Master's Thesis

Intelligent writing software in teaching English in years 5-10.

Hans Reidar Grønvik Hoffseide

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HØGSKULEN I VOLDA

Abstract

The goal of this study is to examine how English teachers in year 5-10 perceive, use, and relate to intelligent writing software. The use of intelligent writing software and the way we write is rapidly changing. At the same time intelligent writing software is constantly being improved and further impacts how we write. Because of this it is important to understand how teachers handle intelligent writing software and perceive it. The goal of the study is to investigate how it is being used in Norway and create a point for further research into the topic. My research question is therefore:

"What relation do English teachers in 5-10th grade have to intelligent writing software, and how do they facilitate for students' digital writing skills in English?"

In the study I have performed four qualitative interviews with four English teachers who work in 5-10th grade. The data consists of four transcriptions of these four interviews which have been phenomenologically analyzed and discussed to investigate my research question.

The study finds that the teachers have a general positive attitude towards the use of intelligent writing software. The teachers interviewed are focused on developing their own digital skills and improving their use of the intelligent writing software available to them. At the same time there seems to be less awareness of the features allowed in the classroom and their potential English didactical implications. Furthermore, the teachers believe that many of the pupils use the features of intelligent writing software without considering their effect. This results in a perceived confusion in the pupils or a lessened learning outcome. The study finds that the teachers perceive lack of motivation in the pupils to use intelligent writing software to further their own learning as a central part of the issue.

Sammendrag

Formålet med denne studien er å undersøke hvordan engelsklærere i 5-10.klasse oppfatter, bruker og forholder seg til intelligente skriveprogramvarer. Bruken av intelligente skriverprogram og måten vi skriver på er i rask endring. Samtidig er disse programmene under konstant forbedring og påvirker i økende grad hvordan vi skriver. Av den grunn er det viktig å forstå hvordan lærere behandler disse programmene og oppfatter de. Målet med studien er å belyse hvordan dette blir brukt i Norge og skape et utgangspunkt for videre forskning på dette temaet. Problemstillingen min er derfor

«Hvilket forhold har engelsklærere i 5-10.klasse til intelligente skriveprogramvarer og hvordan legger de opp til elevens utvikling av digitale skriveferdigheter i engelsk?».

I denne studien har jeg gjennomført kvalitative intervju med fire engelsklærere som jobber i 5-10.klasse. Datamaterialet består av fire transkripsjoner av de fire intervjuene som har videre blitt fenomenologisk analysert og drøftet for å belyse problemstillingen.

Studien finner at lærerne har en generelt positiv holdning til intelligente skriveprogramvarer. Lærerne som ble intervjuet hadde et fokus på å utvikle deres digitale kompetanse og forbedre deres egen bruk av de intelligente skriveprogramvarene som var tilgjengelig for dem. Samtidig er lærerne noe ubevisst på funksjonene som er tilgjengelig i de intelligente programvarene de bruker og de engelsk didaktiske implikasjonene de medbringer. Videre oppfatter lærerne at mange av elevene deres bruker funksjonene i de intelligente skriveprogramvarene uten å tenke over effekten de har. Ifølge lærerne resulterer dette i at elevene blir forvirret samt et dårligere læringsutbytte. Studien finner at lærerne oppfatter mangel på motivasjon som en sentral del av hva som påvirker mangelen på bruk av intelligent skriveprogramvare hos elevene.

Preface

Writing this master has been a challenging process that has given me insight into several aspects of both learning and technology. I would like to thank my father for supporting me throughout this endeavor and lending an ear to my complaints.

I want to give a special thanks to my supervisor Kim-Daniel Vattøy for giving thoughtful, thorough, and fast feedback throughout this whole process as well as being flexible and available at a moment's notice. I also want to thank my first-year grammar teacher for at large being responsible for my understanding of English grammar and somehow making it interesting at eight o'clock in the morning.

I am also immensely thankful for all participants who took the time and effort to be interviewed in their hectic schedules. You all took what must have seemed like an intimidating challenge head on. Without your help this master would not be possible.

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Hans Reidar Grønvik Hoffseide

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1 Introduction

The way we write has largely changed in a short amount of time. In the last decade the prevalence of intelligent writing software has increased (Mcknight et al, 2021, pp. 442-448). Intelligent writing software allows the user to produce and edit text while the software assists in this process (Zhao, 2022, p. 1). This change stems from new modes of digital writing transforming the way we write and communicate, with important implications for foreign and second language learning (Barrot, 2021, p. 1). The most recent and established use of artificial intelligence in Norwegian schools is intelligent writing software. This is achieved using artificial intelligence (AI) and more precisely language models. A simplified explanation of how language models work is that they guess the next word based upon the previous ones (Floridi & Chiriatti, 2020, p. 684). The focus up until recently has been editorial assistance such as correcting words or grammar (Zhao, 2022, p. 1). More advanced technology has become more and more prevalent helping with not only producing but generating text. Recently there is an increased attention brought to non-generative software in second language learning classrooms and its use supports pupils' writing process (Zhao, 2022, p. 1). A review of 84 studies on automated corrective feedback tools specifies that these tools are frequently used in English language learning and especially in learning environments where English is learned as a second language (Shadiev & Feng, 2023, p. 23). This means that the use of these tools is especially important for Norwegian pupils. Expectedly, software intended for producing text usually includes this. However, it is also prevalent in most parts of our digital lives (Lin et al. 2017, p. 1523). When we are communicating online, we are often corrected by the service we use. When searching for information our words are restructured and corrected by the search engine. These changes are often subtle and might go undetected (Wood, 2014, pp. 24-29). It still influences how we write and what we write. There are promising results regarding the use of such technology to further English as foreign language (EFL) learner's understanding using these tools (Lin et al, 2017, pp. 1514-1516). It is therefore important that we understand how teachers approach this new digital environment and how they teach within it. This in turn will allow researchers and institutions to support future education.

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Writing and digital skills are in many ways connected in the English subject. Developing digital skills in English should result in the pupil strengthening their language learning and producing texts according to (Norwegian Ministry of Education, 2019b). In the same manner, writing texts is categorized as a competence aim that involves digital skills (Norwegian Ministry of Education, 2019b). Looking at writing as a basic skill we see that intelligent writing software supports most focus areas. "Writing requires planning, formulating and processing texts that communicate, and to adapt the language to the purpose, receiver and situation, and to choose appropriate writing strategies.». Norwegian Ministry of Education (2019a). Intelligent writing software allows pupils to easily edit texts which supports many of the requirements. Software like Grammarly can help with adapting the texts and formulating sentences. It also has a focus on explaining its reasoning for doing so. One can choose a tone and formality depending on what is needed according to (Grammarly, 2023). Technology forces the learning environment to adapt. Pupils are expected to use digital media and resources to strengthen their language learning (Norwegian Ministry of Education, 2019a). Intelligent writing software is continuously developed and improved upon. This means that they are increasingly able to provide this digital resource to improve their language learning. Because of this growing role we need to understand how teachers approach and use these tools in the classroom.

A clear example of this came in November of 2022. The release of ChatGPT3 brought attention to language models. Looking at Google searches we see an increase in the interest in language models after November of 2022 (Google, 2023a). Earlier models existed but were lacking comparatively. ChatGPT3 got a lot of attention quickly. Overnight, pupils who were at most able to write a sentence or two could generate page long essays within minutes at a higher level than before (OpenAI, 2022). Compared to earlier intelligent writing software ChatGPT generates texts on a completely different level to traditional tools such as those available in Microsoft's Word. It creates text based upon instructions given to it. Word is an intelligent writing software that has a broad set of functions. This includes advanced corrective features that are able to correct and reformulate text. It is not clear how this affects teaching and learning. It is concerning that the only mention of such technology comes from a charitable interpretation of the English core curriculum. The use of intelligent writing software such as

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Word can be both beneficial and problematic according to (Artan, 2016, p. 28). The Norwegian ministry of education gives little insight stating that "Digital skills in English involve being able to use digital media and resources to strengthen language learning" Norwegian ministry of education (2019b). Both intelligent writing software and ChatGPT fall within *digital resources.* The statement is so vague that it gives no guidance on how one should proceed in this new environment. Digital resources are also not mentioned under writing in basic skills (Norwegian ministry of education, 2019b). As stated earlier these two areas are intertwined which makes this concerning.

1.1 Structure and content

My thesis is divided into six different parts. These are introduction, literature review, methodology, results, discussion, and conclusion. The introduction presents the subject and its importance. Here I present the limitations and reasons for studying the topic. In my literature review I present earlier studies and studies on language learning and processing, digital skills, and assessment. I then present my method and the results of it. Finally, I discuss the result in light of the previous literature. All of these are in relation to intelligent writing software. I also explain important terms.

1.2 Research question

In my master thesis, I wish to explore the attitudes and the experiences of four teachers using intelligent writing software in 5-10th grade as well as the didactical implications of using it. The reason being that pupils within this range more frequently write longer texts. Specifically, the focus is on researching what features are being used in the classroom and what attitudes teachers have towards them. How these tools are implemented in the classroom will help or constrain the pupils' learning. Therefore, I have researched: *What relation do English teachers in 5-10th grade have to intelligent writing software, and how do they facilitate for students' digital writing skills in English?* My goal with this paper is to create a starting point for further research regarding the perceptions of intelligent writing software in the 5-10th grade Norwegian English learning classroom. Knowing the teacher's approaches and goals in using the software gives insight into how one may improve and create a better learning environment. Doing so

would be productive for teachers and help narrow the gap between technology research and the didactical implications of them.

1.3 Delimitations

My master's thesis focuses on intelligent writing software in the Norwegian English learning in the years 5-10. The years 5-10 have more text creation compared to 1-5 which makes it more suitable for my study. My focus is on teachers' facilitation for learning and attitudes regarding these and their functions such as autocorrect and spell-checking. These are small features that have a large impact on the way we create texts. Delimiting the study to these features creates precise results compared to studying the use of intelligent writing software in general. My goal is discovering how it affects both teaching and assessment and getting an insight into how pupils use it. How teachers adapt to these new tools and how they understand them will affect how the lessons are planned and preformed. The corrective features are more closely related to assessment since they are at times giving feedback or outputs that can be used to further develop one's own understanding. They are also important given that the pupils are EFL learners. This means that their use of the software will be different from pupils who learn English as a first language. An example of this is acquiring new vocabulary or understanding appropriacy or colocations. EFL learners have lower exposure to these, because of this intelligent writing software can play an important role. Their exposure to English words will be lower than someone who has lived in an English-speaking country. This is an additional reason for why I am focusing on English teachers in Norway.

In the years 5-10 the pupils are writing longer and more complex texts in the English subject. This means that they will be using intelligent writing software more frequently than in the years prior. The pupils are also able to use the software in a more advanced manner, making use of its features more often and effectively. For this reason, I expect the teachers that educate within these years to have more experiences and opinions regarding the subject matter. Interviewing these individuals should therefore result in more data and a more accurate view given limited time and resources.

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My method is performing qualitative interviews of the teachers. As stated earlier I wish to understand the use, attitudes and potential learning outcome of intelligent writing software. Because of this my methods are also limited to qualitative ones. This way I can fulfill the purpose of the study effectively and help build a groundwork for future research.

1.4 English as a foreign language in Norway

Looking at Nations research we see that meaningful language output is important for EFL learners' development of English. This requires tasks about conveying information around familiar topics with most of the language being known. (Nation, 2008). When producing English in the Norwegian classroom all these factors should be considered. Because of this and the previous paragraph it is important to distinguish *English* as a *foreign language* or EFL. Some literature included mentions *second language learners* this term encompasses EFL learners without it regarding the learning of English specifically. Therefore, literature on second language learning is important to include. Not all learners of English in Norway learn it as a second language. Because of this and for the sake of consistency I use the term EFL learners unless I am specifically referring to literature on second language learning.

It is important to understand the context that the teacher was interviewing is teaching in. Understanding how Norwegian pupils learn this is essential. Most pupils in Norway are learning English as a second or third language. This is a different process compared to the acquisition of native speakers. My reason for using the term EFL over English as a second language (ESL) is that it defines English as a foreign language. English as a second language includes people speaking it as a second language living in a country that uses it natively. Because of this the term EFL is more relevant to the study of English in Norway.

A meta-analysis was done in 2014 by Lervåg and Lervåg. Here, they looked at 82 different studies regarding second language reading and language comprehension (Melby-Lervåg & Lervåg, 2014, p. 426). The studies analyzed were from Europe, Canada and USA.

> both language comprehension and decoding skills moderated the degree to which the
> reading comprehension skills of the second-language learner samples lagged behind

those of first-language-learner samples. Samples with small differences between first- and second-language learners in language comprehension and decoding skills showed comparable small differences between reading comprehension skills. (Melby-Lervåg & Lervåg, 2014, p. 426)

The findings confirm that pupils who learn a second language are slower at it than pupils that are native speakers. It also identifies language comprehension and decoding skills as a large part of the issue. There are a few factors specific to reading and comprehending English in a Norwegian classroom. The first is the fact that English and Norwegian are closely related both being Germanic languages. Their grammar is similar, and many words are similar as well. A study supports this. Here the acquisition of an artificial third language was studied. The language was created to be syntactically and lexically similar to Norwegian and/or English. The study concluded with "We found that both lexical and syntactic cues in the input affected crosslinguistic influence, and the presence of English-based syntax in the L3 appeared to be particularly influential." Jensen & Westergaard (2022, p. 23). This suggests that languages that are similar are more easily learned. The second factor is that there is a high exposure to English in Norwegian in the current society according to (Vattøy, 2017, p. 3). Because of this the Norwegian pupils have a substantial amount of exposure to English throughout their leisurely activities as well as school. These factors in turn effect how the pupils learn English and how teacher need to adapt.

2 Literature review

In this part I present the literature and studies that are relevant for my study. My literature review is divided into four different sections. In three of the subsections intelligent writing software is linked to language learning, language processing and assessment. The remaining subsection focuses on digital skills and critical thinking. Intelligent writing software is a broad topic and because of this I have chosen these subsections to cover most features and ways of implementation. The goal is to have data that allows me to understand my findings and discuss them. My reason for structuring it this way is to have it be more understandable for unfamiliar readers.

2.1 Intelligent writing software and language learning

Intelligent writing software is a broad term and encompasses automated written corrective feedback as well as non-written feedback such as visual clues (Barrot, 2021, p. 2). Automated written corrective feedback refers to software that points out mistakes that are made and attempts to explain them to help the writer fix them (Barrot, 2021, p. 2). When referring to intelligent writing software in my study, it refers to software that assists the writer in the process. This can be in different ways such as changing layout, changing grammar and automatically inserting sources and well as guiding the writer directly. The recent attention brought to the use of generative artificial intelligence to create text leaves the term Intelligent writing software in a limbo between these two meanings. It is almost certain that most of the functions in intelligent writing software have a grounding in AI (Zhao, 2022, p. 1). Although AI is involved my main focus is on corrective features within intelligent writing software. Using interviews means that there might be a wide range of intelligent writing software features or implementations. For this reason, I have covered different areas that relate to this.

The distinction between error-detection and error-correction needs to be made (Lin et al, 2017, p. 1503). Error-detection spell-checking functions by helping the user notice the mistakes being made. As stated by (Lin et al, 2017, p. 1501) this is often done by a visual clue such as a red underline. Here, the software identifies the mistake and brings attention to it by marking it. The spell-checking feature also often includes a style or structure feature. Here the software uses an underline of a different color to suggest a restructuring or some other grammatical change. This might also occur if a certain word or phrase has been used repeatedly. This allows the user to spell correctly and structure their sentences in a proper manner.

Error-correcting spell-checking with options works in a similar manner. Here the error is marked as previously explained, but the user has an option to interact with it. "In the spell-checker condition, when participants right-clicked on the signified word (red underline), a drop-down list of choices, which contained the correctly spelled word, is provided." Lin et al. (2017, p. 1511) These might be words that are spelled similarly to the word, conjugations of the word or words of similar meaning. Here the user chooses which word they want from a menu. This

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menu might also include information regarding the words that are presented, meanings or synonyms to the word. The same is true for the grammatical version of this feature. This is usually indicated by an underline that is a different color to concrete errors. Here the software presents one or more restructurings of the phrase. Here it might also include a reasoning for doing so. This allows the user to identify their mistakes given that they understand grammatical jargon.

Autocorrect is a feature that is both error-detecting and error-correcting. This is more often seen in software meant for communication, it is however often included to some degree in software meant for writing longer texts. This refers to software that instantaneously changes the word without any other prompt than a misspelling. (Lin et al, 2017, p. 1501) agree with this definition however they classify this under spellchecking. For my text it is useful to categorize these differently for didactical reasons. I expect the didactical discrepancy between drawing attention to a misspelling and instantly correcting it to be significant. Therefore, the distinction is important to make. Here the user is not notified beforehand and might not notice the change at all according to a study done by (Wood, 2014, pp. 24-29). This can also lead to the correction being wrong since the software might mistake the input of the user.

To understand the relation between intelligent writing software and teaching digital writing we first need to understand how languages are learned. In a summary of psychological articles (Schmidt, 1990, p. 149) concludes that subliminal language learning is impossible. This study looks at the input of second language learning, yet the conclusion states all language learning. It is also worth noting that although spellchecking is a part of production, reading and editing what you have written involves input seeing as you are consuming the language. He states that for language learning to occur the learner needs to consciously notice the language (Schmidt, 1990, p. 149). Pupils are often unaware of their mistakes while writing. Here the potential for a learning outcome diminishes unless something guides them. (Schmidt, 1990, p. 143) states that expectations are important to whether we notice something. If something is unexpected, we often notice it. Since the text is black on white the red underline works as a signifier. Secondly, he states that repeated exposure to an item increases the chance of it being noticed (Schmidt,

1990, p. 143). If a pupil is repeatedly notified of their mistakes, they will be aware that they need to improve upon this. Depending on their level and autonomy they might be able to do so on their own or need help from a teacher. Spellchecking does exactly this when notifying the user of its errors. Here the error stands out because of the underline. This could be for the whole word or specifically the suffix. This then allows for the pupil to correct it or take further steps to improve their language understanding.

Furthermore, in their conclusion regarding the learning outcome it is stated that "despite the convenience offered by computer-based spelling aids, they can also enhance students' incidental spelling learning." Lin et al. (2017, p. 1524). It should also be stated that this is even more applicable for EFL learners. This stems from a lower exposure of the target language resulting in a lack of acquisition of it. The lack of everyday exposure to uncommon or subject specific words might lead to them being misused. Intelligent writing software can create awareness and/or display the meaning of the word. This shows that teachers should focus on the use of such software to enhance learning. When teaching the inclusion of this software should be included since it benefits the writing process and leads to incidental learning. Because of this the teacher can focus on more human-oriented tasks. A study looking at the use of corrective features for learning agrees with this.

> For many teachers, correcting texts is the most time-consuming task, and they aim to use the time to assist learners during the learning process rather than doing the "batch work" of correcting texts. The time that will be saved could be used to help learners in a more personalized way. (Rüdian et al, 2022, p. 431)

The teacher's job becomes focused on helping pupils depending on their own specific needs. This allows the teachers to give personalized feedback and assessment for further learning. This is one of the ways teaching must adapt to the new environment presented.

One needs to be critical of the effect of intelligent writing software and especially autocorrect. The way autocorrect corrects mistakes could result in a lacking learning outcome. The reason for this is the exclusion of the writer in the process. A study by (Wood, 2014, pp. 24-29)

supports the basis of this argument. The study showed that people underestimated how often they noticed or failed to notice the changes made by autocorrect. If this is the case with adults, it is reasonable to assume children would not perform any better. Spellcheckers can be viewed through some different learning theories. The first is behavioristic learning theory. This means the repetition and reward of an action results in it being learned (Skaalvik & Skaalvik, 2018, p. 32). Furthermore, it might facilitate constructivist learning. Constructivist learning happens when a pupil is allowed to form their own understanding. Instead of memorizing what is happening they understand the individual components and how they interact (Skaalvik & Skaalvik, 2018, p. 50). The idea being that the combination of seeing the misspelled word and the correct word allows the pupil to build their own knowledge in seeing the differences and perhaps explore this further. As the name suggests the pupil is here constructing their own understanding and knowledge compared to it being learned by repetition or transferred. Instead of memorizing a single part they are integrating a piece into a larger network that helps build further understanding. This can only happen when the pupil is actively partaking in their own learning. It is also possible for a pupil to simply select the correct word and move on which would lead to a lacking learning outcome based upon the theory presented.

Autocorrection of grammar is slightly more complex. Spellcheckers notifies the user of their mistakes. Awareness is usually brought to this by an underline. Clicking the underline often suggests a rewritten version of what you wrote. This helps the pupil distinguish the mistake from a spelling one. This has the same potential for a behavioristic learning outcome as the previous scenarios. I would argue that this presents a sociocultural opportunity for learning grammar. The reason being that it is unlikely that the pupil will be able to understand any complex mistake on their own. Drawing attention to the mistake can help lead the pupil to a zone of proximal development (Skaalvik & Skaalvik, 2018, p. 70). As stated earlier, the software might be able to help the pupil notice certain repeating mistakes and even help them understand this mistake. This role was previously filled by the teacher correcting the pupils' texts manually. This process has been partly automated since the computer points out and defines the mistake being made. Here the teacher can focus on the task of helping the pupil understand the information provided or the nature of the mistake being made. This is only be

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possible if the teacher is aware of how one uses digital writing software in the classroom, and has taught the pupils to use the writing software and has an approach that facilitates this learning outcome. Therefore, it is useful to study this and bring awareness to the use of digital writing software in the contemporary classroom.

Now that we understand how learning works within this framework, we can understand how teaching must adapt to this new environment. A study on digital writing and AI's influence on this as well as potential adaptations to it McKnight states that "In posthuman English, the teacher becomes a different kind of figure: an initiator, broker, colleague, collaborator, curator and mentor rather than trainer and invigilator" McKnight (2021, p. 452). The focus of the teacher is on guiding the pupil rather than teaching basic writing. This largely reflects the statement from Rüdian earlier. The study says that teachers need to develop their own digital skills and evolve with the changing landscape (McKnight, 2021, p. 452). This is reminiscent of sentiment of the teacher needing to constantly evaluate and adapt new technology (Lund & Hauge, 2011, p. 267). For teaching to be beneficial there needs to be a constant evaluation of how one might use these tools to improve pupils' learning outcome. A review study by Williams and Beam looked at 29 studies on how computers, information and communication have impacted writing in pupils from kindergarten to year 12. The review offered *strong* support for process writing (Williams & Beam, 2019, p. 239). This suggests that teachers should largely focus on the process of writing the text. This means that the pupils work over a longer time with the same text, getting feedback and revising it. Here the intelligent writing software may play an obvious role.

2.2 Intelligent writing software and language processing

Grammar can be learned in two ways. The first is implicit learning of grammar, "Implicit knowledge is intuitive, procedural, systematically variable, and automatic and thus available for use in fluent unplanned language use." Scheffler & Cinciala (2011, p. 13). Here the learner is not actively trying to learn the structure and rules of the language. The knowledge stems from repeated input and output of the target language. In relation to intelligent writing software this would happen through repeated exposure to similar mistakes. Explicit on the other hand is

"conscious, declarative, anomalous, and inconsistent [. . .] and is only accessible through controlled processing in planned language use." Scheffler & Cinciala (2011, p. 13). This is an intentional and deliberate use and learning of the target language. In relation to intelligent writing software this would happen through pupils examining their mistakes either during or after writing. According to (Scheffler & Cinciala, 2011, p. 13) some theorists state that the natural acquisition of language is possible before puberty. During this time the child is exposed to the language around them and naturally picks it up. This happens more frequently with native speakers, and this is especially true for low frequency words. This leads to an implicit understanding of the language where the learner often cannot express why the language operates as it does but is still able to express themselves and follow grammatical rules. It should be stated that nonnative children are exposed to English at a younger and younger age due to an increased use in technology and social media. It is unclear however to what degree this influences implicit language acquisition. The second way of learning is explicit. Here the learner is actively processing and understanding the language. As stated by (Scheffler & Cinciala, 2011.p. 13) this is a conscious process semi-technical or technical metalanguage. This means that the learner has an understanding of not only the language but the processes and rules that make up the language. It is argued that like any factual knowledge this can be learned at any age. This could be seeing patterns in the language or memorizing rules.

When exploring the connections between teachers, grammar and intelligent writing software it is helpful to know which approach is the most effective. It seems that no such conclusion can be drawn based upon the current research. The research on the earlier years is limited and I therefore have to base this upon research focusing on the later years. The first study investigates the effect of explicit grammar teaching on first year students at a UK university (Macaro & Masterman, 2006, p. 297). The pupils are studying French using an intensive course given by a teacher. The course involved directly working with grammar such as analyzing phrases, reconstructing sentences, and using unfamiliar newly learned words in sentences. The study found that there was no significant increase in the ability to make judgements overall, however, there was an increase in the ability to identify mistakes. It is not conclusive if this is related to the new knowledge gained or an underlying implicit understanding. It should also be
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noted that the age of these students is significantly higher than the ones of the teachers being interviewed. Both groups are over the age of 12 which is usually when abstract thinking is developed which is useful for understanding such complex topics (Skaalvik & Skaalvik, 2018, p. 65). The increase in age, however, could be expected to increase the efficiency of teaching such things and thus leading to a lesser learning outcome in younger pupils. (Scheffler & Cinciala, 2011, p. 13) investigated if secondary school Polish pupils were able to explicitly explain the implicit knowledge they had. The pupils in this study had an upper intermediate understanding of English. The study began with an interview of the pupils, structures that were used accurately by the pupils were then extracted. The pupils were then asked to explain the rules and structure of the selected structures. The result showed that pupils might have an explicit understanding of the material they were able to produce using implicit knowledge. The study claims that this means that explicit understanding of grammar can result in second language acquisition. (Scheffler & Cinciala, 2011, p. 22) therefore recommend the use of explicit grammar teaching in the classroom. It should be noted that the first study investigates the improvement of grammatical understanding while the other investigates the explicit understanding of underlying knowledge. Still there is a concrete contradiction which is the approach to grammar learning.

The use of intelligent writing software could support learning methods argued for by both these studies. Reconstructing sentences is something that intelligent writing software offers. More advanced software such as mentioned by (Shadiev & Feng, 2023, p. 10) give specific feedback on the mistake being made and can potentially explain the issue. If the pupil has sufficient knowledge regarding terminology, they can use this feedback to correct the text. Formative feedback can also be given according to (Shadiev & Feng, 2023, p. 10) this happens through a summary the software gives allowing the pupil to see concrete feedback on several aspects of their texts. Here they can work explicitly with grammar in a similar manner to the ones in Macaro and Mastermann's study. If Scheffer and Cinciala are correct the learning outcome could be even greater, and second language acquisition could be possible due to these technologies. Concerningly there was a lack of pedagogical approaches to the software. Only 14% of the studies mentioned it (Shadiev & Feng, 2023, p. 13). One study in this review looked
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at the implementation of it. Here the pupils used both the software and peers to get feedback on their drafts of the text (Shadiev & Feng, 2023, p. 15). This allows for more feedback and different kinds of feedback given the differences in the person who actually gives the feedback. As the study states (Shadiev & Feng, 2023, p. 18) one major advantage comes from larger classes where correcting all the text by hand would be very time consuming. Rather with the use of the software the texts are automatically assessed, and the pupils can continue their work. The final draft can still be evaluated by the teacher. This would halve the workload for the teacher since they do not need to correct a first draft. This could in return mean higher quality feedback on the final version of the text which in turn could lead to a greater learning outcome.

Most teachers' work is done in a digitally rich environment. Understanding these digitally rich environments and how they affect writing and motivation is important. Hauge and Lund has written a text which looks at digitally rich environments and how to improve learning and teaching in them. They state, "we see how such activity involves understanding phenomena on the periphery of our horizon, analysis of the role of artifacts and how such artifacts match (or mismatch) the assignment." Hauge and Lund (2011, p. 267). When introducing new tools, it is easy to have a binary view of them. It is easy to overestimate or underestimate its value in the classroom. A balanced and nuanced view of new tools and how one might use them is therefore necessary. "The result is that teachers and learners constantly have to assess the costs and benefits involved in a new opportunity." Hauge & Lund (2011, p. 269) How one implements technology is crucial for its learning outcome. Intelligent writing software has made writing more accessible and easier. ChatGPT has made it even easier resulting in sentences becoming a paragraph or page (OPENAI, 2023). The use of this enables pupils to generate text at a level higher than they would be able to write on their own. This is already being used by pupils and is an extreme extension of the intelligent writing software. The inclusion of such tools will influence the pupil's motivation either for the positive or the negative. If one can generate texts in different genres, styles and levels it is difficult to motivate pupils to learn how a language works and what its rules are. It has become a question of to what degree one includes tools rather than if one should include them. The use of corrective features could help

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pupils both explicitly and implicitly understand grammar. This could happen from either the repeated exposure to their mistakes or using the grammar mistake as a starting point for further understanding.

2.3 Teaching digital skills and critical thinking

Digital skills, critical thinking and English are closely connected especially in EFL countries such as Norway. The reason for this is that the great majority of content online is English. According to (Norwegian Ministry of Education, 2019a) developing digital skills in English means that one encounters genuine English content, and one can critically evaluate this content and potentially use it to further one's own learning. Looking at Nation's four strands this is largely reflected. He states that when learning through input it is important that the pupil is interested, familiar and enjoys learning or reading about the content (Nation, 2008, p. 2). Doing so according to him leads to a greater language learning outcome for EFL pupils. Nation's criteria are fulfilled when pupils research something of genuine interest. Most resources regarding digital tools will be written in English. Because of this knowing the language increases the information available and thus potential learning outcome. Critical thinking is also affected in the same way. The Norwegian Ministry of Education states that "critically assessing information from different English language sources" Norwegian Ministry of Education (2019a). This makes sense since most available digital sources are online. Exploration and critical assessment of new information will at large happen in English, and it is therefore natural that this happens within a digital English classroom.

A research report was done reviewing previous literature on teaching and evaluating critical thinking. The report finds that using open-ended problems is beneficial for teaching critical thinking. (Lai, 2011, p. 38). The tasks presented also need to be authentic and approximate to real world problems. Lastly tasks should need the pupils to go beyond the information given to force deductive and inductive reasoning. (Lai, 2011, p. 39). It is unclear to what degree one can transfer critical thinking skills from one subject to another (Lai, 2011, p. 42). This means that teaching critical thinking for English, digital resources, and the combination of the two might be different. Lai states that this might be possible if there is a focus on the transfer of these skills

(Lai, 2011, p. 42). English seems to be well suited for this given the reasoning in the last paragraph. It seems that one needs to teach inductive and deductive reasoning in English and the digital environment. An example in English could be text analysis. Here pupils may look at a text and deduce its meaning from the context it was written in. This could be done with differing texts online as well.

The Norwegian Ministry of Educations state that "Writing in English means being able to express ideas and opinions in an understandable and appropriate manner" Norwegian Ministry of Education (2019a). Pupils could do this through discovering, learning and optimizing tools such as Grammarly as mentioned by (Barrot, 2021, p. 2). This leads to pupils noticing and using the feedback of the software for self-directed learning (Barrot, 2021, p. 18). The result is a greater learning outcome. If the pupil can do so it becomes a great opportunity for either learning from the mistake or developing autonomy through understanding and correcting one's own mistakes with the help of technology. We see this exemplified in a study. Here it was shown that there was a strong correlation between learner autonomy and writing achievement as well as a moderate correlation between digital competence and writing achievements. There was also a significant correlation between the combination of the pupil's learner autonomy and digital competence related to writing achievement. This was shown in a study done by (Andina et al, 2020, p. 84). It is uncertain if the correlation stems from pupils with greater autonomy also having greater writing skills. The study presents an explanation for this. It suggests that pupils who are better with digital skills have a greater opportunity to experiment with different writing styles and this allows them to develop better writing skills (Andina et al, 2020, p. 84). Having a greater opportunity to experiment allows the pupil to understand what works and what they need to change. The use of digital tools allows for this to be done more easily. It is necessary that the tools are used for learning and not automation of writing.

Editing and experimenting allows for more writing and process writing according to (McKee, 2016, p. 12). It is reasonable to assume that the understanding of structure and style would transfer from digital to physical. It is not clear, however, that the attitudes and opinions of teachers reflect this. In Artan's article we see the discussion of teachers' approach to

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autocorrect and writing skills. Here one of the teachers lays forth a concern that autocorrection could decrease the pupils' awareness of spelling mistakes. Later, it is stated that "The results seem to agree with Levy (2007) in that they both consider Microsoft's Word as beneficial and problematic for learning writing." Artan (2016, p. 28). The beneficial side comes from the pupils being able to create text effortlessly according to (Artan, 2016, p. 27). At the same time, it may lead to a lack of self-awareness when it comes to grammatical errors (Artan, 2016, p. 27). I do need to note here that this refers to the teachers' opinions regarding Word specifically. This software contains highly developed writing aids compared to other software. Self-assessment also becomes a concern here seeing that the worry stems from the pupils not being able to pick out their own mistakes and correct them. This obviously contrasts with what has been seen earlier. (Andina et al, 2020, p. 84) states that the study is quantitative study, and that qualitative data is needed. Artan's study is a qualitative one and shows more negative attitudes.

It is here the attitudes and actions of both the Norwegian ministry of education and the teachers become important. Artan studied 17 teachers and their approach to using computers in the English classroom. Here he found that "the teachers participating in the present study could be aware that computer use is not suitable for everything and thus use it only where they find it effective." Artan (2016, p. 26) This might indicate teachers' hesitancy to use computers outside their comfort zone. If the teachers are not familiar with the use of intelligent writing software, it might be excluded from the lessons. This goes against the constant evaluation of technology. This evaluation is what will decide if the pupils use corrective features, assistive writing tools or text generating AI. The inclusion and the way they are included will have an impact on the learning outcome of the pupils. It is therefore important that the teachers have an open mind and are willing to explore these features without making rapid judgement. Educators' attitudes towards technology will be a large part of this decision. Consequentially this will influence how the pupils write and their learning outcome. According to Tjøstheim, 1 out of the 6 teachers interviewed considered continuing to develop their digital skills as a part of their digital skillset (Tjøstheim, 2020, p. 46). When asked, the remaining teachers were positive about the idea of continuing their development of digital skills. This again supports the idea that teachers are indeed willing to explore the use of technology and their digital skills.

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2.4 Intelligent writing software and assessment

The advancement of technology allows for the automation of certain parts of assessment such as correcting spelling, grammar and to some degree style. It has also put into question how future English teachers will evaluate texts given pupils access to text generating software. A study done by (Dalby & Swan, 2019, p. 843) looks at the use of digital tools to facilitate formative assessment in mathematics. Tony Burner defines formative assessment in EFL classrooms as "all assessments with the aim of improving students' learning processes and/or the teacher's teaching procedures. The aim of formative assessment is thus more and better learning for both the student and the teacher" Carlsen, (2020, p. 2). Dalby and Swan conclude that the greatest challenges for teachers during the study was using the technology to enhance learning not using the technology itself (Dalby & Swan, 2019, p. 843). This suggests an inefficient use of features that are available to the teachers leading to a lack of assessment thus learning outcome. Tate and Warschauer studied the number of keystrokes and mouse clicks during a 30-minute writing test. The study found that eight graders inefficiently used these corrective tools during the test. It suggests that this might stem from a the time limit given or lack of competence (Tate & Warschauer, 2019, p. 538). This is of course not conclusive but suggests that there might be a lack of digital skills when using digital tools to further one's own writing. As shown, teachers' and pupils' use of technology varies but having an awareness of the potential inefficient or lacking use of it is useful to know during the analysis.

A way of achieving formative assessment is giving feedback to the pupil that is at a level they understand and are able to act upon. Here the teacher is putting the pupil in the zone of proximal development as explained by Vygotsky (Skaalvik & Skaalvik, 2018, p. 70). Feedback acts as a support for the pupil's own growth. The opposite of this is summative assessment. The most common form of summative feedback is a simple grade. In a report reviewing assessment theory and methods Dr. Gultom states that "Summative evaluation seeks to make decisions about the worth of different aspects of the curriculum. It is concerned with determining the effectiveness of a program, its efficiency, and to some extent with its acceptability." Gultom (2016, p. 191). As stated here the focus is on evaluating the worth of what is created not

helping it or the creator improve upon it or themselves. It should be noted though that an assessment often has aspects of both. A summative assessment can be used for formative purposes if the situation is right (Carlsen, 2020, p. 2). A consideration that needs to be made is how this can be applied in the classroom. A study done on Norwegian EFL pupil showed that they struggle to use the feedback given, the teachers giving the feedback also struggle doing so due to a lack of hours being dedicated to EFL learning. (Burner, 2016, p. 641) This presents both challenges and opportunities for intelligent writing software. It is evident that giving formative feedback is challenging. This is even more challenging for a software that is unaware of the level and age of the pupil. Intelligent software can give summative feedback that can lessen the workload of the teacher. These are simple things like correcting grammar and spelling mistakes. In this manner it could inadvertently lead to formative assessment. Certain software such as Grammarly are able to give explanations for mistakes already. Future development of these features could lead to formative assessment.

Dalby and Swan explain that the teacher's role becomes peripheral when technology can perform more powerful functions (Dalby & Swan, 2019, p. 843). One could assume that this is easier in mathematics given its concrete representation when working with it. I would argue that the same level of power is represented in intelligent writing software when working with vocabulary and grammar. The ability to correct and give reason for the correction presents the same opportunity for learning as mathematics. It is therefore reasonable to assume that when intelligent writing software becomes more powerful, the teacher's role will become more peripheral when assessing the spelling and grammar of texts. A study on students between the ages of 16-18 supports this. The study showed that the pupils using automated writing evaluation showed significantly better performance on tests after using the software (Barrot, 2021, p. 13). It should be noted that these pupils are outside the age range I am studying but the general point still stands, that is that software can assess pupils' performance and enhance learning through automated feedback. This was attributed to the software's ability to "promote noticing, provide an adaptive metalinguistic explanation, and engage students in self-directed learning. " Barrot (2021, p. 19). What stands out is the ability to provide an adaptive metalinguistic explanation. This mirrors a lot of what teachers do to provide a zone of proximal

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development as mentioned earlier. The student in return can self-assess using these tools which could provide a metacognitive learning outcome. In this manner they become more independent. The result of this is that the teacher's workload is lessened and can be focused on tasks that are specific to humans. The teacher's focus will then be on evaluating content and structure of the text.

At current time there is not an easily accessible and efficient way to assess the content of a text. The AI that is available at this current moment can understand text prompts and create content based upon it. This can be generating text but also rewriting or shortening an original text (OpenAI, 2022). This means that the AI understands the content given and its relation to a given prompt. This is similar to tasks given in school. This means that teachers will have to adapt the tasks they give to pupils. It also means that there is the potential for AI to help with all aspects of text writing except the initial idea generation and teach pupil relation. We already see this with the use of AI in higher education. A study done on this in higher education found that they needed to "are so ex-tensive that their curriculum needs to be significantly adapted to the many AI uses" Thurzo et al. (2023, p. 11). ChatGPT was released to the public in November of 2022. Within 3 months the article by Thruzo et al was accepted. Within the 3 months since its public release the use of ChatGPT and counterparts has necessitated a significant adaptation in the curriculum of higher education. This is relevant for lower-level education since ChatGPT is easily accessible for pupils. The only requirement is that they are competent enough in writing to explain what they want the software to do. This would be a simple rephrasing of the task given by the teacher. From personal testing I can confirm that ChatGPT is able to understand and answer questions in Norwegian. This means that it is accessible for pupils who struggle with writing English.

3 Method

In this part I lay forth the research methods that have been used to investigate my research question. First, I explain my methodology and why I have chosen to use the methods I have. Once I have done that, I lay forth my recruitment and piloting process and explain their

importance. The transcription of my text also had an influence on its reliability and needs to be addressed. Lastly, I explain my process of analyzing the data.

3.1 Qualitative method

My reason for using a qualitative method is to understand the teachers approach and attitudes regarding intelligent writing software. To do so I needed to gain an insight into how they perceive their use of intelligent writing software and what effect it has. According to (Brinkmann & Kvale, 2015, p. 42) the goal of a qualitative research interview is to get an insight into the everyday life of the interviewee. This mirrored my exact goals with my interview. Furthermore, Postholm and Jacobsen mention that the goal of the method is to understand the *other* (Postholm & Jacobsen, 2018, p. 96)*. I am a person looking into the teacher's use of intelligent writing software. Acknowledging my place in relation to the teacher is therefore important. Because of this it also means I am studying their perceptions and attitudes not the actual use of it. Because of this the method takes on an explorative quality. (Kvale & Brinkmann, 2015, p. 122) states that the goal in using semi structured interviews is to ask open questions that uncover knowledge on a topic. My questions are structured to cover the underlying topics of the research question. They also allow for exploration within that topic. They can also provide perspectives or information that make the later questions more productive or insightful. The method also uses fewer preplanned questions and has less of an overall structure (Kvale & Brinkmann, 2015, p. 122). This is also similar to my method. I have a higher degree of structure and preplanning, but I was prepared to diverge from this should it be beneficial to the research. This also supports my role as an explorer rather than an expert drilling the teachers. In turn this leads to a more suitable interview environment. There were many instances during the interviews where this proved productive. Certain answers were completely surprising. This allowed for richer answers and more data. There were also certain points where the interview diverged onto a topic that was not directly related to intelligent writing software but rather the framework that led to the incompatibility of certain software and the issues that this resulted in. This proved that the method was serving its purpose. This happened in multiple other instances with more predictable results which has led to certain

topics that would not otherwise be included. Establishing an understanding of the terms used before the later questions also proved very productive. None of the four teachers had the exact same definition of intelligent writing software and some had completely different concepts in mind. When this was the case, it was needed to establish a common understanding without changing theirs.

Developing this common understanding happens through the participant answering question one (see appendix B) and me asking follow-up questions if there were any discrepancy between our understandings of the term intelligent writing software. The interview guide consists of ten questions. Question one ensures that the participant and I are referring to the same thing for the following questions. The earlier questions helped build a foundation for the later ones. This is not crucial but rather helpful. The reason for doing this is because I am as stated understanding *the other* (Postholm & Jacobsen, 2018, p. 96). Having a common understanding helps bridge this gap. My understanding stems from the literature presented in the literature review and the perceptions of the teacher. It is important to note that the teacher's understanding will not be deemed wrong, rather it is necessary to define what we are both referring to during the interview. This is to establish a common understanding so me and the subject are discussing the same subject. As stated by (Postholm & Jacobsen, 2018, p. 121) the knowledge is created somewhere in between the interviewer and the interviewee. The goal was to discover the teachers' perception but at the same time it was useful for information to flow in both directions. As stated earlier, the term intelligent writing software can be interpreted in many ways. Because of this, coming to a mutual understanding of the term was beneficial when analyzing the interview as well as reliability. This can only happen when information is exchanged, which means the interviewer has some influence over the interviewee. In this manner the information was not only coming from the person being interviewed but rather it was created between both parties. This supports the data analysis since it is quite difficult to do if there is no common ground to start the analysis from. Using a qualitative method allows one to understand certain things that one cannot exactly measure.

3.2 Semi structured interviews

My method is adapted based upon the topic. Because of the subtle nature of intelligent writing software, I have chosen to use a method somewhere in between a semi structured interview and a structured interview. (Postholm & Jacobsen, 2018, p. 121) states that a semi structured interview has preplanned questions and topics but the order they come in is not as important. My interview guide consists of 9 questions. The questions focus on the teachers' perceptions of intelligent writing software in regard to: pupils, adaptation, assessment, external factors and use and effects on learning. For these interviews it was important that certain questions came before others. The first question asks, "what is your understanding of the term intelligent functions in writing software in the English classroom" (see appendix B). This was important because of the many interpretations of the term. Therefore, a common understanding was established. The rest of the questions were structured in an order that flows naturally like a conversation. The topics are related to each other which results in smooth transitions. The goal in doing this was to create a comfortable environment for the person being interviewed. In certain situations, the order was sacrificed to gain further information. Doing so also allowed the associations of the teachers to come forth. There were instances where the teachers' associations differed from mine. Following their thought process to come forth allows for their experience to be presented rather than mine. Because of this the interview was more related to a semi structured interview than a structured one. My lack of experience made it helpful to have a structure to follow. I experienced this during my pilot interview. Having a familiar structure was beneficial while at the same time there were instances where the interview focused on things not necessarily planned for but were greatly beneficial. I therefore have a planned structure that is created to generate as rich as possible answers.

3.3 Piloting

Prior to the start of data collection for this master's project I piloted the interview guide to ensure its quality. I interviewed an English teacher in lower secondary school. The interview was conducted at the school using the Diktafon application created by the University of Oslo. The interview lasted 38 minutes, this does not include conversations before, or after. The

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interactions before and after both the pilot interview and the final interviews were important. The reason was that I wanted to create a comfortable environment for the participants, thus leading to more data and a greater chance of them telling me if they were uncomfortable or wished for something to be redacted. Creating a comfortable environment is also recommended by (Postholm & Jacobsen, 2018, p. 132). Using the pilot interview forced an early connection between the research question and the interview questions. Here I evaluated each question against the subtopic and decided if these were sufficient to cover my research question. After testing the interview guide, I revised it with my supervisor, and we formulated richer questions that allowed for even more information to be presented. Most questions became shorter and more open. For example, *To what degree have you been included when it comes to the choice of software the pupils are using* became *in what way have you been able to influence the choice of software.* There are also two more questions included in the final version to gain a broader understanding. The pilot interview allowed me to estimate the time requirements for the final interview and transcribing. Having this information proved beneficial when contacting the final subjects since I was able to give a more accurate and confident time estimate. The interview was recorded using my phone and the Norwegian Agency for Shared Services in Education and Research's (SIKT) Diktafon application. It was later transcribed using Microsoft Word. Here I got to test out the Windows encryption features as well as create an efficient way to transcribe future interviews. As stated by (Kvale & Brinkmann, 2015, p. 128) it is difficult to assess what time and resources a project will demand beforehand. This proved to be the case. Most importantly it allowed me to get some experience with interviewing and transcribing the interviews. This benefited the process by allowing me to reflect on my role as an interviewer in a more concrete manner. Using the information and experience gained from the pilot interview I was able to adjust the interview guide. Question 1 and 7-9 had originally planned follow up questions. These were incorporated into the main question. The goal in doing so was to create more concise and open questions so that the teacher could easily give rich answers. The participants provided rich answers. It seemed, however, that the participant was well informed and genuinely wanted to be helpful. Because of this I realized that I needed more open questions seeing that a less informed or helpful individual would have resulted in

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lacking data. Because of this I changed the interview guide to have more open questions. I also restricted my role as interviewer. The transcription of the interview revealed that my role as interviewer often ended up creating unnecessary breaks in the interview. The pilot interview had too many similarities to a conversation. This resulted in me participating to a smaller degree during my final interviews. I only interfered when necessary to clarify a statement or meaning.

3.4 Participants and data collection

The participants in my study are four female English teachers working in two schools. The teachers' experience spanned from around 3-20 years. This meant their experiences spanned for a significant part of the timespan intelligent writing software has been used in Norwegian schools. Both schools are rural but are geographically distant from one another. The schools were small to medium sized. The requirement for participating was that the teacher taught English and worked with pupils in the 5-10th grade. This was to maximize the chance of their pupils using intelligent writing software and still being withing my own area of experience. It also allows for insights into how the use of intelligent writing software is affecting evaluation. The production of longer text usually increases in the later years. This means that the use of intelligent writing software should also increase. This also coincides with an increase in evaluations that occur. In the later years pupils are evaluated much more frequently and by standardized tests. Because of this focusing on this group provides more data. It also allows for the inclusion of standardized tests. The interviews for the study were conducted in South-western Norway. More specifically, this was done in a city of larger size and its surrounding area.

Recruitment happened through phone calls directed at the principals at the schools. I contacted 9 different schools in the middle of February. Because of vacations and extracurricular activities, it took two weeks to get an answer from most schools. This included one positive one that was later discouraged by the intimidating nature of the subject. After this I recruited in person, which was done in the first weeks of March. This also gave the opportunity to explain the project in more detail to the teachers included rather than explaining it to the principal. In

general, the teacher seemed much more confident in their ability to participate after this. This resulted in four out of four teachers asked wishing to participate. Since the recruitment process took longer than expected and left little time for transcription and analysis, I stopped at a sample size of four. The sampling was largely a convenience sampling given the limited time and resources afford to the project. The data does not show any trends that would suggest this has impacted the final results of the study.

3.5 Transcription of interviews

The interviews lasted from 16-26 minutes. After the interviews were complete, I transcribed the audio using Microsoft Word. It was important that as much information as possible was extracted from the audio. Some words were intelligible because of the audio quality or noise during the interview. The audio was played back at a speed between 0.6-0.7 times the original speed. This allowed for a workflow that was efficient since I was able to type at the same rate as the speaker speaking. All personal or identifiable information has been redacted in the transcription to ensure the anonymity of the participants. This ranged from names, pronouns to number of pupils in a class. In the documents the interviewer is identified as "I" and the participant is identified as "O". The transcriptions were done by me because of a lack of resources. (Kvale & Brinkmann, 2015, p. 182) states that consistency is important when transcribing either in between the people doing it or how it is done. Having transcribed the pilot interview helped familiarize me with this process and ensure that all the interviews were transcribed in a similar manner. When transcribing I write it in Bokmål, signaling pauses with (pause) and commas to signal smaller pauses or natural breaks in between sentences. All other notable sounds or actions was noted in parentheses. My reason for transcribing in Bokmål stems from the differences in dialects in my participants. Writing a direct transcription could be an identifying characteristic and was therefore not included. This does not influence the final results in any meaningful manner since all included examples were translated into English. Therefore, any potential nuance of the dialect or language was lost in the final text. When translating the text into English I chose to keep mistakes since these provide data in certain situations. Because of this it is more efficient to transcribe the audio into Bokmål.

3.6 Data analysis

In this part I present how I have analyzed the interviews. I have condensed the data using phenomenological analysis to make it presentable within the scope of the thesis. My method is a combination based upon the two methods presented by Postholm and Jacobsen (Postholm & Jacobsen, 2018, pp. 160-163). It has been adapted in some ways that will later be specified. Using interviews leaves a lot of data material to be analyzed creating the need for a proper way to compress it. (Postholm & Jacobsen, 2018, p. 160) agrees with this sentiment. Using a phenomenological method provides a way of compressing the data. My method requires a common understanding to be created within the first question. Because of this it was important that I was aware of my role and how it might affect teachers.

During the transcription and analysis, I did each step with each interview before moving onto the next. My reason for doing this was to ensure that I had a similar amount of experience regarding the process throughout all the text. If not, my experience would be vastly different from the first interview to the last. The first step was reading the whole text then rereading it and picking out units of meaning based upon the meaning gathered from the first read. Then I sorted these units based upon the teachers' statements and the research question. I lastly created phenomenological statements and cross examined these. I began with reading the whole text as stated by (Postholm & Jacobsen, 2018, p. 160). The reason for doing this is to get a full understanding of the text and what the participant was conveying. This helped me stay consistent in the next part which was picking out units of meaning. (Postholm & Jacobsen, 2018, p. 161) states that one should pick all units of meaning that are non-repeating. For the sake of accurately representing the data and transparency I chose all parts that had importance even though there might be overlap. When selecting the data that was going to be further analyzed I chose everything that was relevant to the research question, including repeating sentiments and/or relevant information stated by the teacher. An example of this is the mentioning of digital framework. For one teacher interviewed this had major impacts on their use of intelligent writing software and it needed to be included. Allowing this influence allowed for crucial information to be included.

Once the transcribed text was selected, I sorted it depending on its topic. The data was sorted based upon the relevant subcategories in the interview guide and potential topics brought up by the teacher. This again was based upon Postholm and Jacobsen's directions regarding coding (Postholm & Jacobsen, 2018, p. 160). The codes grew naturally from the transcription or the topics of the interview questions. The selected raw data was placed in a column to the left and the phenomenological statement on the right. Statements relating to one another are placed in the same row. An example is shown below.

Table 1

Like IntoWords or eeh those who help you find words or sentences or letters in relation to education. The words you use its about the intelligence that helps you as a writing aid. Intowords is a software that we have tried to use here at the school that can help you with suggesting words or it can help you have correct sentence structuring and right word structure and helps you by and large by suggesting things or pronunciation or how you should say and use words.		The teacher associates intelligent writing software with Intowords and software that helps the user find words, sentences or letters. Intowords helps with suggesting words, sentence structure and pronunciation.

This allows for repeating data to be excluded while keeping the nuances of the statement. The data was placed into the category it was most closely related to. After this all the statements were analyzed phenomenologically. This was done based upon the directions of coding that were provided by (Postholm & Jacobsen, 2018, p. 160). At this point I looked at statements that were similar. If their meanings were identical, they were sorted under the same category and their phenomenological meanings combined. My reason for this was that the two original separate statements provide evidence of the teachers' views and their nuances. For example, a teacher mentioned IntoWords twice. This software claims to correct texts, and suggests words, grammar and formulations based upon context (VITEC, n.d.). Both times they mentioned how it was used, from there they talked about how it works as a writing aid and the second time they mentioned its features. This was then combined into a single phenomenological statement that encompasses all three meanings. The structured manner of this helps with analyzing the text in the next step since it prevents missing information or merging separate statements. This allows for an easy comparison of the different views of the teachers. Looking at the data I was able to cluster them together to represent larger concepts as stated by (Postholm & Jacobsen, 2018, p. 160). These clusters of information were used when comparing the different teachers' views to one another. Having the data compressed in this manner also allows for trends to be more easily observed, this includes potential influences that might be present. My method for analyzing allows for the core of the transcription to be presented without including vast amounts of largely extraneous text. Without doing so it would have been challenging to compare the data. When comparing the data, I made a document where the topics were presented vertically while the categories; same, different or rest were presented horizontally. This is shown in table 2.

Table 2

Topic	Phenomenological Statements	Same	Different	Rest
Assessment	The teacher perceives Google Docs as mostly able to correct pupils text and the proficiency of certain pupils to be extreme. They also show at least a lower understanding themselves. They experienced its (ChatGPT) use as efficient and seem slightly embarrassed using it. The teacher perceives ChatGPT as a productive tool that is able to correct text both on a general level and a smaller level. The teacher has previously combined ChatGPT and Into Words to help create tasks in English. The teacher encourages awareness of how the software works and how the pupils can use it more efficiently. The teacher again expresses rising academic expectations due to the increase in resources for the pupils.	Teacher 1 and 3 seem to agree on there being a certain subset of pupils that are able to use Intelligent writing software at a higher level. Teacher 1 and 3 are both positive to the use of Intelligent writing software. They both encourage awareness of its use. Teacher 3 and 4 both adapt their feedback depending on the tools that were allowed during the assignment.	Teacher 1 has used ChatGPT for giving feedback. Teacher 3 uses Grammarly and attempts to make their pupils aware of it when using it in a correct manner. Teacher 3 does not compensate for the lack of feedback stemming from the pupils not using the software. Teacher 3 does not change their evaluation criteria depending on use but 4 does. Teacher 4 has to compensate for the software's lacking functionality. Teacher 1 fins that the software mostly does this	

The transcribed texts are marked with different color to ensure their separation. The vertical topics are the general topics that were extracted from the previous step. This means that not all teachers have data included within all categories. One would expect this since the teachers have different ways of operating and using the software. The categories were assessment, adaptation, adaptation and learning challenges, teachers' attitudes, teachers perceived use, pupils' attitudes, pupils use, external factors and ChatGPT. Assessment is self-explanatory whilst I have divided adaptation into two categories. The reason for this is that the adaptation for learning difficulties (specific) and the (adaptation for) general classrooms were different. It is also valuable to have data on the adaptation for pupils with learning difficulties specifically. Separating teachers and pupils use of intelligent writing software is useful since it can then be compared with their attitudes. This data was still important to include but was not fitting for any other category. External factors are all outside influences that in some way influence the use of intelligent writing software or its didactical implementation. ChatGPT was included as a separate category since its new status and advanced technology makes it untypical compared to other intelligent writing software.

All the phenomenological statements were placed within the categories mentioned above. It was not possible to place a phenomenological statement completely within a category without either having an even larger number of subcategories or restricting their nuances during the phenomenological analysis. Because of this some sentences are included in two categories. For example, Teacher 1 talked about their use of ChatGPT to give feedback. This data belongs in both the subcategory of ChatGPT and assessment. I have chosen to do this to avoid the loss of data during the analysis. The columns were sorted into Topic, Phenomenological statement, Agree, Disagree and Rest.

When using this system, I was able to sort the data into parts that are easily understood and cross examined. The same column allowed me to look at statements from different teachers that were similar and sort them together. As stated earlier it is important to include the nuances of this therefore, I have the different sections. Here the differing opinions of teachers are included. This could be a difference in something they largely agree on but choose different practices or statements that are in opposition to each other. An example is Teacher 1 and 4's use of ChatGPT. What they have in common is their use of ChatGPT in a classroom setting. Teacher 1 generates tasks and evaluates texts with it while Teacher 4 generates example texts. This information was put into the *different* column of the table 2. The rest column serves an important function. It is easy to categorize a statement as agreeing or disagreeing with some other sentiment. This forces the data into categories it might not belong in and reduces the reliability of it. Because of this I have the rest part to include data that does not agree or disagree with other sentiments. The result is that the data is sorted without losing details. This is also reflected in the results where answers often belong to two categories. A reason for this could be the semi-structured nature of the interview. The different interviews most often covered the same topics without necessarily corresponding to the same questions. Because of this the results are structured after the subcategorize stemming from the analysis rather than the original questions.

3.7 Reliability and validity

In my master's I have had a focus on being transparent and open in the manners of how I have conducted my research and why these methods have been chosen. My understanding of reliability and validity stems from Jacobsen and Postholm. They state that reliability is to what degree one gets the same results when using the method at a different time (Postholm & Jacobsen, 2018, p. 223). They explain validity can be divided into two. This is how accurate are the measurements being made and how accurate are the conclusions made from these measurements (Postholm & Jacobsen, 2018, p. 223). In this part I discuss the steps I have taken to ensure the accuracy of the study.

When creating the interview guide it was crucial that it corresponded with the research question. When creating the research question, I considered to what degree it was researchable. This forced me to consider some outlines for the questions. The questions were later created and revised with my supervisor. It was then piloted and revised first by me then by then with assistance of my supervisor once more. The data from the pilot interview was all relevant to the research question. This showed that the questions were accurate enough and thus valid enough to proceed. The adjustments made were mainly to gather even thicker descriptions to ensure the validity of the phenomenological statements drawn from the data. Looking at (Postholm & Jacobsen, 2018, p. 223) both forms of validity are covered here.

To mitigate my influence, I have minimized my own participation as much as possible to let the view of the subject stand on its own with minimal influence from me. I asked open questions, only participating with affirmative sounds or words to validate the teacher. I made sure to take time before making follow up questions to make sure they were not leading. Most of these follow-up questions were specifically to make sure that the view of the participant was presented clearly and accurately. This was of course done after they had fully answered so as to get as much information to evaluate the information resulting from the follow-up. Doing so made sure the accuracy of what was being said was higher and also followed the sentiment of (Postholm & Jacobsen, 2018, p. 223. I also made it clear that the focus of the study was their understanding and their experiences. The goal of doing this was to ensure two things. The first

was that the teachers felt confident in their own experiences during the interview. It was a common experience that teachers felt they lacked knowledge or experience on this topic. Since most teachers use writing software of some kind, I assured them that this was unlikely and that a lack of knowledge was still data to me. The second was to avoid them giving answers they think I want to hear. The goal here is once again to be accurate.

In the first round of recruitment, I received feedback that they felt they lacked knowledge in the area and wished not to participate. Because of this it was necessary to provide some information regarding the topic to ensure that the teacher realized their own knowledge regarding the topic. Because of this the data regarding what intelligent writing software is in the first question is unreliable in certain cases and these are mentioned when brought up. This also stems from a need to establish a common understanding of the term for further use in the interview. During times of misunderstanding or differing views it was important that a common understanding was established but that no information was lost. It is also important to consider the teachers' standpoint during the interview. No teacher wants to come across as incompetent. During my pilot interview I experienced this, and it was clear that it was important for the teacher that they came across as competent. There was also a concern that the teachers' views might have been influenced during the research process due to this wish. What is meant by this is that once the teacher is participating, they might do their own research and inform themselves.

As stated by (Kvale & Brinkmann, 2015, p. 92) the relation between the interviewer and the subject can be a point of contention. Because of this is important that I evaluate my role and the role of the subject when interviewing. Qualitative research is always challenged by its reliability and how reproducible it is. This is especially true for a study with the sample size of mine and being geographically confined. The sample makes it more statistically likely that misleading trends present themselves. As Postholm & Jacobsen states there are two ways to mitigate this. These are being transparent in how the research is preformed and reflection over one's own influence in the study (Postholm & Jacobsen, 2018, p. 224). No part of the study is hidden other than confidential information regarding the subjects. The small sample size also

means that the chance of reproducing the exact same information is less likely than with a larger one. Reproducing the study is also challenged by the follow-up questions. These can not be recreated since they are specific to the situation.

An issue that needs to be addressed is one of translation. When transcribing the information from different Norwegian dialects into Bokmål some information is lost. This was a necessary sacrifice to keep the information of the different teachers anonymous. Southwestern Norway is an area with distinct dialects that can easily be located. Because of this I chose not to use a direct translation. When transcribing the information from Bokmål to English even more information is lost. The main thing that is lost was the nuances of meaning in the descriptions of each participant. The participants have different ways of formulating sentences and vocabulary. These were homogenized during my translation. I have made an effort to influence the texts as little as possible but translating requires certain choices at points and those are inevitably made by me. Because of this the variety in language and expressions will be smaller than if it were in Norwegian. Having interviewed the person being transcribed allowed me to mitigate this to some extent since I possess a large amount of information regarding the interview. To increase the reliability further, each step of each process in the analysis was performed after one another. This meant that I transcribed each interview before analyzing any of them. I then began by reading all the interviews and gathering clusters of meaning and so on. This meant that my experience from one interview to the next was as similar as possible. These selected parts were then analyzed with the text in mind. Doing so resulted in subtopics that were created based upon the research question and the individual views of the teacher. The information in these were then phenomenologically analyzed. This allowed for an easy overview, and because of this I was then able to create a table for cross analysis of the interviews. This included assessment, adaptation, adaptation for learning challenges, attitudes of teachers, teachers use of intelligent writing software, pupils use of intelligent writing software, pupils' attitudes, external factors and ChatGPT. Doing so ensured both validity and reliability since it was a structured repeatable method that influenced the data the least amount possible.

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The way we see the validity here is by comparing the subcategorize to the original research question. What relation do English teachers in 5-10th grade have to intelligent writing software, and how do they facilitate for students' digital writing skills in English? There is a direct correspondence between the nine questions (Appendix B) and the final category presented. Assessment, adaptation, attitudes, use are all directly connected to the research questions. Certain topics like pupils' use and attitudes reflect the teachers' perceived notion of their use and adaptation and gives insight into the environment these tools are used in. Lastly, looking at external factors we see some of the teachers influence the analysis. This was never planned as a part of the study but was necessary to validly portray the teachers' attitudes and facilitation. The combination of software and hardware proved to be the main factor in how a teacher conducted their lessons using intelligent writing software. Excluding this would have been dishonest and reduced the validity. Therefore, we see that the research method has answered the question and adapted to circumstances of its use.

3.8 Ethics

Ethical issues are of a high concern when studying the lower levels of the educational system. My focus is on teachers and not pupils, which mitigates most of this. My project closely follows the guidelines of the Norwegian National Research Ethics Committees (NESH). Following these ensure that the interview and processing of the data is ethical. Furthermore, the project has been approved by the Norwegian Agency for Shared Services in Education and Research (SIKT). There are still some areas of concern that are worth discussing in relation to the NESH guidelines. Most of the ethical concerns regarding the project revolves around section B in (Norwegian National Research Ethics Committees, 2022, p. 3).

The first concern was gaining informed consent from the participants in the study. As stated, "Ethical consent to participate should be voluntary, informed, and unambiguous, and it is preferably documentable." Norwegian National Research Ethics Committees (2022, p. 20). To achieve this, I have used the SIKTS's template to create an invitation for all willing participants (see appendix A). This document first informs the participant of what the purpose of the study is. Secondly it informs the participant of what involvement in the study would require from

them. This was done both orally and using a written consent form. It clearly stated that participation is completely voluntary, and that consent can be withdrawn at any moment should they wish to do so. The invitation also provides contact information to facilitate this or any questions that might arise. It is also clearly stated when all the information would be anonymized. Lastly there is a line to sign if one wishes to participate. This ensures that the participant is informed before they sign it. Doing so also makes the process of gaining consent as ethical as possible. It also fulfills the last requirement which is the documentation of the consent process.

The second concern is ensuring anonymity of the participants. (Norwegian National Research Ethics Committees, 2022, p. 23) requires that the project protects the identity and integrity of the individual. It also points out the distinction between collecting anonymized data and de-identifying information. My project achieves anonymization using a cipher where the participant is only identified as O and the interviewer as I. This means that the project falls into the de-identifying classification. All identifiable information is not included in the transcription and the original audio is encrypted. This is achieved through the use of SIKT's Diktafon application's local and cloud-based encryption as mentioned earlier and Windows' built in encryption. No names, locations, or other kind of identifying information is written down. The original audio files were encrypted during the transcription then deleted. I have also carefully considered how the combination of necessary identifiers might be combined to help identify the person. I have therefore included only information that is strictly necessary. This mitigates any reasonable concern for re-identification. "Re-identification refers to a residual risk that individuals may be identified, including by non-researchers, even if the initial information does not identify any individuals." Norwegian National Research Ethics Committees (2022, p. 25).

Another concern that is precent is the risk of harm and disadvantage (Norwegian National Research Ethics Committees, 2022, p. 27). The main concern here is question 8 in the interview guide (see appendix B). This question asks about the teacher's involvement regarding choice of software. Depending on the level and manner of involvement in this choice, the teacher could have a negative impact on the school's public image and thus themselves. This of course only

occurring should they be de-anonymized. (Kvale & Brinkmann, 2015, p. 93) agrees with this concern and explains that one of the four main parts of an ethical protocol is consequences. This could then have a negative impact on the teacher's career. This also aligns with the risk of damaging the participant's reputation (Norwegian National Research Ethics Committees, 2022, p. 27). The manner of representation and analysis of question 7 (see Appendix B) is also of importance. It needed to be accurate while at the same time not damage the reputation of the school or the teacher should it ever be de-anonymized. This requires a balance between not distorting the information as is discussed by (Norwegian National Research Ethics Committees, 2022, p. 16) and not bringing potential harm to the participants should the data somehow be leaked or decrypted. Understanding teachers' involvement in the process of selecting the software helps reveal to what extent pedagogical and didactical issues are of importance during this process. Because of this it was important that the question was included. The anonymization and ability to withdraw from the study helps mitigate this risk for the teachers involved. This should suffice that the teachers do not suffer any consequences from the participation of my study. Lastly, I have included the Norwegian national research ethics committees' letter of approval for the research project (see appendix C).

4 Results

In this part I present my findings. They are sorted based upon the different subcategorizes generated in the analysis process. The data presented corresponds with the general findings of the analysis. Where needed I use examples directly taken from the interviews to show the nuance and details of the situation. I begin with the teachers' attitudes towards and then their perceived use of intelligent writing software since this gives the broadest context possible for the rest of the results.

4.1 Teachers' attitudes towards intelligent writing software

All teachers have a general positive view regarding the use of intelligent writing software in the classroom. They all have differing opinions regarding that constitutes intelligent writing software and what features should be included. Teachers 1, 2 and 3 believe that the software supports the learning outcome of the pupils. Teacher 1 elaborates on their view stating that

they wish to use intelligent writing software as a learning tool, but they do not view it as inherently a learning tool. It requires pupils to consciously use it. The teacher is questioning the actual learning outcome that stems from the corrective functions in intelligent writing software. It seems to reflect the findings in the adaptation part. One of the main concerns of the teachers was that the pupils were using these tools without any regard for the outcome. Here Teacher 1 directly questions its usefulness as a learning tool, putting the emphasis on how one uses it. Teacher 4 has limited access to functioning intelligent writing software but suspects that its use can support the development of vocabulary. The teacher specifies this happening through the pupil's awareness of silent letters being raised. This view stems from previous experience with software on Chromebooks rather than the current iPads. According to Teacher 4 there is severe lag and the keyboards on the iPads are bad which leads to a lot of frustration and lack of use. Teacher 2 has a unique appreciation for a software called Book Creator. It has a focus on multimodal text creation. It uses the built-in corrective features of the device or browser to provide correction according to them (Kemp, n.d.). The teacher specifically mentions the creative opportunities presented with this software. They also mention that the software is integrated in a cross-curricular manner, meaning that the pupils and teachers have gained a lot of experience using it.

One can compare this to Teacher 1 and 3 who both express feelings of inexperience regarding intelligent writing software meant for providing support to pupils with dyslexia. Teacher 1 finds the software quite cumbersome and has had some difficulties gaining experience with it. Teacher 3 has some more experience with the software they use. They still express that they wish to understand it better, but they lack the time. The motivation for this is to help the pupils. The teacher views this as an ongoing process. Teacher 3 has a productive approach to the use and learning of intelligent writing software. They want to improve their use of the software and have set a goal of doing so. The teacher says that they are in the process of doing so and wishes to bring their pupils along. The second factor is the lack of time for this process. Later the teacher stated that the team has a goal of improving their use of technology. With this being true we still see some critical and reflected attitudes coming from Teacher 3. They wonder if the pupils should see their mistakes when writing. This is stated in relation to the personal use

of Grammarly to help the teacher correct texts. The question shows that the teacher has given this some thought and provided an interesting question for further didactical exploration. Teacher 3 also believes that a lot can be gained from not using computers. Teacher 4 shares a similar opinion stating that they believe that the pupils have screentime that is too high. Teacher 4 has a generally positive attitude to the use of intelligent writing software but believes that removing screentime is positive for the pupils. They also claim that they have investigated it at their school. Teachers 3 and 4 are both positive towards the use of generative writing software. Teacher 4 believes it needs to be taught properly not to be misused and that it will become a great tool once properly used.

Teacher 3 has a few criteria for what constitutes an intelligent writing software. The first is that it needs to be multifaceted. What they mean by this is that it has suggestion features, corrects texts without being in the way. Here they mean software that allows them to correct pupils' text while still showing the original mistake while also showing the correction that has been made. They also require that the software is multilingual. Interestingly Teacher 4 on the other hand at first associated this with software intended to help pupils with dyslexia. According to Teacher 4 doing so means that it is able to suggest words, sentence structures and pronounce the text. Teacher 1 views it as something that corrects the pupils' texts but does not further elaborate. Teacher 2's first understanding was invalidated because of the circumstances and is not included. We see here that Teachers 3 and 4 share many of the same expectations of the software. Teacher 2 also shares some of their views on it while being more general.

Both Teachers 1 and 4 find Google Documents quite cumbersome. Google Documents is an intelligent writing software that has a focus on collaborative writing (Google, 2023b). From personal experience and data from the interview it is clear it has fewer corrective features than Microsoft Word and Grammarly. Teacher 1 finds it confusing while Teacher 4 has technical issues with its combination stemming from both hardware and software. Teacher 4 recommends the use of Word and believes this could correct a lot of the most frequent bad habits that the pupils develop. This is stated based upon personal use. Teacher 2 believes that teachers have a better understanding of what pupils need regarding intelligent writing software

than administrators. They also have higher expectations regarding autonomy, spelling and general academic achievement when using intelligent writing software. This is especially true for older pupils. Teacher 3 stated that they are not as strict when correcting handwritten texts and sometimes they are not corrected at all.

Teacher 1 and 3 both state that there is a certain subset of their pupils that are able to perform well with the intelligent writing software. A difference here is that Teacher 3 thinks there is a "right point" where the pupils can use the software to a greater degree. The wording brings out an important difference, Teacher 1 stated that "It needs to be said that some students in my English class are extremely proficient (Google Documents)" whilst Teacher 3 stated that "I think that it can help the ones that are at the right point. I think that some just click on the suggestions and just get even more confused." The wording suggests that Teacher 1 believes that there is a certain subset of their pupils who are very proficient in using Google Documents while Teacher 3 views it as a certain threshold that one can enter and afterwards be proficient. Teacher 3's previous statement connects to this "right point", and it seems that this is defined by the awareness of the pupil.

Lastly something that needs to be noted is that the teachers' use of software shows that intelligent software is not as clear as one might think. We have seen one teacher mentioning using PowerPoint in the same manner as intelligent writing software. Even more revealing is the fact Teacher 1 uses Skolestudio as an Intelligent writing software. Skolestudio is primarily a learning platform that provides books. It has writing capabilities but lacks corrective features. Because of this the line of what is and is not an intelligent writing software is even more blurred.

4.2 Teachers' perceived use of intelligent writing software

Table 2 shows all the intelligent writing software that was mentioned being used during the interviews.

	Google Documents	Into Words	Lingdys	ChatGPT	Word	Power Point	Grammarly	Book Creator	Skole Studio
Teacher 1	x	x		x					x
Teacher 2			x		x	x		x	
Teacher 3	x	x	x		x		x		
Teacher 4	x	x		x					

PowerPoint is usually not considered an intelligent writing software but falls within the definition established earlier since it has corrective and suggestion features. It can also serve many of the same purposes as a more traditional intelligent writing software. We see from table 3 that Google Documents and IntoWords are the most prevalent software among the teachers interviewed. The teachers are in general aware of what software is being used but not necessarily the features within them.

Teacher 2 mentions in their interview that they have a focus on creative output and ease of use. The software they use reflects this. Both PowerPoint and Book Creator have a lot more features that allow for creative exploration compared to the others. At the same time, they mention working with younger pupils. This combined with the mention of the ease of use being important to them makes it unclear if this focus is driven by younger pupils or purely a want for more creative expression in the classroom. Teacher 2 explains that a part of what makes it easy to use is the fact that Book Creator has been implemented in all subjects where it is useful, allowing for the pupils to develop experience using the software for different purposes. We see Teacher 3 trying to achieve something similar regarding IntoWords and Lingdys. Lingdys is a software that offers support for pupils with dyslexia. According to them the school version

offers features such as scanning text from a screen, word suggestion, converting text to speech. Some of the more usual intelligent writing software features such as spell check require a *plus* version (Lingit, 2023). Teacher 3 is trying to implement Lingdys in as many subjects as possible with as many pupils as possible. The goal is to achieve a universal design to benefit as many pupils as possible.

Teacher 3 is an outlier in their use of Grammarly. This is something they have brought up with the IT department and had installed on all the pupils' computers. They also make a constant effort to make sure that it is turned on so it can be used. They state that the use of this software has mixed results. One feature that Grammarly excels in is its explanation features. The teacher stated that this is something they do not use because of a lack of interest from the pupils. Some pupils can use it and see a great benefit according to the teacher. The explanation feature is also somewhat limited by the free version the pupils are using. According to Teacher 3 it is still quite useful in the 8-10th grade. The teacher believes that Google Documents has a feature that allows for the marking of grammar mistakes but realizes during the interview that this is not the case. This shares a general sentiment shown throughout all the interviews of teachers not really being sure what is allowed or not allowed. Teacher 2 has stated that "They're allowed to use everything (Autocorrect, spell-check, grammar-check). If they're allowed to use it for everything I'm not sure, I can't answer that.". Here we see they are unsure of when everything is allowed. Teacher 3 has a similar awareness stating that "I think I allow all of them eeeeh we are working on implementing that all the pupils have access to the same resources because then its that". This again shows that the teachers are not certain of what software or features are allowed.

4.3 Adaptation of intelligent writing software

The study finds that all the teachers allow all features of the intelligent writing software. The amount and awareness of adaptation varies significantly.

Teachers 1,2 and 3 have all allowed all intelligent writing software corrective features. Teacher 4 stated that all features are allowed but the pupils have turned off autocorrect since they find it frustrating because of its frequent mistakes. They claim that there is a daily attempt to adapt

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to the technology provided. At the point of the interview, they have not found a solution and often resort to writing by hand instead. Teacher 3 also differs here given their reasoning for allowing all the features. The choice of allowing all the features is a step towards a universal design which they believe is beneficial to all the pupils. They have also tried to have headsets available in all lessons that are writing focused since it helps pupils with dyslexia, and it helps all pupils discover spelling mistakes or misused words.

Teachers 1 and 2 have a common understanding that they both do not adapt for the inclusion of intelligent writing software. Teacher 2 to a larger degree. Interestingly they both disprove themselves later in the interview showing that their focus changes when using intelligent writing software. Teacher 2 states that the same as previously that they have higher expectations of the pupils when using intelligent writing software but following it with "I do not really plan all that differently, I don't know if I do.". They think they do not plan differently but have different expectations. Teacher 1 states that "Well adapt and adapt (laughs) umh, I, have, used, well I have used writing software and that's about all we have used". The teacher goes on to explain their purpose for writing by hand. Teacher 1 has adapted their lessons by not allowing the use of Google translate something that they have in common with Teacher 3. Teacher 1 states that "I don't feel I have adapted except that I encourage the pupils to look at the squiggly lines, not everyone does that. Why does the line show up? Not everyone cares about or notices it (laughs) at all". This again is something they have in common with Teacher 3 who stated that "They click, see a line and don't think about it. I try to make them aware that they actually need to use their head and consider what they are clicking.". Here both teachers share almost the exact same sentiment regarding the use of options in intelligent writing software. They both have adapted to a circumstance which is the pupils lack of critical thinking when using the software. To counter this, they have both focused on the pupils being conscious of their use of these features. Teacher 2 also adapts the use of intelligent writing software dependent on the length of the text that is expected. They also seem unsure of this, stating that they allow all features but are unsure if this is the case for all activities. Their motivation for doing so is to achieve a better result and learning outcome. Teacher 2 is aware of their

motivation to use the software but both Teachers 1 and 2 seem unaware if they plan differently.

4.4 Adaptation of intelligent writing software for learning challenges

The teachers interviewed are focused on using intelligent writing software to benefit the learning outcome of pupils with learning challenges. Teacher 1 shows a greater awareness for the accessibility features of the intelligent writing software compared to general corrective features.

Teacher 1 stated that the combination of IntoWords and Google Documents can be quite good for pupils with learning challenges. This is in response to a question regarding how the teacher adapts for the use of different software in the classroom. Its significance comes from the focus on pupils with learning challenges rather than general adaptation. This shows a general focus and concern for how these tools can be used to adapt the learning environment for pupils with learning challenges.

Teacher 2's interview shows that they have considered how Lingdys affects their lessons and their measures to adjust for this. There are some challenges brought up regarding the pupils still needing to be able to read the word in English to use the software. The teacher also shows awareness regarding the social effects certain intelligent writing software might have on pupils. Teacher 2 states that it takes time for pupils to accept they need more assistance. Some prefer using iPads over computers since it does not attract as much attention. Pupils with dyslexia are always supposed to use Lingdys on their computer. Some like it since they get extra help. Teacher 2 shows an understanding of how intelligent writing software might have an effect on the relations within the class and reasons why some pupils might not want to use it. The fact that the pupils are always supposed to use it brings up two things. One is that the inclusion of their software should always be considered. The second is that it is framed as "supposed to" which makes it uncertain if this is always the case. Here we also see how the adaptation of hardware can have an impact on the comfort of pupils. The teacher has to make a decision between the comfort and potential embarrassment of the pupils and the learning outcome. Based upon the first sentence it seems that this is something that improves with time.

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Teacher 3 explains that the pupils who are dyslectic and proficient in English also are quite good at using Grammarly's explanations. The teacher has a focus on universal design and adapts their lessons accordingly. Here the goal is to develop a classroom that supports the learning of pupils who have certain learning challenges while also providing an environment that supports all pupils. To achieve this the teacher is trying to implement Lingdys and Grammarly in a cross curricular manner. The use of intelligent writing software necessitates headphones which is the biggest change the teacher has made. They believe that if you adapt for dyslexic pupils you have adapted for a lot of other diagnoses. Pupils tend to realize their mistakes when texts are read aloud. This is a sentiment that is largely shared by Teacher 1. They find that using IntoWords has a beneficial effect on the learning outcome of pupils with autism, dyslexia or other learning challenges.

4.5 Teachers' perception of pupils' attitudes towards intelligent writing software

There is a divide between the teachers' perception of pupils' attitudes towards the software. Some of this stems from technical challenges. Teachers 1 and 2 have a shared perception that pupils in general are happy about getting to use computers in general. This answer comes when asking about pupils' attitudes towards intelligent writing software. Teacher 2 confirms that this is particularly when writing on computers. For Teacher 1 we can assume this is also the case since the answer came when asking about pupils' attitudes regarding intelligent writing software. This means we can extrapolate that the pupils are happy to write since it is on a computer. Teacher 2 gives further details specifying that the pupils prefer Book Creator then PowerPoint and lastly Word. This suggests that Teacher 2's pupils like the multimodal creative aspects of using intelligent writing software. In contrast we see Teachers 3 and 4 express that their pupils lack interest in using the corrective features that are presented to them. Teacher 3 stated a lack of interest from most pupils when it comes to the explanation feature of intelligent writing software. The pupils' focus is on the grades they receive rather than feedback both from the intelligent writing software or the teacher.

Teacher 4 explains that the software in general works poorly and frustrates the pupils. It is confusing to the teacher that they do not complain about Google Documents specifically since

they themselves find it frustrating. They also mention autocorrect specifically being frustrating since it makes mistakes, so most pupils turn it off. Teacher 4 also believes that some of the lack of use stems from the pupils being too lazy to use the features that are available. They state that the pupils that chose to use them are quite pleased. The teacher states that they expect the older pupils to not be as frustrated and appreciate intelligent writing software more since they are able to use computers compared to iPads. The pupils have also developed an impression that they are not supposed to correct or edit texts that are written by hand. Teacher 2 has a similar experience stating that "would say they are quite happy when they get to write on PCs or iPads instead of in a book. It's almost like they won't write if they have to write by hand.". We see here a general lack of interest and willingness from the pupils when they are expected to write by hand. When writing in intelligent writing software editing and correcting texts have been a focus but not all pupils bother to do it.

Teacher 2 states that pupils who are dyslectic or have other reading and writing challenges need some time to accept that they need a bit more help. As stated earlier here there is a difference between the pupils' attitudes towards computers compared to iPads. This contrasts Teacher 4's beliefs since Teacher 2 believe the pupils prefer iPads since they are more discreet compared to the computers leading to there being less focus on their challenges. After some time, the pupils are usually more ok using it and appreciate its help.

4.6 Teachers' perception of pupil's use of intelligent writing software

The teachers perceived the pupils as unaware in their use of intelligent writing software. Teacher 1 states that "I don't feel I have adapted except that I encourage the pupils to look at the squiggly lines, not everyone does that. Why does the line show up? Not everyone cares about or notices it (laughs) at all." (Teacher 3) The pupils are also quick to accept the changes or suggestions made by the teacher without trying to understand why it is wrong. Even when the pupils are using corrective features the teacher is unsure if this creates a learning outcome. They state that it is a lot of nitpicking, but the learning outcome is uncertain for the pupils. Teacher 3 states that "They think they're getting good help something that turns out to be false. […] I try to make them aware that they actually need to use their head and consider what

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they are clicking. If they do that a lot of the work has already been done." (Teacher 3) There is a similar sentiment from both teachers here regarding the pupil's use of the software. They both experience their pupils using the software without thinking about what the software is doing or how it is affecting their learning outcome. We see that both teachers focus on the awareness regarding the pupils' use of the software. We also see similar concerns regarding the use from Teacher 4 which states "The problem is Google Translate which is used a lot because they translate and they think it's good enough. It's not always good enough English." This is another example of the pupils using functions equal to those of intelligent writing software, suggesting that this is recurring in multiple classrooms. Teacher 2 also touches upon this briefly stating that the use of the suggestion feature in the software is something that needs to be practiced. The go on stating that this is something the older pupils have become better at and resulted in them realizing it improves their language.

This may relate back to Teacher 3's statement regarding a certain point where pupils are able to use Grammarly efficiently. As stated, there is a certain age or proficiency level where the pupils are able to make better use of the software to improve their own learning outcome. Teacher 4 says that they "have to use their heads". To do so they write by hand to facilitate a more conscious writing process. They believe writing by hand forces the pupils to think when writing. This is also motivated by the otherwise poor digital writing conditions.

4.7 External factors affecting teachers' use of intelligent writing software

All teachers interviewed feel negatively impacted in some way by the technology provided. This is thought to be a result of lack of funding or school resources. Teacher 1 mentions that they are lacking Word and they have had no input in the choice of software at their school. The teacher finds the current software Google Documents frustrating and uncooperative. They believe that the school does not use Word because of a lack of funding. Teacher 2 shares a similar sentiment stating that they believe that they do not have any influence over the software used. They blame the financial situation rather than the principal. Teacher 4 has tried to adapt the software they are provided daily. This has been unsuccessful due to paywalls within the software restricting it and not providing a sufficient learning outcome. The teacher

has repeatedly asked questions regarding the software but had no influence over the decisions made regarding it. They show awareness of other software or hardware that can be used but are unable to implement these because of cost. Teacher 3 has experienced a lack of learning outcome since they are only able to implement the free version of Grammarly. What is different compared to the other teachers is the fact that Teacher 3 has been able to influence what software the pupils have used. It is not completely clear from the interview, but it seems like a personal effort they have made. Their team has made an effort to implement Lingdys and IntoWords, but they have found this a difficult task. What we see is that the intelligent writing software provided to the pupils and staff are all influenced by the financial situation they are in. Interestingly both Teacher 1 and 2 wishes for better software. Teacher 1 wants to use Word while Teacher 2 has Word but wishes to use something better. Teacher 4 is clearly the most affected by the software and hardware provided to them. The interaction between Google Documents, iPads and IntoWords results in server lag that makes it difficult to write. The teacher has to compensate for this by correcting the pupils' texts live while they are writing. Still the teacher is able to appreciate the read aloud feature of IntoWords.

4.8 Assessment and intelligent writing software

Three out of the four teachers interviewed use intelligent writing software actively to assess or assist assessment. Teacher 4 is unable to do so because of technical difficulties.

"English feedback is (redacted) they don't care. They see a grade and continue on. We work on it continually. Some pupils that think and actually want to improve and are interested in making an effort in it. I have experienced a lot of them using Grammarly and not just clicking on the first thing but actually reading. […] The ones who are there might be able to reflect after a while but there needs to be a willingness for it and that is lacking in pupils lately." (Teacher 3)

Teachers 1 and 3 have both used intelligent writing software to help provide feedback to pupils. Teacher 1 has used ChatGPT to both generate and evaluate tasks. The teacher claims that the evaluation of the text is correct 93% of the time. This of course is just an estimate but an educated one at that. At times they have also used ChatGPT in combination with IntoWords to create tasks for the pupils. Teacher 3 uses intelligent writing software in a different manner. "I

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think that (laughs) to be honest its quite nice having it when you're correcting texts and you're completely blind and you see that there is something and great there I got help by Grammarly to correct a text. Sometimes I proof read and I find almost no mistakes and then I turn on Grammarly." Here we see that the teacher is often supported by intelligent writing software when correcting texts. Here the process has not been automated as with Teacher 1 rather the process is still very much human but supported by intelligent writing software. The software is at times able to outperform the teacher in detecting errors in the pupils' texts.

Teacher 2 states that they have higher expectations of the pupils when using intelligent writing software. "I ask them not to hand in anything with color since they can correct that themselves. **So that's a standard you've put?** At least for the oldest in the seventh grade.". (Text marked in **bold** are follow up questions) The teacher expresses that they expect the pupils not to hand in anything that has been marked as an error. Teacher 2 then explains that they believe that "The more tools they have the stricter we are I think. […] It turns into the ones who can be bothered and the ones who can't". We see a similar sentiment regarding Teacher 3. They express that they do not correct texts that are written by hand, this relieves the pressure regarding writing according to them. Teacher 2 explains that the pupils have missed an opportunity for *good help* if they choose not to use the software. This also depends on the level and age of the pupil. When asked Teacher 3 states that the focus on content and spelling is the same with both digital writing and writing by hand.

Teacher 4 is an outlier here since the combination of software and hardware results in the corrective features being close to unusable. Because of this the teacher is forced to correct the texts live while the pupils are writing. As they put it "they become the intelligence". What they mean by this is that they fulfill the role that is usually given to intelligent writing software such as correcting spelling mistakes, rephrasing or similar tasks. This is not by choice but rather by circumstance.

4.9 Teacher's views and use of ChatGPT

Teachers 1 and 4 are the ones who have used ChatGPT. Teacher 1 has used it for generating and correcting as well as evaluating texts. They state that the software can correct texts with an

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accuracy of 93%. This is the percentage of the time the teacher agrees with the grade given by the software. The teacher provides criteria and guidelines for the software. Either it can look at specific elements in the text and it will make a list of mistakes based upon the criteria given. It can also provide a general review of a text. Teacher 1 has given ChatGPT a text and certain instructions then asked it to generate tasks based upon this. The teacher seemed pleased with the resulting tasks. The motivation of the teacher doing so also comes forth in the interview. They state that it takes "a 100 years" for them to correct texts and that for the software it only takes 3 seconds. If they are "not all there" it can be a nice thing to use as a support. This mirrors Teacher 3's use of Grammarly. They state that they like using it when they have "4 o'clock teacher head" which similarly refers to being tired. We see here that the teachers are adapting intelligent writing software to support them when they lack time or energy. It is also clear from the tone in the interview that the teacher seems slightly embarrassed having used the software for this purpose. They have also managed to combine ChatGPT with IntoWords to create tasks for the pupils. The teacher has not experienced the pupils using the software. If this were to happen the teacher would conduct tests offline or by hand. From this we can deduce that this is of some concern to them.

Teacher 4 has used the software in a different manner. The teacher expresses having gained some experience using the software to generate texts for personal purposes. The teacher has used the software to generate example texts for their classes. The example they bring up is a text on Roald Dhal. Here ChatGPT has written a factual text on Roald Dahl and one of his stories. The teacher had to make some adjustments to the text but was able to present it for the class. They state that "It can be used in a fantastic way but it can also be misused like hell." They go on to explain several issues and how they believe it will be used in the classroom in the future. The main issue as they state is that the text writing is good, but the facts are unreliable. They compare it to the launch of Wikipedia. They state that they need to teach the pupils to use it in a proper manner if not it will be misused. The teacher states that the pupils can use ChatGPT for inspiration. One of the issues that have been stated repeatedly regarding intelligent writing software comes back. This is the critical use of it. As stated earlier the facts are unreliable so if the pupils are not critical, which the teacher claims they are not, it will end

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up hindering their learning outcome. They believe that the use of it will lead to more slacking. They state however that this is until it becomes a resource. It seems it is a question of when this happens, not if, according to the teacher. It is after this they mention training the pupils to use it properly. The teacher has not yet experienced any pupils using the software for school purposes but states that if this were to happen you would need to test then and there or without computers. These solutions are quite similar to Teacher 1. Teacher 4 also stated that teachers need to be smart to decode its use. They state that with the current state of digital intelligence it is more difficult to catch something like ChatGPT if you are inexperienced. Stating that the text generated about Roald Dahl could have been written by a pupil.

5.0 Discussion

In this part I discuss my main findings and examine these in the context of the literature review which consists of theory and earlier research that surrounds my research question. This is the foundation for the conclusion which answers: *What relation do English teachers in 5-10th grade have to intelligent writing software, and how do they facilitate for students' digital writing skills in English?* The discussion is structured so that the earlier parts provide context for the later ones. Some categories have also been merged so that smaller but relating data sets can be discussed in a similar context.

5.1 Assessment and intelligent writing software

The results show that three out of the four teachers actively use intelligent writing software to assess or assist assessment. The last teacher is largely limited by technical difficulties and because of this ends up not using it. Teachers 1 and 3 both mention using it in the process of assessing the pupils. Teacher 3 states that they experience most pupils not caring about feedback while some do, and their learning outcome is improved. This is regarding feedback both from the teacher and from intelligent writing software. The pupils will click on the software without considering the word. The teacher believes this stems from laziness which has increased lately according to them. There are some reasons presented by earlier theory. The first is a study done on eight graders that showed that they used corrective tools inefficiently, the reason for this is suggested to be a time limit given or a lack of competence (Tate &

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Warschauer, 2019, p. 538). Teacher 3 specifically mentions helping the pupils along the way while struggling to find time to do this. This reflects the findings in Tate and Warschauer's study. Dalby and Swan found that using technology was not challenging for teachers but enhancing learning outcome through the use of it was (Dalby & Swan, 2019, p. 843). Teacher 3 came across as reflected and competent regarding their use of Grammarly. The issue laid with the pupil's motivation to use Grammarly rather than the teacher's incompetence. At the same time a study looking at Norwegian EFL learners found that they struggle using the feedback given to them and teachers have little time to provide the feedback. (Burner, 2016, p. 641). A combination of these factors could be what is causing the experience Teacher 3 has. At the same time, they address the issue from another perspective stating that pupils "hit the right point" and are able to use the software more efficiently after that. This suggests that the issue is the pupils being able to use the software and its feedback efficiently to achieve the expected learning outcome. The right point here refers to the ability to use the software feedback efficiently which can be regarded as a level of autonomy or self-directed learning. Andina's study suggests this correlation between autonomy and greater writing skills and attributes it to the pupils being able to use the software efficiently (Andina et al, 2020, p. 84). It becomes uncertain if motivation is affecting autonomy and writing skill or the opposite. Making it more difficult is the fact that using the feedback is especially challenging for EFL learners as shown by (Burner, 2016, p. 641).

Teacher 1 uses ChatGPT as a way of providing feedback. Their motivation aligns perfectly with Burner's results of teachers lacking time for providing feedback (Burner, 2016, p. 641). The teacher states that they use "100 years" while the software only uses "3 seconds". It becomes clear that a lack of time is a big part of what is motivating them to use it. Using intelligent writing software as support when tired is also mentioned by Teacher 3. ChatGPT gives the same grade as the teacher an estimated 93% of the time according to the teacher. (Dalby & Swan, 2019, p. 843) state that the teachers' role becomes more peripheral when technology performs more powerful functions. The teacher claims that ChatGPT can give both generalized and specific feedback if prompted to. We see the theory mirrored here given that the teacher in instances of using ChatGPT becomes either a cowriter or a moderator of the feedback given.
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This role is certainly more peripheral than the earlier one of feedback provider. We also see this tendency and some of the motivation for it in Teacher 3. Regarding the use of Grammarly they state that they like using it when correcting texts, especially when it is later in the day when they are tired. They feel blind sometimes to their own mistakes and the software helps with countering this. Grammarly here takes on some of the role of the assessor away from the teacher to lessen their burden again mirroring the statements of (Dalby & Swan, 2019, p. 843). Interestingly the implementation of badly functioning intelligent writing software might have resulted in the opposite effect for Teacher 4. Since corrective features make the writing process lag the teacher takes on this roll themselves. The teacher monitors the texts while the pupils are writing them, assessing them live and giving feedback. The use of intelligent writing software has presented an opportunity for the teacher to monitor and edit pupils' text at a rapid pace. Because of this situation the teacher's role as assessor has increased since they have taken on the now expected role of the software.

Lastly there is a tendency for the expectations towards pupils spelling to improve when using intelligent writing software. We see this in both Teachers 2 and 3 when expressing their use of the software. Teacher 2 expects the pupils to not hand in any errors marked by the software. The reason for doing so is that the pupils can correct the texts themselves. Here we see the expectation of autonomy in the pupil rise. Before, it was expected that the zone of proximal development would be reached in the learning space between the teacher and the pupil (Skaalvik & Skaalvik, 2018, p. 70). For simpler spelling mistakes this has now been transferred to the learning space between the pupil and the intelligent writing software. The software then must provide a sufficient learning environment for the pupil to develop their writing skills to a degree they would not be able to on their own. To do so the pupil needs a digital competence higher than expected before if not the language learning outcome will suffer. We see that pupils who are able to use automated writing evaluation are significantly better when tested (Barrot, 2021, p. 13). There is a significant correlation between the combination of a pupil's autonomy, digital skills and writing achievement. This gives credence to the expectations that the teachers put on the pupils. The same study also found that the results of writing tests were significantly better with pupils who used automated written feedback (Barrot, 2021, p. 13).

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However, it is not clear that this expectation should be equally applied. Teacher 3 talks about pupils hitting the right point of using the software. Both Teachers 2 and 3 refer to the willingness of the pupils to use the software. The issue here is distinguishing what is willingness and what is ability. Teacher 2 and 3 both express some awareness of this stating it depends on the level of the pupil and distinguishing the ones who "can't be bothered and the ones who can't". This gives the impression that the teachers are aware of the situation and are adapting to adjust it depending on the pupil.

5.2 Adaptation of intelligent writing software

The study finds all teachers allow all available features (spell-check, grammar-check and autocorrect) while having a differing awareness of the features and their implications. The results were clearly separated into two categories. The first was how to adapt the software for general use in the classroom. The second being how the teachers could use the software to help pupils with different learning challenges.

5.2.1 General adaptations

The teachers all mention allowing all features in their provided intelligent writing software. Teacher 4 is an outlier since technical difficulties hinder the use of the features. Most pupils have also turned off autocorrect since they find it makes too many mistakes to be productive. Teachers 1 and 2 believe they do not plan differently but disprove this later showing a lack of awareness around it. Teachers 1 and 3 share a common shift of focus toward consciously using the software. They both experience pupils clicking on suggestions without considering them. This is similar to concerns stated in Artan's study where teachers report pupils being unaware of their grammatical errors (Artan, 2016, p. 27). Schmidt states that pupils consciously notice language for language learning to occur (Schmidt, 1990, p. 149). Interestingly one would expect the red underline to do this, but this is not the case for Teachers 1 and 3. Teacher 1 and 3's focus aligns with Schmidt's theory. The situation allows for a learning outcome that would go largely undetected. Because of the repeated exposure to their mistakes implicit language learning could take place based upon the findings of (Scheffler & Cinciala, 2011, p. 13). It is

important to distinguish here that the teachers have not adapted the software to fit their needs. Rather they have adapted to the environment created by the software.

Teacher 3 has a clear motivation behind allowing all features. They view allowing all the features in what can be regarded as a step towards universal design. They believe providing all pupils with the same tools is beneficial for learning outcome. Teacher 2's motivation for using the software is to achieve better results. This can be interpreted as learning outcome or test scores. They adapt the use of intelligent writing software dependent on the length of the text as well. It is possible these choices are also influenced by the teacher's awareness of the social impact of hardware or software. Allowing all tools for everyone would mitigate this. Teacher 1 does not allow the use of Google Translate and the same is true for Teacher 3. We see here certain adaptations but no clear trends. The teachers adapt based on their own motivations and the digital environment present. Hauge and Lund state that the new digitally rich environment leads to a demanding and complex learning environment. Which demands understanding "phenomena on the periphery of our horizon" Hauge and Lund (2011, p. 267). The expectation being that the teachers should be ready for this demanding and heavy task. We see Teacher 3 attempting this by implementing Grammarly themselves and taking advantage of this to further language learning. Teachers 1 and 4 have also used ChatGPT but this adaptation does not affect the pupils but rather the workflow of the teacher. As concluded in the last paragraph it seems that the teachers are adapting to the software except for Teacher 3.

5.2.2 Adaptation of intelligent writing software for learning challenges

All teachers associated intelligent writing software with learning challenges at certain points. There was also a general focus on how one can use it to benefit pupils with learning challenges. Again Teacher 4 is an outlier given their technical difficulties and limited options to adapt because of it.

Teachers 1 and 3 have both adapted their choice of and use of intelligent writing software to support pupils with learning challenges. Teacher 1 believes that adapting to dyslexia also adapts for autism or other learning challenges. Teacher 3's belief in universal design encompasses the

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same as Teacher 1 but on a broader spectrum. Viewed in accordance with Artan's findings this becomes interesting. Artan expresses that teachers usually use computers only when deemed effective (Artan, 2016, p. 26). The teachers seem to have experience experimenting with the software and have deemed it effective enough to spend time installing it and teaching it. A clear example of this is Teacher 3's experience with text to speech feature. This feature reads what is written aloud for the pupil and according to the teacher helps pupils realize their mistakes. Teachers 1 and 3's focus on development suggests they are in accordance with the requirements of (Hauge & Lund,2011, p. 269). For Teacher 3 this is especially clear since they directly state they have a focus on continually improving their digital skills. With Teacher 1 we can assume this since they express experience using ChatGPT as well as combining IntoWords and Google Documents to support pupils with learning difficulties. The positive attitudes towards adapting intelligent writing software are in accordance with Tjøstheim's findings regarding teachers' focus on continually developing their digital skills (Tjøstheim, 2020, p. 46). Lastly Teacher 2's adaptation and evaluation regarding the use of intelligent writing software and its required hardware is interesting. The findings from this interview suggest that computers are preferred when using intelligent writing software intended to support pupils with dyslexia, but the pupils prefer using iPads. The reason for this being its more discrete formfactor and thus lesser social impact.

5.3 Teacher's perceived use of intelligent writing software

The study finds that Google Documents and IntoWords are the most prevalent intelligent writing software. The teachers show an awareness of the software but less so the features within them. Note that use of ChatGPT has been moved to its own dedicated section given its unique nature.

Table 2 shows that there are multiple intelligent writing software present in each teacher's classroom. This is not surprising looking at Shadiev & Feng's study. They found that automated corrective feedback tools were are frequently used in countries where English is learned as a second language (Shadiev & Feng, 2023, p. 23). When looking at the findings of Lin et al this is expected to have a positive effect on learning outcome (Lin et al, 2017, pp. 1514-1516). This is

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also supported by McKee who found that the use of Google Documents allowed for more writing and specifically process writing which according to them strengthens writing (McKee, 2016, p. 12). This approach is further supported by Williams & Beam who found that there was strong support for process writing after analyzing 29 studies on writing from kindergarten to year 12 (Williams & Beam, 2019, p. 239). Teacher 4 has a large focus on editorial writing but finds that this is only manageable when using intelligent writing software since the pupils do not expect to edit anything written by hand. At the same time this is difficult since the intelligent writing software they have access to is cumbersome. Teacher 3's experience regarding pupils' use of feedback also hinders this. The reason for it is that they do not look at the feedback given but rather just the grade. This shows that there are some issues regarding implementing the use of intelligent writing software for process writing in these instances.

Teacher 2 has a focus on creative output. Their choice and use of intelligent writing software reflects this seeing that their main intelligent writing software are Bookcreator and Powerpoint. They choose these while having Word available. There are two reasons for this. The first is that the teacher's pupils are on the younger end of the spectrum of the research question. This means that multimodal text creation may be more motivating for the pupils. The second reason is that the implementation of the software is cross curricular. The teacher states that this makes it much easier to implement. They also state that Bookcreator's handling of save files makes it easier to use compared to Word. Teacher 3 has attempted to implement Lingdys and IntoWords in this manner to achieve similar results. They believe achieving this would result in a better learning outcome for all the pupils. They are also trying to implement Grammarly. They state that it takes effort just to make sure that the pupils have it turned on. They claim using Grammarly has led to mixed results. Furthermore, it is difficult to get the pupils interested in the explanation features of the software. Specifically, the feedback feature which provides not only corrections to issues but also gives an explanation. The goal of such feedback would be to provide a zone of proximal development for the pupils in the class without using the time of the teacher (Skaalvik & Skaalvik, 2018, p. 70). The fact that the teacher is unable to do this mirrors the challenges presented by (Dalby & Swan, 2019, p. 843). The reason for this is that the teacher is able to use the software and get the pupils to use the software, although with some
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struggle. The main issue lies within the lacking learning outcome since the pupils are not interested in the feedback they receive. Within the literature previously presented there are two reasons that are presented. The first is based upon Burner's study of EFL pupils. They state that EFL pupils struggle to use the feedback presented to them. What further complicates this is that most intelligent writing software is produced in USA or UK. As shown by Lervåg & Lervåg EFL learners are slower to acquire English than native speakers (Melby-Lervåg & Lervåg, 2014, p. 426). This means that explanations intended for a certain level could be too complex if not adapted for Norwegian pupils. Secondly it could be possible that the software is not able to present feedback that is at the level needed for the pupil. For formative assessment to be effective it needs to be at a level the pupil can understand. This would also explain the pupils hitting the *right point* as Teacher 3 states in the interview. This sentiment is further supported by their experience of the software being more effectively used in 8-10th grade. The teacher ends up using it to help correct texts and assist in writing tasks for the pupils. Teacher 3 also wonders if the pupils should see the mistakes that they make. The potential didactical implications of doing so would show that mistakes are common. This may lessen the pressure put on the pupils and make the teacher more relatable. Of course, this might also lead to the teacher coming across as incompetent. What is most important here is that the teacher has considered their own use of intelligent writing software and how it might impact the pupils.

When asked what features of intelligent writing software are allowed in their classroom all teachers answer something equivalent of everything. The teachers do not give any reasoning for this choice or how it might impact learning outcome. We see this exemplified in Teachers 2 and 3. Teacher 3 is unsure if everything is allowed all the time. It needs to be noted that the phrasing of this suggests that there are set rules for the school rather than this being a personal choice the teacher has made. Teacher 2 states that they think they allow all of them. Teacher 4 realizes during the interview that Google Documents does not have grammar correction. This may relate to Teachers 1 and 3's feelings of lacking experience. The only insight we gain into this lack of experience is Teacher 3's lack of time to develop it. We also see an interest in Teachers 1, 3 and 4 regarding developing digital skills. It seems that there is a lack of time to develop an understanding of the software provided to them.

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5.4 Teachers' attitudes towards intelligent writing software

The teachers interviewed in this study show a general positive attitude towards the use of intelligent writing software. What is considered an intelligent writing software varies from teacher to teacher. A general trend was a focus on intelligent writing software aimed at supporting pupils with dyslexia or other learning challenges.

The general views of the teachers are in line with the previous literature presented. Artan's study showed that teachers view Word as both beneficial and problematic when learning to write (Artan, 2016, p. 28). Although the same specific details are not present, we see the same tendency for the teachers' opinions to reflect both the positive and negative aspects of the intelligent writing software they are using. Teacher 1 states that they believe intelligent writing software can be used as a learning tool, but this requires conscious effort from the pupil. The focus on consciousness for learning is supported by both Schmidt as well as Scheffler & Cinciala's study. Schmidt states that a conscious effort on the language is required for it to be absorbed and Scheffler and & Cinciala state that this is required for explicit language learning. (Scheffler & Cinciala, 2011, p. 13) (Schmidt, 1990, p. 149). Teacher 4 views ChatGPT the same way stating that it can be an incredible tool but also misused if not taught properly. Teacher 4 also shares a similar view to the one presented by Artan stating they think handwriting leads to more conscious writing and results in the pupils noticing their mistakes. This infers that writing digitally and, in this case, using intelligent writing software is less conscious. It should be noted that Teacher 4 views intelligent writing software as able to increase awareness of silent letters. This exemplifies the nuanced views the teachers most often hold. Artan states that the use of Word results in pupils being able to create text effortlessly but also reduces self-awareness of grammatical errors. (Artan, 2016, p. 27). This also reflects Teacher 1's experience of the pupil's use of Google translate and Teacher 3's experience of the pupil's use of Grammarly. They both view it as helpful but at the same time the pupils' actions can be deemed unaware.

The study finds that the teachers interviewed have a general feeling of inexperience or a need for improvement regarding intelligent writing software. Teachers 1 and 3 feel inexperienced regarding software made to support pupils with dyslexia. This is representative of a general

trend, being that the teachers felt they could improve in their use of intelligent writing software to promote greater language learning. This again relates to McKnight's need for teachers to constantly develop their digital skills and Tjøstheim's finding that teachers are positive towards this notion. (McKnight, 2021, p. 452) (Tjøstheim, 2020, p. 46). All the teachers interviewed were quite aware of how fast the digital landscape is changing and for Teacher 1, 3 and 4 this included intelligent writing software. It therefore makes sense that they understand and are aware of the need for constant development and improvement. The self-assessment aspect of this is shown in the teachers' approach to using computers for writing in general. Teachers 3 and 4 believe that the pupils can gain a lot from not using a computer. This critical approach is reflected in Artan's article as well as the constant evaluation mentioned by Hauge & Lund. Artan states that teachers often use computers only where needed (Artan, 2016, p. 26). The use of computers has largely become a norm but interestingly this trend is still portrayed. Hauge & Lund states that teachers need to constantly evaluate what digital tools should be used (Lund & Hauge, 2011, p. 267). We see this general trend once again in the choice to implement or not implement intelligent writing software when writing in the English classroom.

The teachers had different associations and criteria for what constitutes intelligent writing software. Teacher 2 is not included in this given my influence on their perception of it. Teacher 3 believes that intelligent writing software needs to be multifaceted and multilingual. This means that the software has a lot of functions, including corrective and editorial features in multiple languages. Teacher 4 associates intelligent writing software with software intended in supporting pupils with dyslexia. They still share some expectations with Teacher 3 stating that they expect the software to provide suggestions, sentence structure or read text aloud. This relates to the multifaceted aspect mentioned by Teacher 3. Teacher 1 simply states that it is something that corrects pupils' texts. We see here that Teacher 3 and 4's understanding is more in line with what the study defines as intelligent writing software. None of the teachers mentioned software that contradicted the definition of intelligent writing software but examples like PowerPoint and Skolestudio reveal a possible need for further delimitations of the term if there were to be further research.

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5.5 Teacher's perception of pupil's attitudes and use of intelligent writing software

All four teachers perceived the pupils as unaware in their use of the intelligent writing software in some manner. Teachers 1 and 2 found their pupils were generally positive about the use of intelligent writing software while the pupils of Teachers 3 and 4 were generally uninterested or frustrated with them.

Teachers 1, 2 and 4 to some degree describe their pupils not bothering to use the features that intelligent writing software offers. Teacher 3 believes that the pupils genuinely believe they are getting help while they are not. This is an important distinction to make, seeing that the pupils can improve their language or use the tools presented to stay at the same level while doing less work. Teacher 4 states that pupils who use the software are pleased with it. Teachers 1 and 3 have experienced some pupils being extremely proficient in using intelligent writing software but this is a subset of the overall group. Viewing this in light of Dalby & Swan's statement is interesting. They state that the teacher's role becomes more peripheral with the increasing role of technology (Dalby & Swan, 2019, p. 843). We see from the teachers that there is a subgroup that is able to use the software proficiently and also a sentiment that they need to be taught how to use it. According to Teacher 3 some pupils are confused by the suggestion which means there might be a negative learning impact if not used properly. If this is correct the role of the teacher needs to increase to help the pupils in their development of these digital skills. It seems however a part of this work is motivation, seeing that three of the teachers mentioned laziness as an issue. Doing so would likely result in findings similar to Dalby & Swan seeing that the teachers interviewed are impressed by the performance of pupils who are able to use the software. This is in accordance with Barrot who found that pupils using Grammarly significantly improved their results when editing and rewriting texts (Barrot, 2021, p. 18). Lastly, developing critical thinking may help the pupils critically evaluate the feedback given by the software. The pupils also seem pleased with using the software once they have understood it.

This relates to something we can extrapolate from the data. The pupils seem to have a general positive attitude toward the use of intelligent writing software. Teachers 1 and 2 state this explicitly. Teacher 3 states that the pupils are not using the features provided, suggesting they

are rather neutral in most cases. Lastly Teacher 4 has experienced the pupils being negative toward the software but not Google Documents. This finding reflects the issues with the software provided rather than a view into the pupils' attitudes. The reason is extreme lag when writing. This is also true for autocorrect. Teacher 4's pupils have turned this feature off since it makes mistakes and has been deemed unproductive. Interestingly this shows that the pupils have been given some autonomy regarding what tools are being used. From this we can extrapolate that there is a general positive attitude toward intelligent writing software. This seems especially true regarding multimodal intelligent writing software when looking at the experiences of Teacher 2. From this it can be assumed that the pupils are generally interested in the more creative aspects of intelligent writing software rather than the corrective features. The interest in creative aspects of intelligent writing is something that is supported by Williams & Beam's findings. They found that in general pupils were excited by the creative opportunities afforded to them by computers (Williams & Beam, 2019). It should be noted that the age of Teacher 2's pupils might affect this. A question for further research is how one can motivate pupils to use the corrective features and if the creative aspects can be a part of this motivation.

5.6 External factors affecting teachers' use of intelligent writing software

All four of the teachers interviewed believe that technology or the lack there of may have a negative impact on their teaching. When asked about their influence on the current digital environment at their school, Teachers 1, 2 and 4 all stated they had no impact. Teacher 3 mentioned their implementation of Grammarly. They are still unable to use it effectively because of financial restrictions. Grammarly requires a paid version for it to provide synonyms. Because of this Teacher 3 believes the pupils' vocabulary will suffer. Including the synonyms could lead to a learning outcome in two different ways. The first being a simple behavioristic learning outcome as explained by Skaalvik & Skaalvik. This stems from the repeated exposure to new words and this being rewarded by better grades, encouragement from the teacher or an underlying wish of bettering their English (Skaalvik & Skaalvik, 2018, p. 32). If the pupils are at the correct age, it could also lead to an implicit understanding of the language according to (Scheffler & Cinciala, 2011.p. 13). The teachers are frustrated with the financial situation

leading up to this but also their lack of participation in the choice of software. Teacher 2 explicitly states that they believe they know what software the pupils need since they know them personally compared to the people choosing the hardware or software. The pupils have a right for adapted teaching or *differentiated instructions* as it is referred to by the Norwegian ministry of education. They explain it as "Differentiated instruction means that the school adapts the teaching so that all pupils have the best possible learning outcome from the ordinary teaching. […] The teachers must use good judgment when differentiating the instruction in the subject." Norwegian Ministry of Education (2017). Intelligent writing software has a large impact on the language output of the pupils. With the Teachers 1,2 and 4 being unable to participate in the selection of software a large amount of their autonomy in planning and adapting lessons is removed. It is unrealistic for the school to buy software tailored to all the teachers' needs. At the same time three out of the four teachers interviewed state they have had no input on the software being used. Allowing for their participation would help fulfil the requirements set by the Norwegian ministry of education and possibly improve learning outcome.

This is exemplified in Teacher 4's situation where the software is actively hindering the text production of the pupils. The teacher has made an active effort stating that they on a daily basis try to adapt the digital learning environment to compensate for the issues with the software. At the time of interview, the teacher corrects the pupils' texts live as they write through a sharing function in Google Documents. This allows the teacher to mark text and either suggest changes or change it. There are some technical issues with this as well and the teacher often must spend time after the lesson removing markings in the text. The first problem is the time spent doing this. The teacher is moving towards a role opposite to the ones presented by McKnight. These are "an initiator, broker, colleague, collaborator, curator and mentor rather than trainer and invigilator" McKnight (2021, p. 452). The teacher here takes on the simplistic role of corrector or trainer as stated by McKnight. Another issue presented is how this affects the pupil's learning outcome. Since the teacher is correcting the texts continuously, the pupils are being monitored constantly. There is little to no literature on the effect of this, but one can imagine an increased pressure on the pupils as the teacher is monitoring them during their writing.

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5.7 Teachers' views and use of ChatGPT

Interestingly we find both teacher 1 and 4 using ChatGPT in different but innovative ways. Teacher 1 uses it for generating tasks and correcting them. Teacher 4 uses it to generate example texts for the class. Their implementation shares a common goal of being more efficient and automating parts of their job. None of the teachers interviewed mention any experience regarding pupil's use of ChatGPT. It should be mentioned that teachers 2 and 3 were unfamiliar with ChatGPT and it is therefore reasonable to assume they would recognize most signifiers of ChatGPT being used. Teachers 1 and 4 come across as experienced in using it and have not noticed any pupils using it. This is in contrast with the findings of earlier literature. Although the students involved are much older, the study found that there needed to be made major changes to the curriculum because of ChatGPT (Thurzo et al., 2023, p. 11). One explanation is the age differences between the students in the Thurzo et al study and the pupils of the teachers interviewed. Although this does not fully explain it since the teachers interviewed are teaching in 5-10. One would expect the older pupils to be aware and able to use ChatGPT to their advantage.

Teacher 1 explicitly states that using ChatGPT for correcting texts is a lot quicker and more efficient than doing it manually. Teacher 4 uses it to generate example texts. One may assume that this is to save time since the quality of the text is not improved, rather the time spent making it is decreased to a few seconds. It is important to note here that the teacher's role is not removed completely. Teacher 1 still spends time checking the evaluation ChatGPT has made. Teacher 4 also spends time adjusting the text created by ChatGPT. We see the same effect as found by Dalby & Swan. Technology plays a greater role, and the teacher becomes more peripheral compared to earlier (Dalby & Swan, 2019, p. 843). Interestingly this seems to be a transition rather than a sudden change. We see the same effect to a lesser extent with Teacher 3's use of Grammarly. The teacher still corrects the texts, but Grammarly is supporting that effort by pointing out mistakes. Another parallel is when it is being used. Teacher 1 states that they like using it when they are tired or unconcentrated. This mirrors Teacher 3's motivation for using Grammarly. ChatGPT functions as an extreme version of this. At the same

time, it is worth noting that it is also in line with McKnight's findings where the teacher takes on a different role of curator and collaborator (McKnight, 2021, p. 452). We see this reflected in Teacher 4's view of it as well. The teacher is generating and adjusting the texts being presented rather than creating them. They suggest letting the pupils use ChatGPT as an inspiration. The reason for this being that the facts presented by ChatGPT are rather suspect according to them. If this is the case the role of collaborator would also be filled in some part by ChatGPT seeing as it is providing ideas and inspiration in the same manner a teacher or pupil might do. It seems ChatGPT may fulfil the role of trainer as predicted by McKnight but that it might also fulfil greater roles within the school system.

Lastly it needs to be discussed how the teachers expect this to affect the classroom and measures they believe can be taken to use ChatGPT for increasing learning outcome rather than hindering it. The main issue presented is the same that has repeatedly come up. This is the pupils lack of critical thinking or awareness when using intelligent writing software. As stated by Teacher 4 ChatGPT does not fact check the information given. Still, it states the information in a confident manner which could mislead pupils. Teacher 4 understands this, stating it can be used in a fantastic way or be misused. Teacher 4 compares it to Wikipedia because of the unreliable facts. In the same manner they believe the pupils need to be taught how to use it. At the same time the school would need to implement tests *then and there* as well as without a computer according to Teacher 4. They believe also that it takes quite a bit of experience to recognize something written by ChatGPT. These sentiments relate back to Hauge & Lund. Regarding digitally rich environment they state, "we see how such activity involves understanding phenomena on the periphery of our horizon, analysis of the role of artifacts and how such artifacts match (or mismatch) the assignment." Hauge and Lund (2011, p. 267). It becomes the teacher's responsibility to adapt to this new digital environment and create a sufficient learning outcome. The question becomes if this is feasible with a changing digital landscape and the time afforded to teachers. It seems the solutions presented by Teacher 4 could have some issues. The first being testing *then and there*. From the context of the interview this can be interpreted as tests that are not as easy to prepare for or that are more sudden. This may lead to summative short form assessment which could have an impact on the learning outcome

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since formative assessment aims to improve the learning outcome according to (Carlsen, 2020, p. 2). At the same time, one would lose the benefits of process writing as found by (Williams & Beam, 2019, p. 239). The irony in the situation is that in the long term it might have the opposite effect of what it is trying to achieve. Looking at Lai we see that using open-ended questions or tasks that force the pupil to deduce things beyond the information given helps develop critical thinking (Lai, 2011, pp. 38-39). Using simpler tasks that test information may have the opposite effect and force memorization more than thinking. Given intelligent writing software's extensive use and improving features it seems integrating it might be the best realistic option available. This is in part reflected by Teacher 4 who at the end states ChatGPT will be misused until it becomes a resource in the same manner Wikipedia was. This is a difficult task, and it is questionable if the responsibility should be put solely on the teacher.

6.0 Conclusion

In this master's thesis I have attempted to answer the question "*What relation do English teachers in 5-10th grade have to intelligent writing software, and how do they facilitate for students' digital writing skills in English?*". Based on this I have made some significant discoveries regarding Norwegian English teachers' relation and facilitation of digital writing using intelligent writing software.

The findings show that the teachers in general have a positive and nuanced view of intelligent writing software and its uses. A common finding amongst the teachers is their want to improve their use of intelligent writing software to further their pupils' learning outcome. At the same time many of the teachers seem unaware of the corrective features allowed in their lessons and their reasoning for allowing or not allowing them in the English classroom. This may correspond with a feeling of inexperience in some of the teachers interviewed.

My findings show that a recurring issue the teachers perceive is the unaware use of corrective features in intelligent writing software by the pupils. A common finding was that the pupils used corrective features such as suggestions without considering its result. This results in the pupils being confused or having a perceived decreased learning outcome. Three of the teachers

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interviewed viewed this phenomenon as partly stemming from a lack of effort from the pupils. Investigating the relation between pupils' motivation and intelligent writing software could be fruitful especially with the rise of artificially intelligent language models.

The study is only on four teachers which means they are adapting to the circumstances of their particular software and schools. Because of this the findings may not be representative of the broader picture. This study has hopefully brought some attention to the use of intelligent writing software in the Norwegian English classroom. Further research should be done into the use and effects of intelligent writing software on Norwegian English learning classroom. If the issues found by this study were to be solved it could lead to a significantly greater learning outcome for pupils and may help with the productive use of generative intelligent writing software in the future.

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Vil du delta i forskningsprosjektet

Intelligente skriveprogramvarer i skolen

Dette er en invitasjon til deg om å delta i et forskningsprosjekt hvor formålet er å forstå hvilke oppfatninger og forståelser lærere har rundt bruken av intelligente skriveprogramvarer og hvilken påvirkning slike programmer kan ha på læring. Mitt navn er Hans Reidar Grønvik Hoffseide, jeg går femte året på grunnskolelærerutdanningen i Volda. I dette skrivet gir jeg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål
Formålet med prosjektet er å forstå hvordan intelligent skriveprogramvare påvirker læreres undervisning i engelsk. Elevers skriving i skolen påvirkes av et konstant utviklende digitalt miljø. Av den grunn er målet å samle informasjon om læreres syn på intelligente skriveprogramvarer med et fokus på rettefunksjoner og læringsutbytte.

Hvem er ansvarlig for forskningsprosjektet?
Høgskulen i Volda er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?
Jeg ønsker å invitere engelsklærere som jobber i grunnskolen 5-10.klasse.

Hva innebærer det for deg å delta?
Deltagelse i denne studien innebærer at du som lærer deltar i et intervju som tar for seg dine opplevelser av intelligent skriveprogramvare i engelsk.

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.

Alle personopplysninger vil bli behandlet konfidensielt. Det er kun forskeren som vil håndtere disse. Deltagerne i denne studien vil ikke bli identifisert ved publikasjon. Om du ønsker å trekke deg fra studien, vil jeg slette alle personopplysninger om deg.

Hva skjer med personopplysningene dine når forskningsprosjektet avsluttes?
Prosjektet vil etter planen avsluttes 24.05.2023 På dette punktet vil all informasjon om deg anonymiseres.

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

På oppdrag fra Høyskolen i Volda har Personverntjenester vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
- å få rettet opplysninger om deg som er feil eller misvisende
- å få slettet personopplysninger om deg
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hvis du har spørsmål til studien, eller ønsker å vite mer om eller benytte deg av dine rettigheter, ta kontakt med:

Prosjekt ansvarlig: Hans Reidar Hoffseide ved Høgskulen i Volda

Tlf: 468 87 112

E-post: hansreidar2@gmail.com.

Veileder: Kim-Daniel Vattøy

Tlf: 700 75 338

E-post: kim-daniel.vattoy@hivolda.no

Vårt personvernombud:

Cecilie Røeggen

Tlf: 700 75 073

E-post: cecilie.roeggen@hivolda.no

Hvis du har spørsmål knyttet til Personverntjenester sin vurdering av prosjektet, kan du ta kontakt med:

• Personverntjenester på epost (personverntjenester@sikt.no) eller på telefon: 53 21 15 00.

Med vennlig hilsen

Hans Reidar Hoffseide (Student)

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet Intelligente skriveprogramvarer i skolen, og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i intervju

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

-- (Signert av prosjektdeltaker, dato)

Appendix B

Intervjuguide

1. Hva er din forståelse av begrepet intelligente funksjoner i skriveprogrammer i engelske klasserommet?

2. Hvordan tilrettelegger du for at elevene skal arbeide med skriveprogrammer i engelsk undervisningen din?

3. Hvordan tror du skriveprogram påvirker elevene sin engelsk forståelse?

4. Hvilke skrivefunksjoner er tilgjengelig når elevene jobber med skriving av engelske tekster digitalt?

   - Autokorrekt
   - Stavesjekk *m/u forslag*
   - Grammatikksjekk *m/u forslag*

5. Hvordan har intelligent skriveprogramvarer påvirket måten du tilrettelegger undervisningen i engelsk klasserommet?

6. Hvordan har intelligent skriveprogramvare påvirket måten du tenker på vurdering i engelskfaget?

7. Hvilke måte har du hatt mulighet til å påvirke valg av programvare?

8. Hvordan opplever du holdningene til elevene når det kommer til intelligente skriveprogramvare?

9. Er der andre ting du har lyst å ta opp som du ikke har fått tatt opp i dette intervjuet?

Appendix C

Vurdering av behandling av personopplysninger

Referansenummer

507409

Vurderingstype

Automatisk

Dato

12.01.2023

Prosjekttittel

Skriveprogramvare i engelskundervisningen i ungdomskolen

Behandlingsansvarlig institusjon

Høgskulen i Volda / Avdeling for humanistiske fag og lærarutdanning / Institutt for språk og litteratur

Prosjektansvarlig

Kim-Daniel Vattøy

Student

Hans Reidar Grønvik Hoffseide

Prosjektperiode

01.01.2023 - 24.05.2023

Kategorier personopplysninger

- Alminnelige

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Lovlig grunnlag

- Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 24.05.2023.

Meldeskjema

Grunnlag for automatisk vurdering

Meldeskjemaet har fått en automatisk vurdering. Det vil si at vurderingen er foretatt maskinelt, basert på informasjonen som er fylt inn i meldeskjemaet. Kun behandling av personopplysninger med lav personvernulempe og risiko får automatisk vurdering. Sentrale kriterier er:

- De registrerte er over 15 år
- Behandlingen omfatter ikke særlige kategorier personopplysninger;
    - Rasemessig eller etnisk opprinnelse
    - Politisk, religiøs eller filosofisk overbevisning
    - Fagforeningsmedlemskap
    - Genetiske data
    - Biometriske data for å entydig identifisere et individ
    - Helseopplysninger
    - Seksuelle forhold eller seksuell orientering
- Behandlingen omfatter ikke opplysninger om straffedommer og lovovertredelser
- Personopplysningene skal ikke behandles utenfor EU/EØS-området, og ingen som befinner seg utenfor EU/EØS skal ha tilgang til personopplysningene
- De registrerte mottar informasjon på forhånd om behandlingen av personopplysningene.

Informasjon til de registrerte (utvalgene) om behandlingen må inneholde

- Den behandlingsansvarliges identitet og kontaktopplysninger
- Kontaktopplysninger til personvernombudet (hvis relevant)
- Formålet med behandlingen av personopplysningene
- Det vitenskapelige formålet (formålet med studien)
- Det lovlige grunnlaget for behandlingen av personopplysningene
- Hvilke personopplysninger som vil bli behandlet, og hvordan de samles inn, eller hvor de hentes fra
- Hvem som vil få tilgang til personopplysningene (kategorier mottakere)

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- Hvor lenge personopplysningene vil bli behandlet
- Retten til å trekke samtykket tilbake og øvrige rettigheter

Vi anbefaler å bruke vår [mal til informasjonsskriv](#).

Informasjonssikkerhet
Du må behandle personopplysningene i tråd med retningslinjene for informasjonssikkerhet og lagringsguider ved behandlingsansvarlig institusjon. Institusjonen er ansvarlig for at vilkårene for personvernforordningen artikkel 5.1. d) riktighet, 5. 1. f) integritet og konfidensialitet, og 32 sikkerhet er oppfylt.