have interviewed. Teachers from different schools in Oslo and the area around Oslo talk about not having enough information about learning difficulties, to be able to adapt their teaching to fit everyone's needs.

English is one of the most commonly taught languages in schools, but it also brings difficulties to the students (Ziegler & Goswami, 2006). In the psycholinguistic grain size theory introduced by Ziegler and Goswami (2006) it is explained the disparities in reading fluency and speed between languages. As noted in chapter 2.4.3, the Norwegian language has a shallow orthography which means it can be easier to recognize different words, and relate the spelling to how you pronounce it (Miller et al., 2014). English on the other hand is a language with deep orthography, which means often the spelling does not add up with how you pronounce it, as our example in 2.4.3 which focuses on the letter A (Seymour et al., 2003). Camille makes a point here as well, and that is that she tries to get students to stop focusing on learning to write English right away. She wants the students to learn how to speak, because if they can speak English, they can dictate, and then they will learn how to write as well. She feels there is too much focus on learning how to write in school, when there is a lot of research done that states that this is specifically difficult for dyslexic students. In 2.4.3 we used the example of heal and health. Two words which are written fairly similarly, but pronounced differently (Saban & Kahn-Horwitz, 2021), which can cause difficulties for the students when they write. Alex tried to learn different methods of how to work with vocabulary and spelling, but she feels this does not help because she still does not have time to sit down with each student and actually work with it. So even though she has the knowledge to learn writing and spelling methods, she is not able to do so in the classroom. Alex also feels as if it is not the language learning that is the problem most often, but the writing itself. This might mean she has mostly worked with students Statped would categorize into group A, students with dyslexia, but who has a strong language understanding.

5.2 Organization of adapted teaching

The participants mentioned that it is very individual how the schools work with organizing adapted teaching for students who are diagnosed with dyslexia. As they are pointing out in the interviews, it varies from student to student if they accept the help and actually use the digital learning aids that are offered to them.

Adapted teaching will take place within the framework of regular teaching. This means that the student is not entitled to individual tutoring for example. Adapted teaching, according to (Utdanningsdirektoratet, 2012) should not require extra resources or support measures. For students who do not benefit from teaching, special education can be relevant (Opplæringslova, 1998, § 5-1). This is something Alex points out during the interview. She mentions that a lot of the students will have an IOP to define the students' academic, personal and employment goals. Also, there are cases where there can be a support teacher in the classroom as well. At the school where David is working, it has been implemented a system which is called a two-teacher and a three-teacher system. In the two-teacher system the teacher will have an extra teacher inside the classroom to be helpful if the students need help during the class. In the three-teacher system, there will be three teachers inside the class, where the third teacher goes between the two classes. Though this seems like to be a good help, Alex points out that having a support teacher in the classroom doesn't necessarily help. This is because she expresses her thought about the students being too proud to accept the help they are receiving. Since the digital learning aids are there to benefit the students teaching, she is concerned there is a chance the students will perform poorer in class.

According to Bruck (1990), one can say that reading difficulties one finds in dyslexia are always accompanied by spelling difficulties. As Bruck (1990) mentions, good, adapted teaching can in some cases help the reading difficulties of dyslexics, while the spelling difficulties persists. Høien and Lundberg (2012) claim that spelling difficulties are found in dyslexics very often. As an example, one can see that a word is misspelled somewhere in the text and the same word is written correctly elsewhere. Although the diagnosis can not be completely cured, there are still many measures that can be implemented, and which have shown very good results. The digital revolution that has happened over the years, with increased access to technology have provided students with dyslexia ever-increasing access to

PC's and word processing programs with correcting software, as well as digital glossaries and other digital and multimedia teaching aids.

According to Lyster (2019), various computer programs provide training for reading skills and spelling skills, which can support spelling skills in several ways. One of the programs that our participants has mentioned is Lingdys, which is specially designed for students with reading and writing difficulties. During our interview some of our participants brought up some issues due to the programs with proofreading software. The participants mention that the students often choose words that are recommended but they do not necessarily understand the meaning of the word. So, the issue here will be that the text the students are producing often can lose the meaning because they tend to choose words that are incorrect in the setting.

Lyster (2019) mention about the positive sides of using digital learning aids to adapt the teaching for students with dyslexia. She mentions how the programs can easily be adapted to fit each student's needs, which is important because dyslexia will not be the same for each student, as mentioned earlier. Camille also points this out as an important aspect to consider. Th teacher needs to be able to see what programs the different students need, otherwise they will not help. If the student needs help with writing you as a teacher need to adapt your teaching for this, and the same if it is reading. As soon as the teacher knows what each student needs, that is when the learning is possible. For the programs to work as well as possible, there is a need for effort from the student. If the student is motivated, and the teacher can assist well, digital learning aids can be a good tool for students with dyslexia, to help them improve both reading and writing skills (Brøyn & Schultz, 2005). Due to the school being digitized, Camille points out that she believed that many teachers now have become better at giving assignments that students can have read or enlarges writing. Though, she believes that in theory, the students should not be taken out of class, instead one should be able to adapt the teaching for everyone.

In the study done by Yunus (2013) there were teachers who reported that there were some advantages with using ICT when teaching reading skills. He refers to ICT as providing more teaching and learning support for the teachers and the students. This will allow more effective feedback, giving positive interactivity within the teaching and learning, allowing collaboration between the students and they will get the opportunity to improve their vocabulary and enable them to find out the meaning of words in the text they are reading

(Yunus et al., 2013). By using digital learning aids in class, these can create more learning opportunities, especially for the vulnerable students, and it is a great opportunity to increase the relationship between the teacher and the student. As mentioned in our interviews, using digital learning aids can increase the student's motivation, independence, self-esteem, and their communication skills. As Camille mentions, the teacher-student relation is significant to achieve learning and to build their self-esteem.

According to Vygotsky, humans can not be separated from historical and social contexts, that both material and mental tools form premises for development, and that collective processes have a lot to say for learning. In the short term, one can say that learning in a sociocultural perspective focuses on knowledge and development as something is created through interaction and interaction with people, objects and environment in different contexts (Säljö & Moen, 2001). Non-material tools are, as mentioned, important tools for development from a sociocultural perspective. These tools contribute to what Vygotsky (1978) calls mediation, namely that a subject interacts with the outside world indirectly through a medium, or referred to as the concept of artifacts (Østerud, 2018). As a teacher, if one do not have an adequate understanding of digital artifacts, it will be difficult for teachers to be helpful to the students in the nearest development zone, which weakens the possibility of a digital environment (Wells & Arauz, 2006). Alex has volunteered herself to hold courses on different programs the students use, to make sure that everyone has the competence to use it, but this has not been done. She believes that if this had been done, the students would benefit strongly from it, as well as teachers, and therefore have a better understanding of the artifact.

If the teachers do not have adequate understanding of the digital artifacts, the teacher will experience some issues when using the digital learning aids. Therefore, the digital learning aids can lose the meaning and just become an digital aid.

5.3 Affordances of digital tools

With the help of a teacher the student can develop knowledge in the community of practice in the class. If we extend this towards the digital teaching situation where the teacher has low digital competence, however, it will be more difficult for the students to learn in the community because the teacher's lack of competence can reduce the student's opportunities

for collaboration. As (Otnes, 2009) points out, education has until recently been limited to classrooms, countries and cultures. This has changed a lot of the way teaching is done on the internet with no borders. Now that digital tools are a part of the basic skills that students are supposed to learn in school and in every subject, it is important to know how to use them (Utdanningsdirektoratet, 2021b).

One thing we found was how the different apps our participant used worked. David pointed out that the programs they used at his school were not fully developed and did not work as well for English learning yet. Since digital competence has been included among the basic skills (Otnes, 2009), there is a need for a more competent teacher role, but the teachers we have interviewed have still not received any training in how to use the different learning aids for the students with dyslexia. Erstad (2010) claims that the teacher's attitude toward digital tools is important for the quality and effectiveness of the teaching. Our participants point out not knowing the programs well enough, and we believe this might make the their attitude toward using it not as well as it could have been with the right training. Erstad (2010) also points out that it is not just the teacher's attitude towards using digital learning aids that decides how well it works, but also how well they know the students interests and the academic level they are at. They need knowledge about what types of different learning aids exist, and how they can be used (Erstad, 2010). By knowing this and knowing what the students is struggling with it is possible to adapt the teaching to fit their needs. As mentioned in the previous chapter, students with dyslexia often struggle reading, and skip difficult words because they do not master it. Brøyn and Schultz (2005) claims that many students with dyslexia have stopped reading development at an early stage, and therefore lacking the skills that can make them good and effective readers. As Camille mentions, there are so many different programs designed for students with dyslexia that focus on different aspects. Some programs are designed for writing, some for reading, some for dictating and so on. As Brøyn (2005) here points out, if you as a teacher know what your student needs, then you can find the right program, and Camille also points out that some of these are better for English than others. Which we believe the schools should focus more on, for example at David's school they are using programs that are not fully developed for the English subject.

According to Erstad (2005), a challenge with digital learning aids is to integrate the pedagogical practice in a way that promotes the student's learning. He points out the challenges the teacher might face can be anything from mastering information processing,

word processing programs, to didactic use of digital learning aids, communication, and creativity as the use of a varied range of digital learning aids. There will be times where it is not always easy to use digital learning aids. There will be times where the tools do not work correctly. Alex often mentions that the problem that occurs is that the students often forget their charger or headset, and then struggle to use the program for what it is meant for. Another challenge that occurs is the use of writing programs, one often has words that are suggested for them. The main problem here is that the students often tend to choose words that they are normally not using, and the meaning of the text disappears. As Erstad (2005) mentions, there is a varied range of digital learning aids, but having all these digital learning aids available can be overwhelming. Especially if the students do not know how to use it. As Camille mentions in the interview, an aid can be everything to a student, but the student needs to own it. One needs to know how they learn and how they as a student with dyslexia can apply it in the way they need in everyday life. Without acknowledging what dyslexia is for them, or not wanting to learn the digital learning aids that are provided for them, it will be difficult.

One of the positive sides to digital learning aids to promote English learning is the possibility to listen to the language. Bogdanowicz (2016) has done studies that show that dyslexic students will struggle with learning a new language, especially English, and points out that if they are exposed to oral or authentic language such as music for example, this can help them gain a deeper knowledge of the structure in the language (Bogdanowicz & Bogdanowicz, 2016). Three of our participants mentioned that they always try to provide audio files for the students, so they can listen to the material instead of being forced to read it themselves. The ability to listen to what the students produce themselves is also pointed out as a good learning aid, because of the orthography of the language. This means when students write a word, they might hear it after and be able to detect themselves that it is not what they intended to write (Miller et al., 2014).

In the previous research we have found there are also some positive sides to the use of digital learning aids for students with dyslexia. One of the main things that is highlight is that on-screen reading using speech synthesis can provide a positive effect on the students vocabulary (Lyster, 2019). This is something that might have been missed because the students did not read as much prior to using screens. Bill disagrees with this, and he feels it is not necessarily better to read on a screen, but that the students should have the opportunity to choose themselves if they want to read on a screen or paper version of the text. Bill is positive

towards using digital learning aids in different learning situations, but he expresses some concern to how overwhelmed the school has become of digital tools. He is skeptical of the fact that one looks at an iPad or a computer as anything more than a tool because the artifact itself is not the teaching, it is how it is used it in the classroom. As Østerud (2018) claims, an artifact is only meant to assist people in their work. Even though Lyster (2019) mentions that vocabulary can improve by reading on a screen, she also points out that the reading comprehension might not benefit as much from it. She believes that there still should be awareness of the fact that the reading comprehension still seems to be better from reading on paper. Delgado (2018) agrees with Lyster on her last point and finds clear benefits from reading on paper rather than on screen, due to the reading comprehension. Camille has talked to students who feel there is too much screen in school today, and she encourages them to use books instead. She feels it is important to see that even though these students have the right to use computers and other digital learning aids, they do not have to. If they feel they learn more by using books and audio books instead of reading or writing on a screen, do it, she says.

Even though digital learning aids have become implemented in most subjects in school there are many studies conducted on the subject, with uncertain results as to how well it affects the learning. Wood et al. (2018) study shows that using ICT has a moderate effect on reading comprehension. Thiessen and Looker (2007) conducted a study as well, which revealed that we do not actually know yet the effect of PC use, and how it improves reading comprehension. This study is from 2007, so this might have changed over the last years is important to remember. We feel this study brings up an important issue. As Camille mentions, new program is often being created, but we might not know how well this will benefit the student's learning outcome when learning English. From Camille's understanding this can also vary from student to student. Some students will prefer to read on a screen, as others will prefer to read on paper. We discussed this during the interview, and this is something Alex also agrees with. And she points out that some students prefer visual tasks, others prefer oral and some written. Everyone is different and learns in different ways.

In prior research Krumsvik et.al (2013) conducted a study which focused on the connection between the use of ICT and learning outcomes in upper secondary school. The main goal in this study was to look at the teachers' pedagogical use of ICT and students' learning outcomes when ICT is used. From the research it was indicated that three out of four teachers express

that they do not have continuing education in ICT. There is clearly a large variation in teacher's digital competence. And often the teachers must take the responsibility for becoming a digital competent role model for the student's academic use of ICT (Krumsvik et al., 2013). This can be connected to what the participants have been expressing in the interviews as well. As mentioned in the prior research most of the teachers in Krumsvik's et.al (2013) study, felt like they had to take initiative on their own to gain experience on how to use the digital learning aids, and our participant mentioned that as well. The only competence Alex had was what she had taught herself. She never experienced that they had any course and especially nothing at the university. Krumsvik et.al (2013) points out that one of the important factors in succeeding at ICT in schools according to the study, is that teacher education should take responsibility for providing future teachers a broad and good knowledge within pedagogical ICT use. This is indeed an important point that is mentioned here. This is also something that our participant has been missing as well. the lack of knowledge in using ICT when they come out as educated teachers. There has not been enough focus from the beginning when they were studying to become a teacher. By spending a lot of time learning the various digital learning aids, you as a teacher may lose the opportunity to create a good relationship with the students from the start. As Krumsvik et.al (2013) mentions, by using digital learning aids, you allow the teacher to get closer to the students than you could before. It provides an opportunity for individual learning. In this way, more vulnerable students can get help for example with homework during school hours but also in the classroom.

6.0 Conclusion

In this chapter we will try to answer our research question by looking at our discussion and theory, as well as previous research on the subject. We will also point out some limitations in our study, as well as some suggestions for further studies that could be conducted on this subject.

Our research question for this study was: What are teachers' perceptions on the role of digital tools in supporting English learning for students diagnosed with dyslexia?

6.1 Main findings

In these sub-chapters we will present a broad overview of our findings where we follow the same structure as seen in the result and discussion chapters.

6.1.1 Knowledge of dyslexia

Our participants who work as teachers all agree on the fact that they do not have enough knowledge about the diagnosis. During their education this is a subject that has barely been mentioned. These three participants have taken the initiative themselves to learn more about the diagnosis dyslexia, to be able to adapt their teaching. Our last participant has a bit more knowledge about the diagnosis, but this is mainly something she has learned herself, due to the fact she is diagnosed with dyslexia.

6.1.2 Organization of adapted teaching

All our participants pointed out audio files as a good tool to adapt the teaching for students with dyslexia. Some of our participants also mentioned having an extra teacher in the classroom. The experience of this was that the students did not want this, due to might being proud, or feeling different from the other students. The teachers need to be able to see the students' needs, and as soon as the teacher knows what each student needs, it is possible to learn.

6.1.3 Affordances of digital learning aids

The fact that digital learning aids is a good tool for student with dyslexia is something our participants agree on. It provides good opportunities for learning, if used correctly. That is why our participants point out enough knowledge as a key aspect to make the most of the tool. If the teachers receive more training, it will be easier for them to teach the student how to use it as a learning tool, instead of it just being a tool.

One thing that was brought up by our participants was that because of the diagnosis the students have, they tend to feel that they have a disadvantage when learning English. Some of the difficulties our participants are highlighting is related to reading and spelling, which Bogdanowicz (2016) mentions is due to the orthography of the language. Writing programs is something that can be a good tool for these students, but our participants point out that the students often use the word list these programs provide, and often choose the wrong word. By doing this, they provide texts with another meaning that what they were supposed to, and this might be because the students have not had training in how to use them properly.

6.1.4 Conclusion of our findings and research question

Overall our participants seem positive towards the role digital learning aids holds in the English classroom, though they all wish for more instruction on how to make the teaching for the students diagnosed with dyslexia even better. English is considered being one of the most challenging languages to learn, for students with dyslexia (Van der Leij, 2004). Because English is a difficult subject, it is important that the teacher can help each student, and adapt the teaching in the way each student needs. The biggest issue regarding digital learning aids in the English classroom for students with dyslexia is knowledge. It is much needed with more knowledge about the diagnosis itself, and for the different programs the schools are using. If this is provided, digital learning aids might be a great tool to improve English language learning.

6.2 Limitations of the study

The results that have been presented in this study imply that there is a need for more development considering the apps that are available for the students who are diagnosed with dyslexia. The consequences we are facing is that the apps do not benefit the students as well as they could have done, which can cause problems for English learning.

However, the limitation resulting from this qualitative study and the small sample size requires caution in generalizing the results of this study to the entire population of the students with dyslexia across Norway.

A first limitation is the sample size. Due to the time limit we had and the covid-19 pandemic happening at the time we did have some issues recruiting enough participants for this study. Due to the small sample size, we found it important to find participants who had knowledge about the topic we wanted to study. All our participants have experience of working with students diagnosed with dyslexia, in the English classroom, and the use of digital learning aids. This was to make sure that we research what we are supposed to, and to ensure the validity of the study.

Another limitation of this study is the subjective knowledge. In this study we have done interviews with teachers, so we only have self-reported data. It is seen from the perspective of the teachers, so it is only their thoughts and experiences about the subject. During this research we have been looking at the perceptions on digital learning aids as a tool when learning English for students with dyslexia. To get a broader picture, further studies can be conducted, by researching the students experience on learning English using digital learning aids

6.3 Suggestions for further research

We discovered when working with our research project that it is needed for more research on this topic. There is a need for more research on the voice of teachers experience with teaching students that are diagnosed with dyslexia, as well as using digital learning aids when learning English as a second language. In our study we have only interviewed teachers and special

educators, due to both time limit and access, but this field could benefit from observation studies we feel. By doing classroom observations or collecting students' work one could be able to see how the students benefit or how they do not benefit from using digital learning aids in the classroom. It could also be a good idea to do a broader study than what we were able to do in this one, considering that digital learning aids in being implemented in schools often. One of our participants also mentioned that a problem with the programs they used was that they were not tested enough for English as a subject, and that could be interesting to see if changes over time.

Both theory and previous research pointed out the fact that for the digital learning aids to work in the best way possible, there is a need for understanding and effort from the students. We have not been able to focus on this, due to our participants being teachers and a special educator. This is something that could be interesting to focus on, how students with dyslexia feel about having the diagnosis, and how this affects them learning English.

In conclusion we want to emphasize that teachers seem positive towards using digital learning aids when learning English, but that there is a need for more knowledge and research on it. If there is more training on how to use it, it can improve the teaching, otherwise it will be nothing more than a tool, and not a learning aid.

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8.0 Appendix

8.1 Appendix 1 – Information letter and consent form

Vil du delta i forskningsprosjektet

"Students with dyslexia learning English using digital learning aids"

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke læringsutbytte til elever med dysleksi i digitale klasserom. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Vi vil undersøke læringsutbyttet for elever med dysleksi i klasserom hvor de bruker nettbrett 1:1. Forskningsspørsmål er: "What are teachers' perceptions on the role of digital tools in supporting English learning for students diagnosed with dyslexia?" Prosjektet er et masterprosjekt.

Hvem er ansvarlig for forskningsprosjektet?

OsloMet – Storbyuniversitetet, Institutt for grunnskolelærerutdanning er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Vi ønsker å intervjue engelsklærere som har erfaring fra å jobbe med elever med dysleksi, samt erfaring fra et digitalt klasserom.

Hva innebærer det for deg å delta?

Hvis du velger å delta i prosjektet, innebærer det et intervju om dine erfaringer rundt arbeid med elever som har dysleksi. Intervjuet vil ha en varighet på cirka 45 minutter og ha form som en dialog der hovedkategoriene er: tilpasset opplæring, hjelpemidler og læringsutbytte. Intervjuet vil bli tatt opp på lydopptak, deretter transkribert, og så vil lydopptakene slettes fortløpende etter endt masteroppgave.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

- Det er kun vi studenter og veileder som vil ha tilgang til opplysningene som samles inn i denne perioden.
- Alle personopplysninger som samles inn vil oppbevares på nettskjema hvor kun vi og veileder har tilgang.
- Opplysninger som samles inn vil ikke publiseres på en måte som gjør de gjenkjennbare.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Opplysningene som samles inn i denne forskningsperioden vil bli slettet når prosjektet avsluttes/oppgaven er godkjent, senest 31.12.22.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,
- å få rettet personopplysninger om deg,
- å få slettet personopplysninger om deg, og
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg 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:
- OsloMet - Storbyuniversitetet ved Førsteamanuensis Ingrid M. Rodrick Beiler, ingrid.rodrickbeiler@oslomet.no, telefon 67 23 56 63
- Vårt personvernombud: Ingrid S. Jacobsen, personvernombud@oslomet.no

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:
- NSD – Norsk senter for forskningsdata AS på epost (personverntjenester@nsd.no) eller på telefon: 55 58 21 17.

Med vennlig hilsen

Ingrid M. Rodrick Beiler   *Lisa Ekornhol Bjerketveit & Yvonne Bergly*
Andersen
(Forsker/veileder)   (studenter)

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «Dyslexia in a primarily digital classroom», og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i intervju
☐ lydopptak under intervju

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Signert av prosjektdeltaker, dato)

8.2 Appendix 2 – Interview guide

Intervjuguide

Innledning

1. Hvilken utdanning har du?

2. Hvor lenge har du jobbet som lærer?

3. Hvilken tilgang har dere til digitale hjelpemidler på skolen?

4. Hvilken kompetanse har du til å kunne bruke disse hjelpemidlene?

Dysleksi

1. Hvilken kjennskap har du til diagnosen dysleksi?

2. Hvordan erfaring har du med å jobbe med elever som har dysleksi?

3. Hvilke programmer har elevene tilgang til?

Tilpasset opplæring

1. Hvordan organiserer skolen tilpasset opplæring for elever med dysleksi?

2. Har du erfaring med å tilpasse opplæring for enkeltelever?

3. Hvordan tilrettelegger du opplæring for elever med dysleksi?

Hjelpemidler

1. Hvilke positive eller negative sider ser du ved bruk av digitale verktøy for å fremme læring hos elevene?

2. Opplever du som lærer å møte på problemer med bruk av digitale hjelpemidler?

3. Hvilke erfaringer har du med digitale hjelpemidler for elever med dysleksi?

4. Hvilke digitale hjelpemidler bruker elever med dysleksi ved din skole?

Avslutning

1. Er det noe du vil kommentere eller tilføye?

2. Har du noen spørsmål?

8.3 Appendix 3 – NSD approval letter

03.12.2021 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg 03.12.2021. Behandlingen kan starte.

TYPE OPPLYSNINGER OG VARIGHET

Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 31.12.2022.

LOVLIG GRUNNLAG

Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER

NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

• lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om ogsamtykker til behandlingen

• formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte ogberettigede formål, og ikke viderebehandles til nye uforenlige formål

• dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante ognødvendige for formålet med prosjektet

• lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for åoppfylle formålet

DE REGISTRERTES RETTIGHETER

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18) og dataportabilitet (art. 20).

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER

NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.

MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: https://www.nsd.no/personverntjenester/fylle-utmeldeskjema-for-personopplysninger/melde-endringer-i-meldeskjema Du må vente på svar fra NSD før endringen gjennomføres.

OPPFØLGING AV PROSJEKTET

NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet i tråd med den behandlingen som er dokumentert.

Kontaktperson hos NSD: Olav Rosness, rådgiver.

Lykke til med prosjektet!

OSLOMET

Medforfattererklæring

Om to eller tre studenter gjennomfører og/eller skriver masteroppgaven sammen, skal det legges ved et medforfatterklæring, jf. emneplan MGMO5900:

"For studenter som velger å gjennomføre masteroppgaven som gruppearbeid, skal det gå tydelig fram i egen redegjørelse hvordan arbeidet er fordelt, og hvordan hver enkelt oppfyller kravet om selvstendig vitenskapelig arbeid. Her benyttes en medforfattererklæring som begge eller alle tre parter signerer."

Masteroppgavens tittel:

Students with dyslexia learning English using digital learning aids

Redegjørelse på hvordan arbeidet er fordelt, og hvordan den enkelte oppfyller kravet om selvstendig vitenskapelig arbeid:

Vi har skrevet utkast på ulike kapitler, og diskutert sammen om hva som er bra, og hva som kan forbedres. Vi har jobbet selvstendig med å finne teori, men og ±tt gjennom teorien sammen. Vi har samarbeidd godt gjennom prossesen, hatt klare forventninger til hverandre, og fordelt arbeidsmengden rettferdig.

Dette har vært en krevende prosess, og en stor oppgave å skrive, men ingen av oss sitter igjen med en følelse av at den andre har sluntra unna arbeid. Vi føler dette er vår oppgave vi leverer sammen.

Undertegnede bekrefter å ha bidratt til følgende deler av masteroppgavearbeidet:

Prosjektskisse, idé og tema for masteroppgaven	(Ja)/Nei
Praktisk gjennomføring av studien for eksempel innhenting av data	(Ja)/nei
Analyse, drøfting og tolkning av resultatene	(Ja)/Nei

Undertegnede har lest og godkjent den innsendte versjonen av masteroppgaven

....   *Yvonne Bergly Andersen*

....   *Lisa E. Bjerketvedt*

....

(sted) Oslo   (dato) 07/05-22   (signatur)