Readtheory.org – the theory of 21st-century reading: fostering 21st-century reading skills through digital competence, digital teaching aids and frequent digital teaching.

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ABSTRACT IN NORWEGIAN

Digitalisering i den norske skulen er synleg – og engelskfaget er ikkje eit unntak. Det engelske språket er vårt verktøy for kommunikasjon med store delar av verda gjennom internet og digitale platformar – å kunne lese engelsk er viktig for å delta i eit stadig meir globalisert og samankopla verdssamfunn. Målet med studien er å setje søkelyset på kva den digitale lærekonteksen og det digital lærematerialet krev av lærar og elevar, og vidare granske korleis engelsklærarar oppfattar digital kompetense og lesedugleikar i det 21. århundre – og korleis dei nyttar digiale ressursar for å fremje dette. Studien er ein undersøkjande studie som tek føre seg norske engelsklærarar sine tankar og erfaringar med kring digital kompetanse, lesedugleikar i det 21. århundre og deira digitale engelskundervisning. I tilegg, undersøkjer studien bruk av eit digital og adaptivt lesevektøy der funna er basert på lærarars og programutviklarane bak ReadTheory sine oppfatningar om til kva grad ReadTheory kan fremje lesedugleikar i det 21. århundre. Prosjektet er basert på datamateriale frå ein åpen-distribuert spørjeundersøking, der lærarar med erfaring frå ReadTheory kunne velgje å svare på både lukka- og opne spørsmål. For å supplere dette datamaterialet har studien nytta dokumentanalyse der ulike dokument distribuert av ReadTheory har danna grunnlaget for supplerande forskingsmateriell. Funna tyder på at det er ein viss samanheng mellom digital kompetense og hyppig bruk av digitale ressursar i engelskfaget – og at det blir nytta ei rekkje ulike digital ressursar i engelskfaget generlt, men og særleg i lesing. Lærararne sine skildringar av digital kompetanse og modern lesedugleikar peiker på mykje av det same – og funna tyder på at ein kan samalikne dei to dugleiksområda og sjå dei i samanheng i diskusjonen om digital og moderne lesing. Readtheory.org er ein amerikansk utvikla leseplatform, som hevdar å gje elevar ein meir individuell tilpassa leseoppleving gjennom sin algoritmedrivne adaptive funksjon. Studien samaliknar norske engelsklærarar sine erfaringar og tankar kring platformen med kva utviklarane meiner platformen kan brukast i lesetrening i engelskfaget. Det er ei viss usemje blant lærarar om at bruken av ReadTheory kan vere med på å fremje moderne lesedugleikar, men at platformen har ei rekkje gode funksjonar. Dei konkluderande tankane rundt bruken av platformen munnar ut i at platformen er god til sitt bruk, men forblir eit supplement i undervisninga – då den ikkje evna å dekkje samtlege kompetansemål og fokuserar på individuelle læremiljø.

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1 INTRODUCTION

1.1 Aim and scope

"English is considered a global language and the lingua franca of the Internet, software and digital technologies (Crystal 2006) - which underscores the importance of mastering the language for participating in the increasingly digitalised and networked world society." (Røkenes 2019, 163). Hence, English language teachers play an important role in enabling pupils to take part in our increasingly digitised and networked society, knowledge- and competency-based economy, and the world of work (Røkenes 2019). The English subject aims to prepare the students in the best possible way in their encounters with the English-speaking world. The English subject curriculum stresses that English is a universal language – and that to succeed in a world where English is used, one must have knowledge of how it is used in different contexts (LK 06/13). Thus, an understanding of what sufficient 21st-century English reading training implies and adapt education and instruction to this is paramount – if not, Norwegian students may end up on the sideline of the globalised and interconnected society.

This thesis aims to discuss the conception of digital competence and skills of the 21st-century's – further shed light on implications of employing adaptive algorithm[1]-based systems in language learning, and how it can facilitate new learning environments that may foster 21st-century reading skills. The English foreign language, henceforward EFL, teaching and learning in Norwegian classrooms have over the last decade been digitalised. This digitalisation, however, seems to be somewhat inconsistent among teachers – and teachers have been criticised for their slow uptake of digital technology (Krumsvik, 2013; Røkenes, 2019). Digital tools and web platforms are used to facilitate standard learner's task such as reading and writing, and may not be used in its full potential. I would argue that, generally, EFL teachers in Norwegian classroom do not utilise and exploit the full potential of digital technologies. We witness a trend that other sectors in our society are way ahead of our schools when it comes to adapting to new technologies and makes use of new innovations. In order to keep up and prepare for what seems to become an even more digitalised and

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[1] Algorithms are sets of rules (for example, 'if x, then y') that are used in computing. (Kerr 2016)

interconnected society, students and teachers need to acquire the skills of handling new media, and how to manage these platforms for their respective field of use.

The overarching goal of this thesis is to provide insight into teachers' thoughts on facets of the digital 21st-century EFL classroom. This includes their perception of the following terms: digital competence, 21st-century skills – and 21st-century reading skills – as reported experiences with digital teaching aids. The present chapter will present the background for this thesis in English didactics, as well as argue why the current study may bring something new to the research area of digital reading in the 21st-century EFL classroom. This chapter will also introduce the main research question of this thesis, and two sub-questions will also be presented. These questions will guide the thesis' exploration of Norwegian EFL teachers' perception of digital competence and 21st-century reading skills and their claims about digital teaching in the EFL classroom.

1.2 Choice of topic

The reasons to discuss digital technology in education are many, and the field of research is growing, however, due to the expanding landscape and fast-changing trends, this topic has been given relatively little attention. Growing up in the age of the internet, being a 'digital native' or a 'screenager' has allowed me to explore the internet's potential in several contexts (Prensky 2001). As a student, and during teaching practice periods in the teacher programme, opportunities to take part in several educational contexts in different classrooms have presented themselves. During these periods, I have always wanted to experiment with various teaching methods and sought to find new and exciting ways to approach English language learning in new and exciting ways. English language training in Norwegian schools, guided by the core curriculum and the English subject curriculum, has focused on implementing ICT in teaching and learning over the past few years. This became evident in the Knowledge promotion, henceforward LK06/13, as the curriculum states that the students should be able to "use a varied selection of digital tools, media and resources to assist in language learning […]" (Udir 2013). The 'Selection of digital tools, media and resources' is advancing and expanding – new and innovative methods are presented to us, and it would be backwards-thinking not to make use of such educational innovations.

Algorithms and AI (artificial intelligence) are newly emerging facets of digital technology and are starting to become known to users of the internet. Algorithmic power

drive our most used day-to-day systems and platforms, Google, Facebook and Netflix – where it seeks knowledge and understanding of the individual's interests and user patterns to provide each individual with personal tailormade content –advertisements, movie suggestions – or recommended new music based on one's previous actions. Fortunately, scholars have adapted this algorithmic power into the educational context – into the language learning context. In recent years several platforms and applications have emerged, aiming to enhance the users' language skills. Through algorithmic technology, these systems seek to learn one's personal learning pattern in order to provide each learner with personalised and individually level scaled content, tasks and language learning experiences.

In a debate from May 2019 in Aftenposten[2] – it is being argued that we are in the middle of a paradigm shift, and that teaching in 2020 should not mimic 1920. 2020 is digitised and technology-driven – teaching and learning in the 21st-century classroom demands renewal and rethinking – thus, it is unnatural to educate on the basis of the pre-digital time.

1.3 Previous research

Numerous studies have been published about various aspects of computer-assisted language learning, but few have yet investigated the potential use of algorithm-based adaptive tools or platforms in the Norwegian lower- and upper secondary EFL classrooms to foster reading skills. The Norwegian Reading Centre[3] at the University of Stavanger has completed several interesting studies on digital reading, but mainly on elementary school level, and in Norwegian language learning.

New technology and the emerge of Artificial Intelligence (AI)-systems, and the advancements of algorithm-based educational tools are highly interesting and fascinating fields of research, and each year several international conferences present the latest research on the field. Innovative and new aspects of education are 'hot topics' and brought into the light by, e.g., EUROCALL[4] and International Conference on Artificial Intelligence and Education[5] hosted by UNESCO. The field of Computer-Assisted Language Learning (CALL) research is touched upon by several international scholars (Kerr 2016; Dodigovic 2005;

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[2] https://www.aftenposten.no/meninger/debatt/i/3JPypM/kort-sagt-fredag-31-mai
[3] https://lesesenteret.uis.no/research/
[4] http://www.eurocall-languages.org/
[5] https://unesdoc.unesco.org/ark:/48223/pf0000370967

Garrett 2009; Murray 2005; Lund 2019) – its language learning implications are investigated thoroughly. However, the essence of these studies concerns general computer learning and teaching, aiming to establish a cause and effect relationship between CALL and language acquisition. In the Norwegian field of research Lund (2019) and Røkenes (2019) address CALL – and point their focus towards the teacher and aspects of digital teaching in the English subject, – and address the importance of professional digital competence and the teacher role in the digital classroom.

1.4 Relevance

As of 2010, it was calculated that 30 billion google search occurred every month – from such fact emerges a question: "Where did we ask all these questions B.G ("Before Google")? I find this question interesting – seemingly is an intriguing point of departure when looking further into the discussion of digitisation of English language learning. The digital possibilities of the information age provide us with abundant opportunities for learning, but calls for instructions and guidance on how to do so efficiently, safely and properly – in private and educational settings. The conceptualisation of Digital competence aims to guide teachers and students on their seek to utilise digital technology in education.

Digital competence in school raises central aspects of the pedagogy of digital media into the light – and coneys insight and knowledge about the technology's place in school and education. Digital technologies' impact on English language teaching in the 21st-century is – and will be evident – for instance, Kerr (2016) suggest that there is a clear global shift away from the traditional print-based classroom. Most learning activities have gained new dimensions, one of them, reading – for instance, many Norwegian classrooms have left the traditional textbook behind, and have implemented digital equivalents – e-books, web compendiums and digital reading platforms. Buckingham (2003) points towards a central concern of media in the educational context – and suggests that media should not be regarded as merely teaching aids or tools for learning – rather, education about media should be seen as an indispensable prerequisite for education with or through media. Buckingham (2003) and Kerr (2016) points to central aspects which define and determine how we can view the 21st-century reading contexts – which may be helpful when clarifying the skills such contexts demand.

The concept of text has changed in English educational context, and today's students are faced with massive amounts of information through access to the internet and

intercommunication with peers across the globe (Alexander 2012). If the texts we read have changed, the practice of reading these texts has changed too – does good digital competence make us into better readers in digital reading environments, or does the 21st-century reading contexts demand a rethinking of how we read?

Reading is diverse and a uniform activity in constant change. When discussing frequent reading, reading better or worse, one must establish what reading is – reading goes far beyond reading printed books. The change of reading as an activity will cause consequences concerning education – we must update our understanding of the text-concept, from the static and linear text on paper to the dynamic and compounded text which we find in the new media. We need a more nuanced understanding of what reading is in order to determine which skills and competencies one should seek to develop for our students (UiS 2020).

1.5 Research question

The present thesis aims to answer the following research questions:

What are teachers' perception of digital competence and skills concerning the digitised 21st-century English reading contexts?

Sub research questions:

1. What are teachers' thoughts and experiences with digital teaching and use of digital teaching aids?
2. What are Norwegian EFL teachers' experiences with *readtheory.org* – and to what extent does it have the potential to promote 21st-century reading skills – comparing platform developers claims with teachers in-class experiences of a digital and adaptive reading platform.

I will address these issues in light of theoretical perspectives of digital competence, digital teaching aids, and 21st-century reading skills.

2 THEORETICAL BACKGROUND

This chapter will serve as a theoretical background for this study. In the first section, I will explore different ways of understanding the concepts of digital competence, 21st-century reading skills and digital teaching aids. I will discuss Lund's (2019) and Erstad's (2015) notion of digital competence and digital literacies - and Alexander's (2012) elaboration of 21st-century reading skills. With this as a background, I will explain Gilje's (2017) definition of digital teaching aids and its didactical impact of the EFL subject – and theory of digital language learning. These concepts will be supported by a review of definitions of the terms given in the English subject curriculum of (LK 06/13) and the PDCFT Finally, I will give a brief presentation of the reading comprehension platform ReadTheory.org, which is this study's sub-focus.

The second part of this thesis focuses on a digital teaching aid's potential of enhancing students' 21st-century reading skills - I have chosen to explore the digital adaptive learning platform ReadTheory.org. The rationale for choosing this exact digital teaching aid is due to its algorithm-based adaptive system – which is found as an interesting new approach to implementing DTA in the Norwegian EFL classroom. One may argue that we are in the middle of a paradigm shift - which reflects how one teaches and how one learns. In this case, how one approach EFL teaching and learning. This discussion calls for exploration of four main theoretical perspectives: computer-assisted language learning, digital reading, professional digital competence and adaptive learning.

Chun claims that: "educators are under pressure to use technology to prepare students to live in a technologically interconnected, globalised world" (Chun, Kern, and Smith 2016, 65). Simultaneously, she addresses the issue of the technology focus in education and points towards the fact that digital learning environments can, in fact, weaken the language learning proficiency (Chun, Kern, and Smith 2016). So how can we determine what is preferable and less preferable digital skills in the modern language learning context, and are we more concerned about when and how these skills come in to play, rather than what these skills imply? To answer such a question, one must explore and investigate what today's digital language learning contexts can offer – and what intricate digital learning environments demands regarding skills and competencies of both teachers and students.

Given the increasing language interactivity and language exposure through the introduction of CALL, one must consider the consequences of how technology changes the English language learning environments and how these environments affect the learning process. Thus, it is consequently essential to evaluate the effectiveness of such technology for enhancing 21st-century reading skills. As Heift and Chapelle (2012) suggest, "The need exists better understand the new conditions for second language acquisition (SLA) brought about by the real language-related capabilities of technologies that many learners have access to on a daily basis" (Heift and Chapelle 2013, 565). On this background, CALL represents a multifaceted approach to practising English language reading in the modern context.

2.1 21st-century reading contexts

Reading is regarded as a cornerstone in language learning and is an important springboard for further education, - scholars, educators, students and pupils have always used reading to acquire knowledge and insight, as entertainment or for enlightenment in the target language.

Employing different digital media and semiotic modes to approach curricular content and develop one's English language acquisition may be beneficial for all English learners, and through this, the learner activates multiple senses and aids memory and processes of association (Ørevik 2018a).

In Norway, one frequently encounters the English language in many settings. EFL reading is beneficial in more than one way, Hellekjær (2019, 184) suggests that there are three main reasons to practice English language reading regarding the modern educational context: (1) Norwegian is a small language community, and higher education tends to use international literature on their reading lists, one must expect to encounter the English language in any field of study. (2) Globalisation and internationalisation call for strong English language skills in general, several sectors and higher education institutions prefer the English language as their language of communication. (3) Higher education institutions rely on supper secondary school to prepare students for (1) and (2) (Hellekjær 2019, 184).

Accordingly, EFL reading is crucial in the 21st-century society, as an instrument for acquiring new knowledge – and prepare oneself for a lifelong development in an internationalised and globalised society. Our international society demands sufficient English reading skills - strong reading skills is a requirement if students are to pay critical attention to

cultural connection, unfamiliar genres, contexts and ideologies embedded in a spectrum of material mediums (Chun, Kern, and Smith 2016). Together with mastering the written and oral aspect of the target language, reading is paramount to participate in English second language contexts such as academic education or interact with native English-speaking counterparts (Carrell, Devine, and Eskey 1988).

In terms of mastering the English language, the curriculum (LK06/13) stresses that reading is not just an instrument of language learning, but can be a key to interact with authentic language, culture and aesthetic experiences (Ørevik 2018a, 95-97). On this background, one may argue that sufficient English reading practice is a necessity when taking part in society in the form of education or work. The various reading contexts in English language learning are many, ranging from 'traditional print reading' to interactive communication through the Internet. Reading today differ significantly from reading in past generations, and the 21st-century has opened up new ways to read, and even redefined how we read. Today's Norwegian classrooms are now widely digitalised, and English language teaching instructions through ICT in Norwegian lower- and upper secondary school are now considered as standard. The majority of students are provided with laptops, others with tablets and smartphones (Røkenes 2019, 163). Such devices facilitate computer-assisted language learning, thus, allows pupils to enter digital reading environments. Computer technology both enlarges and enrichen the reading activities and bring new reading experiences to the English subject.

Moreover, the digital reading context is often found on the internet where the reader is given the opportunity to engage and take a more active part in the reading activity (Ørevik 2018b, 244). Viewing digital reading as an active process is coherent with the suggestions given by DeSeCo, and CEFR when digital skills were implemented into LK06/13. Interactivity was regarded as a central facet and claimed as a necessity when seeking "to lead a successful life in a well-functioning society". This is coherent with the top-down view – which suggests that the reading process is active – or even interactive (Carrell, Devine, and Eskey 1988).

Thus, the digital reading context may demand a new approach to reading – or at least a rethinking of how the 21st-century's technology-rich environments influence reading. D. Reinking et al. referred in Erstad (2015) addresses the notion of how reading shifts through the development of digital technologies – and points towards perspectives of reading in *The*

Handbook of Literacy and Technology - and how this changes the conception of text. This implies that media literacy relates to changes in traditional cultural techniques like reading and writing, and yet opening up new dimensions to what it means to be a competent reader and writer in our culture (Erstad 2015). On this background, one may argue that the concept of text has changed during the last two decades. Thus, when Alexander (2012) defines reading as a relationship between the reader and author via text, one can argue that the concept of reading has changed too. New reading contexts emerge from 21st-century technologies – so how do the 21st-century reading contexts differ from the contexts of our previous generations – and why do they demand our attention?

The fundamental difference between printed text and digital texts is found in its formate and its way of displaying more than text, such as hyperlinks, pictures, films, sound, etc. Hyper-reading differs considerably from typical print reading and hyper-reading stimulates different brain functions than print reading (Hayles 2010). Hypermedia is characterised by what has been termed "flexibility of information access" (Alexander 2012, 266). This entails a nonlinear presentation of digital information that users can access in any order. Hyper-media and hyper-texts allow readers to engage within the reading activity individually, to a larger extent than 'traditional' printed texts. Hypertext and hypermedia change the linear reading pattern and invite the reader to create a pattern on her/his own. Thus, one may argue that a digital reading context differs substantially from a traditional one.

Hayles (2010) raises the question of whether the digitisation of mediums and internet reading influence people's reading. If hyper-reading differs significantly from tradition printed reading, it is natural to explore the consequences of increasing hyper-reading and decreasing print reading. Some observers of language education have been concerned about the computer threatening language and literacy, however, studies suggest that there is no empirical evidence that computers interfere with literacy and language as we know it (Kern 2015). However, one must consider the possibility that this may change over time, and educators need awareness concerning the consequences of less 'traditional' reading and more digital reading.

For instance, a frequently debated issue of the digital reading environment concerns the cognitive demands when reading a hypertext compared to reading on printed paper. Several scholars suggest that pupils tend to have a better reading comprehension when reading a printed text, compared to its digital equivalent. Findings show that the cognitive

load increases when interacting with hypertext and that this increased load limits the amount of new information the reader can hold (Hayles 2010, 68; Mangen, Walgermo, and Bronnick 2013, 62). A study conducted on Norwegian 10th graders found that linear text reading on a computer screen consequently led to poorer reading comprehension compared to reading on printed paper. The 'active' features of the modes in a hypertext represented a heavier cognitive load and therefore might impede better reading performance (Mangen, Walgermo, and Bronnick 2013, 67). These are, of course, important aspects to consider when aiming to implement digital teaching in one's classroom – however, this discussion goes beyond the scope of this thesis.

First of all, in the 21st-century, 'traditional' printed texts are challenged by its digital equivalent. The digitalisation of texts brings three significant changes to the 21st-century reading contexts: (1) new genres and reading mediums, (2) extensive amounts of easily accessible information and curricular content, and (3) importance of critical awareness.

Like most Norwegian classrooms, the EFL classroom is greatly influenced by digitisation. Today, English language learners (and teachers) read on mobile phones, computers and tablets – these devices are generally connected to the internet. The learning environments of the 21st-century consists of digital infrastructure and technology-rich spaces, as well as web-based services and virtual forums in which we can form social relationships, communicate, collaborate, exchange information, or entertain ourselves (Kelentrić, Helland, and Arstorp 2017). The 21st-century is a new mega-context for considering reading because it brings with it new modes of reading, which beget new reading practices (Ng and Bartlett 2017, 19). This means that when the EFL reader may encounter new genres and new text-formats, the student must adapt to this matter, and approach the text with limited experience with such genres and formats. The 21st-century reading contexts are globalised, interconnected, accessible and a sociocultural intersection.

English reading is not isolated educational settings but happens in out-of-school contexts as well, maybe to a larger degree today than for 30 years ago. Digital natives (Prensky 2001) have a different approach in their seeking of new knowledge, they conduct Google searches, use Wikipedia, scanning online-news, and seek information from online chat groups, while previous generations would go to the library, buy newspapers and speak to librarians (Palfrey 2008). These features of the engaging interconnectedly through the Internet

are driven by the globalised processes such as the movement of people, marketisation and advent of new technology (Ng and Bartlett 2017).

Young learners have abundant opportunities to read when engaged in socialising, gaming and information-searching activities using the Internet (Ng and Bartlett 2017). The settings where young learners read and seek information are often complex and provide the learner with a wide and nurturing source of content. However, the opportunities are closely followed by challenges: Political thoughts, religious beliefs, and cultural norms are being spread across the globe in a matter of seconds and minutes through the help of new technologies. Multiple modes define the textual environment of the internet, it is unstructured and ill-defined – and a network of hyperlinks may challenge and even disorient the reader (Ng and Bartlett 2017). This draws upon the essence of the 21st-century reading settings: EFL reading is no longer confined within the content of a textbook's chapter – or the storyline in a novel - the language of the internet is concentrated, intricate, vague, challenging, entertaining and demanding. I argue that traditional reading practice is insufficient and that 21st-century reading practice should reflect the facets mentioned above.

On the background of the new aspects of reading introduced by the 21st-century contexts, I will attempt to shed light upon some of the aspects of 21st-century- skills and reading skills, and define 21st-century reading skills in keeping with Alexander's (2012) article *Reading Into the Future*. She stresses the complex and challenging nature of 21st-century reading: "How do we begin to capture the complex and challenging context in which today's students find themselves?" (Alexander 2012, 266). In sum, the 21st-century educational contexts may change the ways the learner interact and approach curricular content – content present itself through new channels and in new forms. This demands a certain level of awareness of this 'new' learning context and that one learns to adapt to it – which means developing a set of skills: 21st-century skills.

2.1.1 21st-century skills

'21st-century skills' is an important term in today's education, and I find it especially important to explore the term in the EFL context. As suggested by Røkenes (2019), English is the language of the internet, and the English language is tightly connected to globalisation and internationalisation. Writing and reading in English allows students to take part in the globalised community and the political, and sociocultural intersection on the internet. As stated previously, the internet provides students with abundant opportunities – however,

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acquiring the skills to take part in this intersection and to take advantage of these opportunities may be challenging.

21st-century skills origins from the US in the 1980s – the way of thinking spread to Canada, England and New Zealand through various projects. In recent years, it was put on the agenda in Norway too. A report from *Ludvigsenutvalget* from 2014 - through reviews of international projects and own research - points to ten central areas of competence. Competence of: subject, ICT, communication and collaboration, creativity and innovation, critical thinking and problem solving, metacognition and learning how to learn, personal and social responsibility, cultural awareness, life and career, citizenship – local and globally. Some of these competencies are already implemented in the Norwegian curriculum, and others are being implemented through LK20 from august 2020 and onwards (NOU 2014:7). I argue that all ten areas of competence are important and can be implemented in English language learning – and that the English subject is a suitable subject for acquiring and practising such skills.

21st-century skills share its complexity with the technology-rich 21st-century learning contexts, and I suggest that one can draw lines between 21st-century skills and digital skills. Sufficient skills in handling and navigating in technology-rich environments are requirements when efficiently and properly seek and extract information. Increased amounts of research raise awareness of the present and future challenges our education system is facing and calls for a thorough introduction of 'media/digital literacy' (Buckingham 2003), primarily because this term emphasizes that 'reading' (information access) shifts over time. When reading takes place in a digital environment, basic digital skills – or media literacy (see Erstad 2015), is a requirement. Through his own research on the educational use of digital technologies, Erstad has suggested categories concerning how to handle such 21st-century learning environments – this resulted in a framework of *media literacy* which is an extending arch of digital skills defined in LK06/13 (2015, 91-92)

Table 1: Different aspects and categories of media literacy. From: *Educating the Digital Generation Exploring Media Literacy for the 21st Century.* Erstad, Ole. 2015 *Nordic Journal of Digital Literacy* Copyright 2015 Oslo: Universitetsforlaget. Rendered with permission.

TABLE 1: DIFFERENT ASPECTS AND CATEGORIES OF MEDIA LITERACY.

Basic skills	Be able to open software, sort out and save information on the computer, and other simple skills in using the computer and software.
Download	Be able to download different information types from the Internet.
Search	Know about and how to get access to information.
Navigate	Be able to orient oneself in digital networks, learning strategies in using the Internet.
Classify	Be able to organize information according to a certain classification scheme or genre.
Integrate	Be able to compare and put together different types of information related to multimodal texts.
Evaluate	Be able to check and evaluate the information one seeks to get from searching the Internet. Be able to judge the quality, relevance, objectivity and usefulness of the information one has found. Critical evaluation of sources.
Communicate	Be able to communicate information and express oneself through different mediational means.
Cooperate	Be able to take part in net-based interactions of learning, and take advantage of digital technology to cooperate and take part in networks.
Create	Be able to produce and create different forms of information as multimodal texts, make web pages, and so forth. Be able to develop something new by using specific tools and software. Remixing different existing texts into something new.

Erstad (2015, 92) suggests that these categories are a step in the direction towards an operational definition of what media literacy in school practices. Seemingly, the complicated matter introduced by digital technology calls for a more 'in-depth' approach than what is suggested in LK06/13. The *media literacy* framework suggested by Erstad (2015) may provide teachers with more specific guidelines of how to approach the changing curricular work with digital media and help them see the importance of media literacy in order to develop 21st-century skills and 21st-century reading skills.

2.1.2 21st-century reading skills.

Ørevik (2018b) has observed that digitisation introduces fundamental changes to the text culture of the EFL subject. In line with this, the present thesis addresses aspects of 21st-century reading, as well as digital skills and how these aspects overlap when reading takes place in the 21st-century digital context. Ørevik (2018b) further suggests that: "Developing digital skills cannot be seen in isolation, however; these skills are closely connected to and depend on other basic skills […]" (Ørevik 2018b, 245). Reading skills and digital skills are both embedded in the English subject curriculum (Udir, 2013) – and have an essential place in the guidance of teaching and learning.

Reading skills are defined as one of five basic skills:

Being able to read in English means the ability to create meaning by reading different types of text. It means reading English language texts to understand, reflect on and acquire insight and knowledge across cultural borders and within specific fields of study. This further involves preparing and working with reading English texts for different reasons and of varying lengths and complexities. The development of reading proficiency in English implies using reading strategies that are suited to the objective by reading texts that are advancingly more demanding. Furthermore, it involves reading English texts fluently and to understand, explore, discuss, learn from and to reflect upon different types of information. (Udir, 2013)

Digital skills are defined in the following way:

Digital skills in English means being able to use a varied selection of digital tools, media and resources to assist in language learning, to communicate in English and to acquire relevant knowledge in the subject of English. The use of digital resources provides opportunities to experience English texts in authentic situations, meaning natural and unadapted situations. The development of digital skills involves gathering and processing information to create different kinds of text. Formal requirements in digital texts means that effects, images, tables, headlines and bullet points are compiled to emphasise and communicate a message. This further involves using digital sources in written texts and oral communication and having a critical and independent attitude to the use of sources. Digital skills involve developing knowledge about copyright and protection of personal privacy through verifiable references to sources. (Udir, 2013)

I suggest that the 21st-century readings practices are best viewed as a relation between these sets of skills – and investigated how such skills display themselves in the digital EFL 21st-century reading context.

When Alexander (2012) views reading through a lifespan developmental lense, she asks: "How do once-acclimating learners become armed with the knowledge, strategies, and motivation that would permit them to tackle increasingly more complex and demanding texts while addressing problems that require adaptive, reflective, evaluative, or critical thinking?". In line with this, I argue that English language learning and 21st-century reading contexts are more intricate than traditional contexts, and demands attention regarding which skills are required to master these contexts.

The influence of multimedia in reading development in the 21st-century must be taken into account, and one must also recognise that competent readers will be those who are capable of flexible adaptivity. This allows the reader to be both critical and effective in their reading engagement with various media, both traditional printed ones and web-resources presented on a screen. For instance, the internet may provide the reading pupil with numerous authentic, informative and entertaining texts – both in 'traditional'- and new genres. Alongside this extensive access, in the 21st-century new genres seem to emerge more quickly

than before. Consequentially this is due to the use of new technologies for communication and complex social, cultural, and strategic needs. Learners of English need to develop a genre awareness, which will enable them to operate also with new genres (Skulstad 2019, 52) – e.g., social media (SoMe) text formats, blogs, video-blogs, virtual reality (VR) environments. These new 'genres' differ substantially from traditional ones – in format, content and language.

2.1.3 Mass information.

The information age, according to the Cambridge Dictionary, is defined as: "the present time, in which large amounts of information are available because of developments in computer technology" (Information age, 30.04.2020). Information continually surrounds us and takes various forms, and we are increasingly being exposed to it. Numbers from Pew Research Center show that 93% of American adolescents, age 12 to 17, use the Internet on a daily basis (Alexander 2012). Data from "Barn og Medier" by *Medietilsynet* in 2020, show that 90% of Norwegian adolescents ranging from year 9 to 18 use social media and 97% own a smartphone – and 70% have access to a computer (Medietilsynet, 2020).

The information age's implication on reading can be viewed in two ways: increasing accessibility of high quantity of text and an expanding number of formats -in addition, new ways of engaging with new formats emerge. Interactivity is a central aspect of how pupils now engage with written texts, - involvement and interaction with texts is the highly valued form of literacy in educational contexts (Mary and Wendy 2008). This is coherent with the Vygotskian framework of how one view reading - the Vygotskian learner is active, ideally propelling herself forward in the process of learning and development (Edwards 2015).

Concerning the English subject, implementation of ICT may provide many changes, e.g. textbooks and teaching that aims to improve reading proficiency by providing extensive access to different kinds of text (Hellekjær 2005, 50). Hellekjær further suggests that ICT may be an alternative or supplement to EFL, and encourage, or even force pupils into other ways of reading – and even make pupils read more.

However, such standards fail to account for individual differences, in developmental trajectories, by reducing reading comprehension to the mastery of a scripted series of goals (Alexander 2012, 266). The key issues in trying to understand the implications of new digital technologies for children and young people are learning and literacy, or literacies in the

plural. Erstad (2015, 89) suggest that this is because learning and literacy are all about the ways we make meaning of information from resources in our environment.

Ørevik further elaborates this: in the Norwegian educational context: In the wake of unsatisfactory PISA results in 2001, the Norwegian system of education aimed to find potential areas of improvement in general approaches to reading. Rasmussen referred in (Ørevik 2018a, 101-102) addressed a lack of further development of students' competence in reading and literacy beyond basic decoding skills. As we move further into the 21st-century one needs to embrace the concept of reading that recognises its developmental and multidimensional aspects.

2.1.4 Critical and analytical reading

Although acknowledging that potential benefits for readers and learners in the 21st-century are considerable, we see these advantages as inextricably linked to challenges. The accessibility and varied formats of information now available also entail important opportunities for today's learners (Alexander 2012, 267). There is a common perception of an increasing focus on new competencies and new literacies in tandem with the emerging opportunities and possibilities of digital learning environments (Alexander 2019; Lund 2019; Røkenes 2019). However, Alexander (2012) questions the use of 'new' together with various competencies and literacies. She further stresses that one should propose a conception of reading competence that remains relevant for whatever textual and contextual situation arises today, tomorrow or decades in the future, rather than attempt to continually redefine reading or reading competence for a certain age.

Ørevik (2018b) claims that one of two main focus areas of digital skills in the English subject is to be able to encounter digital text resources with critical awareness. Such a focus should be prominent regarding the amounts of various texts being accessible to today's EFL learners. This is coherent with the observations of Alexander (2012, 266) when she suggests that vast amounts of information surround today's readers. Moreover, through the advent of the digital age readers now face e-books, blogs, hypermedia, databases and internet pages – both teachers and pupils will have to adapt, seek knowledge and understanding of how large data-bases of texts can be exploited to their advantage in the EFL classroom.

Chun, Kern and Smith (2016,73) further suggest that the EFL learner should possess the ability to critically assess to what degree meaning is enhanced or detracted from by

multimodal information- and that to become a critical user of digital tools and media is an essential aspect of new media literacies. Moreover, in all cases of encounters with digital reading, learners must be made aware of potential benefits or drawbacks of multimedia texts (Chun, Kern, and Smith 2016, 73).

Reading competence must be founded on a base of knowledge, which allows the reader to navigate sufficiently through the hazards or inaccurate and misleading content and information (Alexander 2012, 274). Further, through her review of the work of Chin and Anderson (2000; Clark et al., 2003) and Murphy and colleagues (2000), Alexander (2012) states, on the one hand, that the future competent reader will need more than the typical litany of reading-specific skills or procedures. Becoming a competent reader requires the ability to be analytical and critical in one's encounters with content and text, and interpret the content and purposes of such texts. According to Erstad (2015), critical thinking and critical evaluation of sources are essential aspects of media literacy. On the other hand, such competent readers must also approach the reading activity with an understanding of knowledge. Further, understand that the reading act fosters engagement and heightens their analytical and critical abilities (Alexander 2012).

Seemingly, critical reading can be viewed as a central aspect of reading competence and one may argue that sufficient ability to read analytically and critically will be highly important in reading further into the 21st-century. Ever-growing sources of texts and content of information accessible through the internet, call for educators' attention regarding instructing readers in how to handle and approach texts in the best possible ways. Alexander (2012) addresses challenges for readers in the 21st-century context and suggests that raises issues that were relevant also in earlier times. She further claims that the 21st-century reading students tend to treat printed text as authorless and as a decontextualised construction – which may hamper these students' development into critical and analytical readers. Finally, she suggests that such tasks of understanding and uncovering the intentionality and purpose of the author is a highly challenging task for students (Alexander 2012, 268).

On the one hand, reading instruction must provide the reader with tools – as well as an understanding of the possibilities, limitations, advantages and drawbacks of characteristics of internet resources. On the other hand, even though many digital resources and tools provide the pupils with good opportunities to work on their own, guidance and instructions from the teachers is paramount when exploring new ways to work in a digital learning environment

(Kelentrić, Helland, and Arstorp 2017). To summarise, 21st-century reading skills are a highly valued set of skills when encountering the digitised society and the various aspects of the information age. However, to acquire such skills, one needs learning environments which can facilitate such acquisition. In terms of language learning, such environments are defined as Computer-Assisted language learning.

Further, what divides 21st-century reading skills from traditional reading skills is critical and analytical reading and reading mass-information texts in various formats. Alexander (2012) suggests that reading competences arise from flexible, dynamic and adaptive configurations of those dimensions for the textual context we have at hand. Further, such competence will require nurture and instructional support.

2.2 Computer-assisted language learning as an approach to 21st-century reading skills development

Computer-assisted language learning as an approach to 21st-century reading skills development has two perspectives: reading with the aid from computers - and reading development in digital reading environments. Alexander (2012) suggest that the affordances of CALL are many and that arising new genres and hypermedia brings new ways to interact with reading material in the English subject. For instance, hypermedia and hypertexts allow the reader to navigate between different 'texts' by following links connected to, e.g. related texts, word explanation, sound clips or video on the subject addressed in the hypertext. Moreover, digital reading tends to take place with access to internet or through digital teaching and learning aids, which often provides the reader with massive amounts of texts to chose from, both curricular content and texts of various genres and formats.

Before one explores the potential advantages and opportunities a computer offers the reading activity, one must explore the various implications of the digital medium – and gain insight into the landscape of digital learning aids. This means asking what, how and why one should employ digital aids in the EFL classrooms.

2.2.1 Digital Teaching Aids.

For this study, I have chosen to address what Gilje (2017) calls: *digitale læremidler* as Digital Teaching Aids (DTA).

Digital teaching aids are complicated and call for an elaborate exploration of the term. In Lund's (2019) doctoral study, he addresses the lack of conceptualisation of technology beyond its instrumental features. This concern is shared by Erstad (2015) when he addresses the danger of becoming too oriented towards present-day technologies because changes and developments within available technology for learning environments are frequent.

This thesis will make use of Øystein Gilje's (2017) and *the Professional Digital Competence Framework for Teachers* (PDCFT) descriptions of teaching aids and tools. I find the given definitions most suitable for this study because the terms and themes are defined and described in keeping with the Norwegian school and the current curriculum (LK06). Gilje points to the 'Educational Act of 2010', §17.1 when addressing the terminology concerning learning aids:

> Learning aids are all published, non-published and digital elements which are developed for the sake of education. They can have single functions or have a larger overall function and should cover competence aims in LK06 alone or correlation with other tools […] (Udir, 2013)

In the discussion of teaching aid, analogue[6] and digital aids have not been separated; however, in the last few years, a growing interest in separating the two has developed.

Through a review of Norwegian research on DTA from the past few years, Gilje (2017) states that The Norwegian centre of information, communication and technology 'IKT-senteret' has attempted to investigate teachers' use of digital and analogue aids in their teaching. Gilje (2017) summarises these studies and suggests that lower secondary school, primarily, used analogue aids, whereas upper secondary had a mixed learning culture. In upper secondary schools, employment of DTA and analogue aids was balanced.

Further, according to Gilje (2017), the Norwegian educational discourse holds no established standard of DTA. Research issuing technology and ICT in education and schools have not come up with an explicit agreement concerning the terminology. This can be challenging and confusing when discussing and investigating DTA. However, if one looks beyond the Norwegian schools, the national centre for learning aid research in Denmark: Through the work from Hansen's (2010) *Læremiddellandskapet* and *Læremiddel.dk,* studies

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[6] Analogue in this context mean: traditional learning aids such as printed books, articles, newspaper, etc.

of the correlation between the use of technology and teaching aids, and three sub-categories of learning aids emerged:

Semantic learning aids: are not specifically developed to function in education. The teacher must adapt the semantic learning aids and use them didactically as a part of the teaching. Semantic aids have a given content of knowledge but are not purposely designed for education.

Functional learning aids: functional aids kan structure the teaching and may include both semantic- and didactical aids. These aids are employed as tools which handle content and work process in the educational context.

Didactical learning aids: are specifically designed for a given subject and a didactical purpose. Didactical aids are anchored in subject-specific goals or competence aims, and they are designed to provide teachers and learners with curricular content. Further, set a framework for the learning- activity and tasks. In addition, it provides the teacher with guidelines and supports him/her with further work (Gilje 2017, 43-44).

According to Gilje (2017), it is crucial that teachers possess the ability and competence in seeing how a teaching resource for learning can be used in the specific teaching context. The growing landscape of DTA challenges teachers – and sufficient knowledge and experience with DTA will be paramount in order to use them in a developing and nurturing way. Nevertheless, teachers' choice of DTA affect the students' learning environment, and to a degree, determine whether such environments are nurturing or not. There is a need to develop insights as to how the interplay between teachers, learners and technologies affect the English language learning classroom (Lund, 2019, 141). Thus sufficient knowledge and experience with various DTA should be paramount when teaching in the digital 21st-century classroom.

Findings from ARK&APP show that the amount of individual work increases in secondary and upper secondary school. Gilje (2017) further states that individual work clarifies the differences in students' approaches to different learning activities with the use of various aids. Variation in working methods entails a broader use of resources, which again provide the learners with learning situation which may enhance competences of source criticism, comprehension of signs and symbols and entail cognitive conflicts which will give increased insight over time (Gilje 2017, 97). On the one hand, increased individualisation

through digitalisation may rise issues: a more complex landscape of aids and resources in the classroom may cause a lesser class environment or enhance differences. On the other hand, some DTA turns explicitly its attention to the individual learner, giving the pupil time and opportunity to browse resources and tasks fitting her/him in terms of learning needs or interests – and take part in another learning context unavailable through the traditional classroom.

Some of the more sophisticated DTAs can be described by way of specific terminology. It is also necessary to define these terms for the purpose of a consistent discussion later on. 'Adaptive learning', 'digital developments', 'digital environment', 'digital resources' and 'digital technology': The *Professional Digital Competence Framework for Teachers* defines adaptive learning as follows: Adaptive learning is learning and teaching, in which digital resources are adapted on an ongoing basis, with the aid of algorithms to each pupil's measured level of skill and development (Kelentrić, Helland, and Arstorp 2017). In the later years, through the arising advancements of technology, algorithmic power and AI have reached the educational sector as well, and given us the very first sophisticated teaching aids.

2.3 Digital Adaptive Learning – Features of the 21st-century

When discussing digital teaching and DTA in the 21st-century, I suggest that the advent of adaptive learning demands attention. It has been acknowledged internationally as innovative and future-oriented. The *US Department of Education Office of Educational Technology* states that "technology-based learning and assessment systems [are seen to] be pivotal in improving student learning and generating data that can be used to continuously improve the education system at all levels" (Kerr 2016, 91). If this is to be evident, one must pay attention to how it may be implemented in today's classroom, and how one as teachers and students can learn to make use of such technology successfully.

The Professional Digital Competence Framework for Teachers defines adaptive learning in the following way:

> Adaptive learning issues learning and teaching, in which digital resources are adapted on an ongoing basis, with the aid of algorithms to each pupil's measured level of skill and development – Norwegian Centre of ICT in Education. (Kelentrić, Helland, and Arstorp 2017, 11)

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Adaptive learning must be kept apart from *adapted education.* Adapted education is embedded in the core curriculum (see Haug 2012), and is defined as a tool which seeks to facilitate increased learning outcome for each pupil (Udir, 2013).

Adaptive learning has been outlined as a 'hot concept' that is 'poised to reshape education' (Webly 2013 in Kerr 2016, 91). In Philip Kerr's exploration of the term adaptive learning in a technology educational context, he gives the following definition: "… we can define it as a way of delivering learning materials online, in which the learner's interaction with previous content determines (at least in part) the nature of materials delivered subsequently. The process is automated, dynamic, and interactive. Its purpose is to generate a personalized learning experience." (Kerr 2016, 88).

Herein, material, learner interaction and personalised learning experience are essential aspects of adaptive learning. Smith (2016) elaborates on the term and claims that it applies to a range of techniques and technology which make use of student monitoring software, which measure and analyse each students' performance and engagement. Such a process often takes place in an online environment, or in a virtual learning environment (Smith 2016, 101).

Generally, the individual student acquires new knowledge in different ways, speed and through different sources - adaptive learning and teaching aim to offer ways to meet such differences.

Figure 1: Difference between traditional and adaptive learning pathways (From Smith 2016)
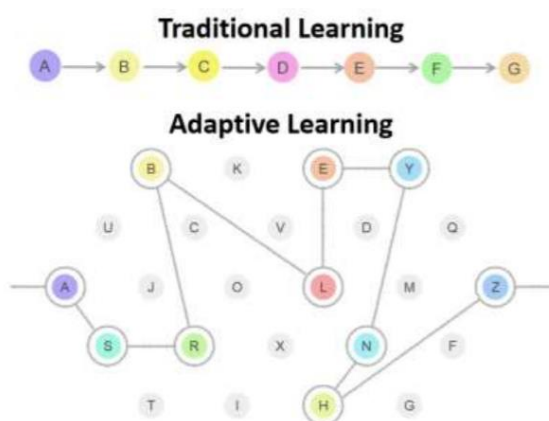
The difference between traditional learning and adaptive learning is simplistically illustrated in Figure 1 (Smith 2016).

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Adaptive learning as a concept views learning as a cumulative and linear process. It assumes that the learning process is fragmental and can be analysed bit by bit, or one small 'learning objective' at the time and that these smaller 'learning objectives' can be organised systematically (Kerr 2016, 90). However, even though English language learning may be taught in fragments, good language acquisition demands a combination of several 'learning objectives'. Thus, one of the problematic aspects of adaptive learning is that it accommodates only a limited part of what constitutes the subject of English. Such learning paths are often limited to a given learning objective and tend to neglect broader aims in the subject curriculum. This calls for sufficient understanding of when and how to employ such platforms – and knowledge of whether it can be a reliable source of curricular content or merely a supportive tool. On this background, I suggest that educational scholars, teacher educators and teachers have a responsibility to thoroughly explore the jungle of new DTA and determine whether one should implement these as standards in English language learning in the future.

The recent years, we have seen emerging adaptive systems which focus on skills such as vocabulary, grammar and reading – such systems tend to limit a broader EFL learning context which includes aspects such as intercultural competence, exploration and personal development. A majority of learning platforms and drill and practice tasks follow the linear and cumulative model of adaptive learning, however, in the recent years, we have gained access to more sophisticated and smart learning systems which are dynamic and allow the interactive data from the learner's input to modify the 'learning objectives' which again modifies the systematic 'knowledge graph' (Kerr 2016, 90). In EFL learning this would mean that students of English could learn English in a more personalised way – e.g. students with good vocabulary skills, but less competent in grammar and syntax could with the help of adaptive learning systems focus on advancing these kinds of skills based on his/her skill level – and rule out tasks and learning content focusing on vocabulary. This sophisticated interactive learning system is the baseline of the intelligent language learning platforms we have access to today, such as DuoLingo, Quill and ReadTheory – platforms developed for students to practice vocabulary, syntax, grammar and reading.

Further, Røkenes (2019) has reviewed findings from international studies on language teaching[7] where ICT is highlighted as effective for learning and teaching. Several aspects of

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[7] Golonka, Bowles, Frank, Richardson, & Freynik, 2014; Stockwell, 2007

language learning were investigated, for instance, a study of how automated speech recognition (ASR) was conducted, where the conclusive matter was that ASR could facilitate the improvement of pronunciation and that such systems could provide efficient and valuable feedback to the individual learner "to a larger extent than human teachers can" (Røkenes 2019, 167).

Sophisticated technology promotes two significant advantages of computer-assisted language learning: efficiency and accuracy. Taking the advancements of algorithms and AI into consideration, one assumes that computers do, and will, outsmart human teachers in terms of collecting learning patterns and learning input from pupils. Assessing each pupil's work is time-consuming and challenging, and giving feedback often takes time, and often takes place out of the learning or assessment contexts. With adaptive CALL systems, pupils may be provided with assessment and feedback directly after the given learning or assessment activity.

The adaptive learning model created by Paramythis and Loidl-Reisinger (2003) points towards the practical aspects of adaptivity, and that it should regard questions of what, when and how. What can be adapted, when should it be adapted and how will it be adapted will be key factors if adaptive language learning systems should contribute to operationalising new standards of English language practice (Paramythis and Loidl-Reisinger 2003, 372).

Adaptive learning systems aim to provide the learner with support, support of individual characteristics based on each learners differences. A crucial aspect of adaptive learning is not only to support the individual with personalised features regarding learning resources, but also provide individual support to the individual process of learning, and learning strategies (Bian and Xie 2010, 203-204). There is no doubt that among a large number of language learners, there are as many ways to approach the learning processes.

Traditional learning environments only facilitates so many ways to learn a target language, but through the expanding landscape of language modes, material, tools, resources and media, the paths to explore language individually expands in a similar fashion. Learning occurs in different modalities, traditional flat or linear presentation of the material may not be ideal for every student in every context. With this said, traditional learning materials also employ different modalities, such as speech, pictures and sound. A personalised and adaptive approach aims to place the students at its heart and is inclusive; giving all an equal opportunity to succeed and this technology provides a mechanism to deliver a genuinely

innovative and flexible curriculum contribution (Thompson 2013; Smith 2016). In terms of English proficiency adaptive learning may

Adaptivity in language learning, especially in reading, may foster motivation and joy of language encounters, because these encounters meet the aims to meet the individual pupil, not the other way around. Information is absorbed in a highly personalised way, not hierarchically, alphabetically or in a linear fashion. Reading, encountering, and engaging with information through text is a based on one's individual base of experience and knowledge, and from that basis the reader will absorb new information and knowledge (Clark 2014, Bain et al. 2010 in Smith 2016).

Among the growing landscape of such adaptive learning platforms, ReadTheory.org is an adaptive reading comprehension platform used around the world for practising English language reading. To illustrate and exemplify the affordances of digital reading environments and to address the potential implication of DTA in 21st-century reading instructions, this thesis explores the potential of ReadTheory. Section 2.6 describes how ReadTheory works.

2.4 Digital English language teaching

At the time of writing this thesis, the department of education presents a new curriculum (LK20), which will be implemented officially in all Norwegian schools from august 2020 and onwards. Drafts from the past two years have indicated an increased focus on digital learning and teaching where digital skills and digital competences are highly valued basic skills. However, this is not a new focus; over the last 30 years, the Norwegian schools have gradually attempted to digitalise classrooms and learning environments.

According to Erstad (2010, 89-92), the Norwegian school has been through three phases of ICT implementation, which aimed to digitise teaching in Norwegian classrooms. With arising algorithm-based platforms and highly sophisticated AI-engines, one can expect game-changing approaches to how we teach and learn in the coming years, this considered, one may argue that we find ourselves in a "fourth phase". Erstad (2010) states that the introduction of ICT in schools is not only an aim in itself, but that digital implementation will be of great importance not only in short terms, but also an essential resource for long term pedagogical and tech-didactical development (Erstad 2010, 66).

Further, there is room to suggest that the 'fourth phase' of digitalisation marks a shift in how we view technological interaction in education and how we conceptualise and discuss

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the consequences of such interactions. However, arguably, such interactions come not without potential challenges, for example, one must consider to what extent computer interaction covers the principles and values of the subject curriculum of English – and whether it covers the basic principles of English language learning better than 'traditional' teaching and learning. In fact, English language learning seen through a developmental lens require practice with aspects beyond 'language skills' and should include encounters with sociocultural, historical and political content.

These views are split - Kerr (2016, 10), suggests sophisticated adaptive systems can provide detailed data about the learners' interaction with the software and facilitate better learning conditions. However, for teachers to be able to act on this data, it requires digital competence – and perhaps even a rethinking of their roles as teachers in the future digital classroom. This is also stated by *The National Centre for Reading Education and Reading Research* (The Reading Centre) at the University of Stavanger, which is in charge of developing and administrating the National Strategy For language, Reading and Writing 2016-2019:

> The school of the future will be technology-rich, both in terms of how students learn and how teachers instruct. Digital technologies will, to an increasing extent, be implemented at all levels of education, from pre-school to upper secondary school. Framework plans and steering documents in Norway focus strongly on the increased use of IT. The development is fast-paced and places new demands on teachers. (Rongved, 2018, my translation)

Lund (2019) also suggest that teachers' digital expertise is an important factor in a sustainable and future-oriented educational context and that teachers' ability to work as the more knowledgeable peer in technology-rich settings has become an essential part of their teacher profession in the 21st-century (Lund 2019, 143).

Lund further states that interest in teachers' professional digital competence (PDC) has increased in recent years (2019, 156). However, he contends that PDC is not an established concept or practice – and suggest that much research remains until a robust conceptualisation of this competence defined. This is coherent with what Erstad (2010, 93) suggests: "The concept regarding new technology and education is unclear and unsystematic" (My translation). Moreover, Lund addresses the connection between PDC and the learning sciences and fundamental assumptions of learning as an important element.

On the one hand, today's pupils, often called digital natives (Prensky 2001), tend to have quite a repertory of the features of internet and technological devices, whereas many teachers struggle to follow the rapid development and the constant shifts of, e.g. trending social media and web platforms. The pupils' digital lifestyle makes their average school day full of digital and technological impulses, many of them viewed as distractions (Krumsvik 2013, 530). This might gap between students and teachers might be challenging when aiming to advance and develop teaching and learning in parallel with digital technology.

On the other hand, teachers have been criticised for not being digitally competent, and many teachers themselves acknowledge this critique and state that their digital competence is coming short. Even though we have seen a strong attempt to implement ICT in Norway, compared to other countries, two different studies on teachers' digital competence show that almost 1 of 3 think they lack own competence to use digital tools in their teaching (Krumsvik 2013, 539). This calls for a discussion of what the able digital teacher entails. The *Professional Digital Competence Framework for Teachers* (PDCFT) states that a digitally competent teacher is able to understand how digital developments are changing the content of subjects, is aware of the functions of digital media in today's society and knows how to guide learning work in a digital environment (Kelentrić, Helland, and Arstorp 2017).

Associate professor in English didactics Frederik Mørk Røkenes has the recent years investigated teachers' professional digital competence (PDC) and addresses the importance of the matter: In order to meet the requirements of language teaching in today's digitalized schools and networked world, language teachers need professional digital competence (PDC) in subject disciplines such as ESL (Lund, Furberg, Bakken, & Engelien, 2014; Tømte, 2013 in Røkenes 2019, 163). Røkenes (2019), further suggests that today's teaching and learning contexts call for an increased focus on PDC.

The *Professional Digital Competence Framework for Teachers* (PDCFT) from 2017 was created to give substance and meaning to the concept of teachers' professional digital competence. The term 'Teachers' professional digital competence' was first introduced in 2012 by *The Norwegian Centre for ICT in Education.* They highlighted the importance of competent teachers in the process of digitalisation of schools and stated that teachers played a key role in the development of digitally competent pupils (Kelentrić, Helland, and Arstorp 2017). The framework is a guidance document which aims to guide everyone involved in the educational sector, from the department of education to the student-teachers in their encounter

with digital education. Teachers' professional digital competence is dynamic and complex, and it covers a range of different elements: subjects and basic skills, school in society, ethics, pedagogy and subject didactics, leadership of learning process, interaction and communication, and change and development -all seven areas are viewed equally important (Kelentrić, Helland, and Arstorp 2017). However, for the scope of this thesis, I will only briefly introduce three of them: Subject and basic skill, pedagogy and subject didactics and leadership of learning processes.

To provide pupils with a nurturing digital learning environment teachers need to understand how digital developments may expand and change the content of subjects and working methods. Besides, teachers also should possess knowledge of how digital development give increased opportunities for access and sharing of professional knowledge (Kelentrić, Helland, and Arstorp 2017; Alexander 2012). An example of this played out in the educational situation during the COVID-19 outbreak spring 2020: teachers from all over the country assembled through Facebook-groups, google folders, and other digital platforms - where they shared ideas, digital sessions, platforms, etc. Such mediums allow teachers to meet across schools and regions - and for massive amounts of information to be shared systematically and in a way that it is easily accessible.

The framework also suggests that the able teacher needs to make use of digital technology, teaching material and learning resources to support the students in achieving competence aims and utilise digital teaching materials and digital learning resources to support the development of all five basic skills (Kelentrić, Helland, and Arstorp 2017). The relationship between digitalisation of education, teachers' digital competence and the pupils' digital skills development is a complicated matter. In keeping with suggestions from Røkenes (2019), I find room to claim that handling this development is given too little focus in the EFL classroom.

The rationale for implementing digital- resources, aids and tools in teaching can be varied, and digital learning environments do not simply replace analogue ones, and well-working strategies and methods do not necessarily apply directly to digital equivalents. For the digitally competent teachers, there needs to exist an understanding of the relationship between several factors: aims, content, assessment, teaching methods, students' preconditions for learning and development in a digital environment. Thus the digitalisation of learning and teaching environments requires rethinking pedagogy and subject didactics. The PDCFT

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suggest that teachers should possess pedagogical knowledge as well as knowledge of subject didactics relevant to the practice of their profession in a digital environment (Kelentrić, Helland, and Arstorp 2017, 7).

There are several elements to consider when aiming to implement new aids and tools, and due to the large volume of options, it can be challenging to chose suitable resources. Røkenes (2019) describes this challenge from the perspective of teacher-student education in Norway - and addresses how one can understand teachers' development of digital competence: Research shows that teachers' use of ICT differs from other professions, which calls for a development of PDC among teachers, teacher educators, and student teachers. Accordingly, PDC can be understood as: "the teachers/TEs' [teacher educators'] proficiency in using ICT in a professional context with good pedagogic-didactic judgment and his or her awareness of its implications for [digital] learning strategies and the digital Bildung of pupils and students" (Krumsvik 2011, 44-45). Moreover, Røkenes (2019) stresses the importance of teachers' professional digital competence and that it enhances awareness of how teaching with ICT affects pupils' learning.

Furthermore, the framework suggests the requirements of skills of locating, critically evaluating, choosing and integrating digital teaching materials and digital learning resources based on pedagogical, subject didactic and professional criteria. Such skills require experience and time to explore, test and evaluate. This also implies planning and reflecting on teaching in a digital environment based on several factors: steering documents, collaboration with others, experience-based knowledge and research. The ability to foster individual pupil's motivation and desire to learn in addition to facilitate digital learning environments which foster faith in own learning capacity, ability to create, interact and share, are crucial competences of the competent digital teacher (Kelentrić, Helland, and Arstorp 2017). Standards for digital competence needs to be set, and rethinking pedagogy is a requirement for meeting the future education.

The third dimension of PDC concerns teachers' ability to exploit digital resources at hand. A professional, digitally competent teacher possesses the competence to guide learning work in a digital environment (Kelentrić, Helland, and Arstorp 2017, 8). The teacher must make use of the opportunities inherent in digital resources in order to develop a constructive and inclusive learning environment and to adapt the teaching to both diverse groups of pupils and pupils' individual needs. Moreover, the PDCFT stresses that teachers can assess

individual learning needs, and make use of the opportunities that digital technology, digital teaching material, and digital learning resources provided for adapted teaching and special education (Kelentrić, Helland, and Arstorp 2017). Knowledge of the pupils' learning needs, together with a broad repertoire of resources and tools, may strengthen the personal learning environments, giving each pupil material and methods best suited to their level and learning objectives.

The teachers' knowledge of digital resources or tools must be sufficient to the extent that they can contribute and adapt their teaching roles in the digital learning environment. Such roles can shift from tutor, guide, participant, instructor and intermediary (Kelentrić, Helland, and Arstorp 2017). Many digital resources and tools provide the pupils with good opportunities to work on their own, however, guidance and instructions from the teachers are paramount when exploring new ways to work in a digital learning environment (Kelentrić, Helland, and Arstorp 2017) – even in personalised and adaptive learning environments, such as provided by the digital adaptive reading comprehension platform ReadTheory.

2.5 Teacher cognition

When aiming to understand the potential implications of digital teaching- both from practical and theoretical perspectives - including aspects of teacher cognition, may be helpful to gain a deeper understanding of the issue and serve as an interesting research approach. Language teaching is a complex subject, and teachers' thoughts and experiences concerning classroom activity and education should be given considerable attention in discussions of language education development. Borg (2008) states that language teachers' actions are underpinned and influenced by a range of pre-active, interactive and post-active cognitions which they have. However, the relationship between cognition and language teaching practice is neither linear nor unidirectional.

Given that digital teaching and DTA issues new aspects compared to 'traditional' teaching, thoughts and experiences of teachers may be considered highly valuable for further advancement within the field – both in research and in teaching practice.

In his review of research concerning teacher cognition, Borg (2008) claims that it is an increasingly international phenomenon. Teacher cognition is a diverse field of research, and Borg classifies the various aspects into three main categories: pre-service teachers, in-service teachers and specific curricular domains. Borg's model of teacher cognition is a good point of

departure when aiming to investigate teachers' thoughts and attitudes on a given theme or subject. His model presents the relationship between schooling, professional coursework, contextual factors and classroom practice. These four aspects create the basis of teacher cognition – and allow the subject to be investigated upon from several perspectives, fragmented and in the broader context where the four aspects are viewed in relationship to each other.

Schooling concerns the extensive experience of classrooms, which defines early cognitions and shapes teachers' perception of initial training. This leads to professional coursework which may affect existing cognitions although especially when unacknowledged, these may limit the impact.

Contextual factors may influence practice either by modifying cognitions or else directly, in which case incongruence between cognition and practice may result. This can affect classroom practice, which is defined by the interaction of cognitions and contextual factors. In turn, classroom experience influences cognitions unconsciously and/or through conscious reflections (Borg 2008, 82)

This thesis will make use of a selection of specific concerns of language teacher cognition: *Cognitions and reported practices of in-service teachers, cognition and actual practices of in-service teachers'* and *'teachers' cognition and/or practices in relation to the teaching of reading'* (Borg 2008, 47).

The study of language teacher cognition has made a significant contribution to our understandings of how teachers learn, what teachers do, and the cognitive bases for their actions. In terms of how language teacher cognitions is defined, one particular challenge is posed by the array of concept and terminology (Borg 2008, 272). Under the term teacher cognition lays *knowledge, beliefs, attitudes, conceptions, theories, assumption, principles, thinking and decision-making.* Borg (2008, 273) further suggest that studies of what teachers do should be integral to the study of language teacher cognition, given that the aims of such studies are to understand teachers and teaching better, not only describe in theoretical terms what teachers believe and know.

Further, there is evidence that knowing a subject is insufficient as a fundament for skillfully teaching a subject. This is particularly germane to the language teaching field, where belief may still persist in some quarters that one's status as a native speaker of a language

(and knowledge of the language which status is assumed to imply) in itself qualifies on to teach it (Borg 2008, 81). By comparing teacher reports, theory and curricular guidelines, one may reveal discrepancies between practice and curriculum intentions. Teacher reporting on the same subject may also lead to new perspectives and approaches to the subject being studied. When studying practical aspects of language teaching and learning – and especially first-hand experience and thoughts on specific aspects of classroom teaching, teacher cognition is considered paramount in this context of research. I argue that the relationship and potential correspondence or discrepancies between EFL teaching theory based on previous research and classroom experience described through teacher cognition is one of the most important approaches to improve and advance EFL teaching standards for tomorrow's classroom.

2.6 ReadTheory

Readtheory.org is an American developed reading comprehension platform. It is designed to meet the standards of the Common Core[8]. The common core is the American curriculum which concerns principles of learning in the American school system. The platform provides the full range of reading levels, from elementary schools reading to challenging passages of college-level. However, readtheory.org is used in classrooms all around the world, also in Norwegian English teaching classrooms. By employing readtheory.org, teachers can provide each learner with an individual learning environment and track their progress through automatic feedback in the form of statistics, graphs and charts.

The platforms design model and practical user process can be divided into five phases: (1) the pretest, (2) the reading, (3) reading comprehension quiz, (4) feedback, and (5) progress rapports.

(1) The pretest – When starting off using RT, each learner will be prompted to complete a pretest – a 10 question test which aims to measure the learner's reading comprehension skills and critical thinking abilities. This information gathered through the platform's algorithms will calculate the level of the learner, and this level will be the starting point of phase (2).

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[8] The Common Core: Building on the best of existing state standards, the Common Core State Standards provide clear and consistent learning goals to help prepare students for college, career, and life. The standards clearly demonstrate what students are expected to learn at each grade level, so that every parent and teacher can understand and support their learning. http://www.corestandards.org/read-the-standards/ 27.04.2020

(2) The reading – readtheory.org is mainly a reading practice aid. Readtheory.org provides the reader with a wide range of different texts – these passages can vary from being created by the developing team for the purpose of ReadTheory in keeping with Lexile Framework[9]. The Lexile Framework for Reading is an American developed approach to measuring both reading ability and text complexity of reading materials on the same developmental scale. Passages can also be authentic excerpts from articles from various online databases. The level of the texts depend on results from the pretest, and will automatically adjust after new passages are read and new post-quizzes completed.

(3) Reading comprehension quiz: the reading comprehension platform aims to provide each user with level adapted questions connected to the reading passages. Through the reading comprehension quizzes, learner's will be tested in how they have understood the text, in terms of content and information, and the text's structure, arguments and intention. A wide range of questions is designed to feed RT's algorithm with the right input in order to generate new passages even more fitting for the reader. Figure 1.1 illustrates an example of a passage and one of eight questions related to this passage.
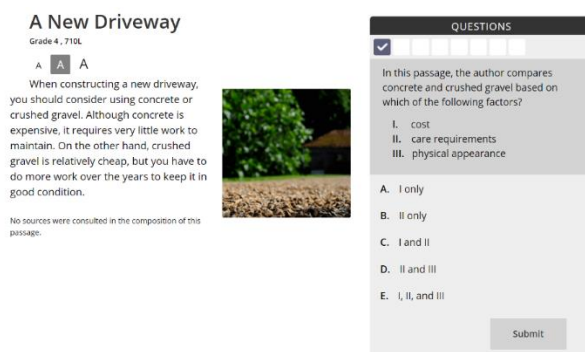
Figure 2: Example - text passage 1   Figure 3: Example - quiz rapport 1

(4) Feedback – Feedback is an integral part of the learning process. RT provides the learner with feedback in the form of written explanation and in number and statistics. Figure 1.2 shows how feedback is presented to a learner after completing a passage with its corresponding quiz. The learner will see a score, as well as knowledge points. Finally, an explanation of the results is given, giving information on whether the level on ones reading passage will go up, down or stay at the same level. In this way, the learner is at all time aware of his/her progress.

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[9] The Lexile Framework for Reading https://lexile.com/educators/understanding-lexile-measures/

(5) Progress report – ReadTheory aims to provide the teacher with an efficient and easy reading aid. Each student's activity is measured and saved within the platform, providing the teacher with information about workload, progress and reading level for each student. Reading progression and reading level are factors which may be challenging to measure and assess – ReadTheory progress rapports seek to give the teaching a picture of how students progress in relation to the rest of the class and to standards provided by the Lexile Framework.

2.7 Summary

To summarise, the digitised 21st-century EFL classrooms calls for an understanding of central aspects such as 21st-century skills, digital skills, reading skills of the 21st-century, digital teaching aids and professional digital competence. Working and reading in digital learning environments have both affordances and challenges – and requires competence among learners and instructors. This chapter has presented perspectives of 21st-century skills professional digital competence, DTA and 21st-century reading skills display themselves in the English subject, and a given an outline of what this implies in the Norwegian EFL classroom—finally attempted to point at the importance of sufficient 21st-century reading skills in today's educational context. Working with DTA- and digital reading demands a rethinking of reading competence – and calls for an investigation of how readers interact with texts and approach reading in modern digital learning contexts. 21st-century reading environments often consist of large amounts of information, the information presented through multiple modes and genres, traditional, or new ones. The skilled 21st-century reader must be capable of navigating in mass-information texts – understand and utilise the benefits of hypermedia, hypertexts and multimodal texts to seek curricular content and new knowledge. When the learners aim to develop such skills, careful and thorough instructions from teachers are paramount – and there are no evident reasons to suggest that teachers will lose this role and be replaced by computer technology. However, I would argue that digital technology has and will force us into rethinking the teachers' role in the EFL classroom.

3 METHODOLOGY

3.1 The nature of research

For the present study, I chose to employ different approaches in order to touch upon a broader empirical landscape and seeking an opportunity to shed light on the research question from multiple angles. Thus, this would give a more nuanced analysis of the quantitative and qualitative questionnaire data, and the qualitative document analysis data from *ReadTheory*, and create a more substantial base of problematising this study's focal points. The fundamental idea in empirical research is to make use of data to develop and test ideas in order to answer questions (Punch and Oancea 2014). Empirical data takes many forms and can be obtained through several approaches and, the researcher delimits these forms and approaches, first and foremost, by creating (a) research question(s). Choice of design and approach set additional outer frames of the study.

The first step in a research process is generally to construct (a) research question(s) and by doing so, determine where one wants to go next. Consequently, methods have to be determined by the objectives of the study - they are chosen because the researcher judges them to be the best ways to obtain answers to the research question. Mackey (2005) suggest that the research term can be described as follows:

> A systematic process of collecting and analyzing information that will investigate a research problem or question or help researchers obtain a complete understanding of a situation (Mackey 2005, 364).

What the present research entails is described in the following sections.

3.2 Research methods

This study attempts to shed light upon how teachers perceive digital competence, 21st-century skills and 21st-century reading skills - and how digital teaching aids fits in the EFL classroom – and its implication on digital reading practice and potential to foster 21st-century reading skills.

What are teachers' perception of digital competence and skills concerning the digitised 21st-century English reading contexts?

Sub research questions:

1. What are teachers' thoughts and experiences with digital teaching and use of digital teaching aids?
2. What are Norwegian EFL teachers experience with readtheory.org – and to what extent does it have the potential to promote 21st-century reading skills – comparing platform developers claims with teachers in-class experiences in the EFL classroom.

This chapter presents and explains the research framework for the study. A description of the methodological approach chosen in order to answer the research question will be given. The following sections will present method, approach and design of the research.

The research material of the present study consists of data obtained through a teacher questionnaire and a document analysis. Further details concerning the material will be presented related to the respective methods. Finally, the last sections will cover the present study's validity and possible limitation.

There are two main approaches to research: quantitative and qualitative. The quantitative research relies on quantitative data, put in simplistic terms: quantitative data can be defined as data in the form of numbers (Punch and Oancea 2014). Creswell (2014) claims that, typically, the purpose of quantitative research is to create generalisations from a large study sample which again allow the researcher to make inferences about attitudes or characteristics of the sample.

A qualitative approach, on the other hand, make use of qualitative data. Researchers who chose a qualitative approach aims to explore a matter more thoroughly by collecting in-depth data from a smaller number of sources (Cresswell 2014). The present study makes use of open-ended questions and document analysis as sources of qualitative data. This data often contain information of thought, attitudes, experiences, etc., of the participating informants.

Both quantitative and qualitative methods have advantages and disadvantages, both in the procedure of collecting the data, but also concerning the study's analysis and discussion. Since the two methods come with weaknesses and strengths on both sides, a mixed-method approach is often used in modern research. This entails a combined approach, which often gives a complete understanding of the subject. Mixed method research is usually defined as: 'research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single

study or program of inquiry' (Tashakkori and Creswell 2007: 4 in Creemers 2010, 116). The present study makes use of a mixed-method approach, where the qualitative data is deemed as the primary data – and the qualitative is viewed as subordinate and supportive. Creswell (2012) addresses the mixed-method research design as beneficial when the researcher wants a better understanding of the research problem.

The current study collected both quantitative and qualitative data simultaneously through a questionnaire distributed among teachers and analysis of documents. The data sets from both were analysed in keeping with the research questions – and aiming to support and contradict each other in the discussion. Thus, this study can be seen as a convergent parallel design (Creswell 2014, 15). This design tends to collect the data at roughly the same time and merges the overall data into the interpretation procedure. There are several benefits one can draw from a mixed-method approach, however, the main reseason, according to Creswell (2012), is that a combination of qualitative and quantitative methods provide a more robust understanding of the research and the research question than when used on its own.

A mixed-method approach strengthens the study's breadth and builds credibility. Multiple perspectives on the research problem provide the research with a more nuanced view. Generally, this is one of two main reasons for choosing a mixed-method approach. A typical rationale for choosing a mixed-method approach is to include follow up data in the data collection procedure, where qualitative interviews are conducted after a quantitative questionnaire is completed (Creswell 2012). Such a procedure provides the study with two different evidence sources from the same sample. This study, however, combines two different sources of evidence from two different samples.

3.3 Research design and instruments

The overarching aim of this thesis is to examine teachers perception of digital competence, digital teaching aids – and 21st-century digital reading in the EFL classroom. The focal points of the research are the reported attitudes and opinions of the responding teachers, so, overall, a study of such character would correspond best with an overweight of qualitative approach (Creswell 2014). The study was carried out with a questionnaire answered by teachers combining elements of the quantitative and qualitative approach - which sought to investigate teachers' perception of digital teaching and digital competence concerning the 21st-century EFL classroom. In addition, a document analysis was included in order to shed

light on the potential of employing Readtheory.org in the EFL classroom. This document analysis is based on documents issued by the developers of the ReadTheory platform.

The present study bases its findings on data from a survey where teachers gave answers to a questionnaire, which consisted of both close- and open-ended questions. This data will be combined with data from a document analysis – which seeks to gain understanding and insight into the developers' thoughts and perceptions of their digital reading platform ReadTheory. I find the opportunity to compare experiences from teachers and claims from the developers as an interesting approach to a discussion of digital teaching aids in the EFL classrooms. Further details of the two will be given, in connection with a presentation of the corresponding methods and research design.

This study combines quantitative and qualitative elements in the data collection procedure and the procedure of analysis. As such, the research design employs two instruments for the data collection - a survey where a digital questionnaire was used, in combination with a document analysis of official and unofficial documents from ReadTheory. The merged data provided me with a good basis for further analysis and discussion in keeping with the research question(s).

The research design is presented in two sections: (1) Teacher questionnaire - the quantitative- and qualitative part, (2) Document analysis - the qualitative document analysis. These sections will be followed by a description of how the data from both designs were analysed.

3.3.1 Population and sample

The sample for this study consists of data from a defined population. So before describing the sample, one must consider the population. Creswell (2012) defines a population as a group of individuals of a particular character, and this character distinguishes them from the rest. This entails that the population have some common characteristics, features or functions which allows the researcher to target such a group.

The present study's target population or sampling frame is Norwegian English teachers, teaching lower- and upper secondary school classes, in addition, these teachers would have to be familiar with the ReadTheory platform. So with one more variable added to the population criteria, the population decreased. Targeting a population belongs in the early stages of the research process, and together with sketching up the research question(s) makes

a good entry point for the study. Targeting a population is not necessarily a straight forward task, this is due to potential lack of availability and the researcher's practical limitations in terms of time and resources (Creswell 2012). I reached out to the possible sampling frame through the social media platform Facebook, and distributed the request of participation through various 'groups' for Norwegian English teachers located early in the research process – seeking a sample for the present study.

According to Creswell (2012), survey researchers collect and study a sample, then attempt to generalise results from this sample. The sample is often defined as a subgroup of the population that the researcher plans to study for generalising about the population (Creswell 2012, 142). The individuals that actually are included in the research is often called, in operational terms, the sample. The present study's sample: Norwegian English teachers who are familiar with ReadTheory and chose to give a response to the questionnaire. Thus, the sample is random and had no other knowledge or insight to the project than presented information in the distributed request of participation: respondents were fully informed of the research's purpose and given a description of the project, ensured their full anonymity and security through this project being proved anonymous by NSD. Survey research often requires a large sample so that the sample can represent similar characteristics to the target population (Creswell 2012).

3.4 Teacher questionnaire

The questionnaire data consists of responses from a random sample of Norwegian English lower- and upper secondary teachers. Each response contained answers to 21 questions, both closed- and open-ended. For the questionnaire to correspond with the research question, it had to be carefully put together and created with an attempt to gather a suitable collection of data. Details of the questionnaire will follow in section 3.4.3, for a full overview of the questionnaire, see Appendix B.

The questionnaire was distributed through an open-source, which means it had no known receivers in the form of e-mail lists or any other form of database with potential respondents. Through the early stages of the project, the researcher used a Facebook group called 'Engelsklærere' to explore the landscape of potential respondents. By exploring posts and discussion concerning digital teaching aids and ReadTheory, I concluded that this study

should be feasible and that open distribution through social media would be a sufficient entry point of the data collection phase.

The questionnaire is one of the most common instruments for collecting opinions and data on attitudes from a broad mass of participants. Brown (2001) in Mackey (2005) defines questionnaires as: "any written instrument that present respondents with a series of questions or statements to which they are to react either by writing out their answers or selecting them among existing answers." It has been a widely used method to investigate a range of questions in second language research (Mackey 2005).

English teacher's perceptions and claims play a significant role in this study. Through a combination of close- and open-ended questions, the questionnaire would provide the study with both numeric data to, e.g. point to trends and more substantial data to either corroborate these trends or make contradictions. Due to a relatively narrow and unknown sample wanted for this study, an open distributed questionnaire was found the most suitable instrument to collect the data needed.

3.4.1 The questionnaire procedure

The questionnaire was distributed in march 2020 through the various Facebook-pages selected through pre-study observation which indicated a possible sample. This study is operating with an unknown sample which needed to be located. The questionnaire design included no questions of sensitive character or questions where answers could be traced back to the respondents. However, to ensure that the study was in keeping with the guidelines of NSD, an evaluation of the questionnaire's anonymity was requested from NSD. The questionnaire was approved as anonymous – and cleared for distribution.

3.4.2 The Questionnaire

The following section will present the questions asked in the teacher questionnaire, and give a justification for the selection of question designs.

Questionnaires are the instrument of choice when the researcher wants to collect a large set of data efficiently. Through questionnaires, the researcher is provided with information that the respondents are able to report about themselves and their experiences of the subject matter, this kind of information is valuable to the study, though such information is not available from pre-existing production data (Mackey 2005, 92-93). To locate evidence

of the same character as provided by a questionnaire with direct questions concerning the study's subject, would be rather time-consuming, and with no guarantee that such evidence exists at all.

According to Mackay (2005), one of the main advantages is its economic and practical aspects. For the present study, the researcher had no immediate access to teachers – and therefore found the questionnaire as a suitable instrument for the data collection procedure. In addition to this, comparable information from multiple respondents can be evoked from questionnaires. Questionnaires can take many formats but tend to take digital form in today's research contexts. Depending on how they are structured, questionnaires can provide both qualitative and quantifiable data, and thus are flexible enough to be used in a range of research (Mackey 2005, 94-96).

Dörnyei and Taguchi (2009) point to the following consideration when designing a questionnaire: the researcher needs to set som general features, like: format, layout/interface length, language, instructions, parts and section. These features create the framework of the questionnaire and can play a significant role in the outcome. With easy access to the internet, the researcher has a wide selection of tools to choose from, which provides the researcher with a range of efficient features and flexibility in the process of gathering data (Mackey 2005, 94-96).

The questionnaire platform used for the present survey is SurveyXact[10], a frequently used tool within the research field at the University of Bergen with an access licence provided by the faculty. The survey platform is a third-party tool beyond UiB but is claimed to have a well-established security system which is of importance when considering the choice of such tools. SurveyExact has a range of functions covering both the design-, collection-, and the analysis-procedure. Some features provide the researcher with a range of esthetical options, where the researcher should aim to create a professional, appealing and tidy interface. The first impression of the questionnaire is significant, the graphic layout and professional attractiveness may have a substantial impact on the responses (Dörnyei and Taguchi 2009, 13). For this study, the researcher chose a minimalistic layout for the questionnaire and attempted to keep each page neat and as straightforward as possible.

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[10] UiB has a common licence on a web-based tool for development, implementation and analysis of surveys. The tool is located beyond UiB's own resources, bu the distributor has good routines of security. The tool is called SurveyXact and is found through: http://www.surveyxact.no/.

Further, concerning the questionnaire design, the researcher must choose the content of the questionnaire and think about how the questionnaire is presented to the potential respondents. The chosen language for the questionnaire was Norwegian, L1. There are two main reasons which justify this choice. The questions were asked in Norwegian to ensure that terms and subject themes were fully understood and to avoid misinterpretations which could lead to invalid answers, or that the respondent lost interest because they did not understand the questions asked (Roness 2016, 71). Language is powerful and may quickly be leading, misinterpreted, or misunderstood. Each question must, therefore, be carefully formulated, concerning terms, precision and ambiguity. When a questionnaire consists of multiple questions, one must consider the chronology of the questions and pay close attention to possible overlaps, the language that may lead the respondent or repetitive questions. Specific terms and phenomena tend to be easier to describe through L1 in a research context where the respondent usually respond with their answer within a short time frame. Nevertheless, there is no reason to point to definite drawbacks of designing the questionnaire in Norwegian – except that this requires translating the data into the target language. The open-ended question may even benefit from being responded in L1, though some answers might be elaborated and contain more detailed descriptions.

Employing a survey for this study is, first and foremost, an easy and efficient way to reveal the thoughts and opinions of the respondents. The present study aims to investigate Norwegian EFL teachers' perception of digital competence and use of DTA. Thus, the questionnaire consisted of both general questions concerning ICT in their teaching, terms within digital education and specific questions concerning the use of one specific DTA - ReadTheory. The data from the questionnaire will serve two purposes: first, analysed isolated and second, given a comparative analysis with data from the other evidence source: document analysis from *ReadTheory.* For the present study, a dual approach to the collection- and the analytical procedure was chosen as a way of strengthening the overall study.

According to Patton (1990), triangulation guards the researcher and study against being accused of basing the findings from a simple source of evidence or an artefact of a single method (Patton 1990). This builds credibility as well as covering the researcher's bias (Bowen 2009, 28). However, a concern of employing a questionnaire is that responses will only provide data on what the teachers report. Respondents can always fabricate answers, give answers in favour of a given context or give answers they think will suit the given purpose

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best. All the respondents have different prerequisites, and each will perceive the research context and the questions differently.

The questionnaire aims to reveal behavioural and attitudinal matters. Dörnyei and Taguchi (2009) states that behavioural questions are well-know in L2 studies when the researcher aims to investigate inventories of language learning strategies. Another frequently used question type is attitudinal questions, often employed when attempting to find out what people think - and addresses attitudes, opinions, beliefs, interests and values. Such questions are highly subjective and aim to reveal the individual thoughts of the given subject. For this study, attitudinal questions were used as an attempt to reveal teachers' attitudes and perception of certain terms, phenomena and their opinions of the ReadTheory platform in their own English language teaching.

The questionnaire consisted of both close-ended questions and open-ended questions. In close-ended questions in surveys, the researcher poses a question and provides preset response options for the participants. Such preset response options are effortless for the participants and demand less from each individual completing the questionnaire. Close-ended questions are practical because all the individuals will answer the question using the response options provided, which allows the researcher to conveniently compare responses (Creswell 2012, 386).

Close-ended results can also be analysed in cross-tables, which may be beneficial when attempting to analyse variables of a different character. Variables are easily linked together and provide a good overview of the frequency of responses and how they match other responses. By crossing two questions, one may be presented with a more nuanced and complete picture of the investigated matter – attempting to sketch up relationships between informants' answers on two different questions may provide the study with more than one perspective. Findings from a single question can either be interpreted in isolating - or relation to other findings, choosing to do either will provide the research with a given set of findings. Further, by setting two sets of data up against each other might point to trends and patterns that were unexpected and unintentional – which again may provide the study with another dimension when attempting to answer the research question.

However, this study is of a more explorative nature- and have set attitudes and experiences of the respondents as the primary objective of the questionnaire. In this research context, the researcher wants to probe deeper and explore the individuals to a larger extent. In

this case, open-ended questions are considered a better alternative. Open-ended questions in a survey are questions for which researchers do not provide the response options; the participants provide their own responses to questions (Creswell 2012, 386-387).

There are numerous implications of employing both response options, however, the present thesis holds only room for a brief discussion of the advantages and drawbacks of the two. As mentioned above, employing the instrument of a questionnaire in one's study, the researcher, usually, aims to gather large amounts of data. Questionnaires typically contain close-ended questions and aim to provide the researcher with numeric data, which she/he can generalise from. Close-ended questions are suitable for such purpose – each individual has the same questions and the same answer options to choose from. Such response types are rather effortless for the respondent, hence, it is more likely that respondents will give their answer. However, close-ended questions remove the individual's opportunity to elaborate and describe the subject of the question further. Close-ended questions only give a certain number of close-ended responses. Thus the respondent may be forced to give an answer she/he disagrees.

In some populations, operating with open-ended questions can turn out to be challenging. Including open-ended questions in a questionnaire is debated: it can be challenging and time-consuming for the researcher to handle this type of data (Danielsen 2013, 45). Creswell (2012) addresses this as a drawback of the open-ended questionnaire, due to the inconsistency and amount of data which need to be analysed. Further, open-ended question may cause challenges to a questionnaire: "they may be too challenging to answer for some respondents" and that a consequence of this may be that they choose to give insufficient answers, or even skip the question (Roness 2016, 72).

However, with a target group consisting of teachers, the researcher calculated little risk in including open-ended questions. On the contrary, employing open-ended questions, usually, aim to reveal the respondents' thoughts or opinion on a given phenomenon, their interpretation of a term or concept or their description of an experience or specific action. Open-ended questions allow each respondent to give rich descriptions and elaborate on the addressed subject. Further, questionnaires usually give no time limit, and therefore, respondents are given sufficient time and room to answer questions with their own thoughtful words (Fink, 1995).

With a selection of both multiple-choice and open-ended questions, the survey results will provide the research with quantitative data which will allow pointing to trends and patterns, but also give qualitative data which can provide more detailed accounts of these trends or discrepancies.

Apart from handling the data, the procedure of data collection, where one aims to collect qualitative data, can also be challenging when employing a questionnaire. Unlike in an interview, the researcher has no way of controlling, guiding, help or encourage the respondents in order to gain sufficient data material. The outcome of this is two-sided: First of all, open-ended questions in a questionnaire limits the researcher's involvement. Respondents may give a more honest answer when the researcher is not present in the data gathering context, like in an interview. Thus this data have less chance of being influenced by the researcher's bias or stance in the research context. Secondly, when the researcher is removed from the questioning, the respondents have no chance of asking clarifying questions concerning ambiguity, unfamiliar terms or other issues of the questions being asked. This might limit the quality of the qualitative answers, though some respondents fail to interpret the questions or give insufficient answers due to insecurity.

The first section of the questionnaire concerns the teachers current teaching status, asking whether they teach at the given moment and what level they teach. These questions provide the study with background variables. Even though the observations in the pre-study phase pointed at *ReadTheory* is mostly used in secondary school, I wanted to include this element to examine if there existed any differences in trends or discrepancies between lower secondary and upper secondary. This section contained close-ended questions about whether the teachers were active in teaching at the current time, whether they teach lower- or upper secondary school.

The second section issues digital competence among teachers - the teachers' perception of the term 'digital competence' and to what degree they felt digitally competent. In this section, I wanted to address the teachers' perception of digital competence, both the term itself, but also their own relationship with it. Both close- and open-ended questions were chosen for this section. The rationale for including such questions is to attempt to investigate the background context of the responding teachers – whether they experience sufficient focus on digital competence and their suggestions on their own digital competence. Such questions provide the study with quantifiable data which, for example, with an opportunity to point at

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possible differentials in trends among those who report their digital competence as teachers were weak, compared to those who report it as strong.

In this section, I wanted to shed light on how teachers related 21st-century reading skills to digital competence. This section also contained an open-ended question regarding such matter.

The third section addresses the teachers' repertoire of digital resources and concerns their use of digital tools and aids – as well as how they report such tools and aids are used. Further, this section of the questionnaire contains questions issuing the teachers' experience with various digital resources and tool, and why they chose to implement such elements in their teaching. Such matter is addressed in order to investigate and explore the broader digital teaching context of the responding teachers. Further, it contains mostly closed-ended questions, where the respondents gave their answer by selecting one, or several pre-set answers. The pre-set answers were constructed based on the researcher's previous experience with English language teaching in Norwegian classrooms. The pre-set answers aimed to reflect the most frequent and common digital tools and resources used in previously observed classrooms. For a full overview of these pre-set answers of the questionnaire, see appendix B. Possible findings from this section may provide valuable aspects in the overall discussion regarding ReadTheory's impact of 21st-century reading skills, however will not be presented as prime findings in the discussion in chapter 5.

Section four concerns teachers reports on their use of ReadTheory.org that they use in their EFL teaching and how of reading in digital learning environments and how the teachers report their use of digital learning aids in reading instructions- and activities. Further, this section addresses the specific use of ReadTheory.org and whether it has the potential to foster 21st-century reading skills.

The penultimate two questions aim to shed light on the teachers' perception of 21st-century skills and 21st-century readings skills. I wanted to investigate the two terms and to see whether the respondents have the same understanding of the term -or if new aspects of the terms were brought into the light. Whereas the final two questions aimed to provide me with the respondents' thoughts on the advantages and disadvantages of ReadTheory. Herein, the questions sought to investigate the teachers' attitudes and perception of the online adaptive reading comprehension platform. Such questions were found as a good way to gain direct responses to the matter, in keeping with Dörnyei's (2009) notion of behavioural and

attitudinal questionnaire approaches. The researcher's intention of this final section was to gain a deeper understanding of the subject – an understanding based on the responding teachers' thoughts and experiences.

3.5 Document analysis

To supplement the data material from the teacher questionnaire, this study employs document analysis – based on official and requested documents from the American developers behind the adaptive reading comprehension platform *ReadTheory.* The document analysis aims to shed light upon the developers' claims about Readtheory.org – concerning how it may promote and foster reading skills of the 21st-century digital learner.

The platform's official web page provides some of the official documents included in this document analysis. These documents have a commercial character, as well as an educational agenda. These are factors that will be taken into account when analysed and included in the data presented. The requested documents are collected from e-mail correspondence with the support team in *ReadTheory.*

3.5.2 Rationale for employing Document Analysis

In qualitative studies, the researcher should rely on more than one source of evidence (Bowen 2009, 28). By including a document analysis in this study, the researcher seeks corroboration and convergence through the different data sources. The present study conducts a document analysis in search of findings that contribute to a better understanding of the subject of study. Bowen (2009) defines document analysis in the following way:

> Document analysis is a systematic procedure for reviewing or evaluating documents— both printed and electronic (computer-based and Internet-transmitted) material. Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge. (Bowen 2009, 27)

In terms of methodical contribution, a document analysis which reviews documentary sources are not surrogates for other kinds of data (Atkinson and Coffey 2004, 79). For this study, the documents data is regarded as secondary data, aiming to support data from the teacher questionnaire. Further, Atkinson and Coffey (2004, 79) suggest that one cannot learn through

written records alone – and that documents construct a particular representation through literary conventions. However, with such restrictions pointed out, one should not ignore documentary data – but approach documents for what they are and pay attention to what they seek to accomplish.

Document analysis is a systematic procedure for evaluating and reviewing documents, the documents can be both electronic and printed. Document analysis is typical of a qualitative character and requires examination and interpretation of the data. This is in order to develop empirical knowledge - and to gain an understanding of the subject conveyed in the document (Bowen 2009). The documents chosen for this study carries a commercial and educational agenda – where the authors of these documents are from the developing team behind *ReadTheory[11]*. As opposed to questionnaire data, (a) document(s) is created without a researcher's intervention and has to a small degree chance to be influenced by the researcher's agenda. Typically, documents that are selected as part of a study take a variety of forms. Bowen (2009) states that such documents can be everything from maps to meeting journals to books. The selected documents for this study are web-pages, e-mails and excerpts illustrating platform examples[12]. The different documents have different agendas and suggest various aspects of the same matter.

Therefore, the analytical procedure started by investigating the public documents in which ReadTheory provide the users through their website and platform manual. The analysis of the documents aimed to give an overview of *ReadTheory's* claims about their platform's implication on English reading and to gain a deeper understanding of the platform. The data gleaned from the document analysis provide a different perspective on the ReadTheory platform than the user's perspective evident in the data from the questionnaire. In order to investigate and examine the matter thoroughly – the researcher found it both highly interesting and necessary to view the objective from more than one angle.

Document analysis is particularly applicable to qualitative studies - studies in which give rich descriptions of programs or single phenomena (Stake 1995, Yin 1994). Document data, on the one hand, provides the researcher with a certain point of view which can establish one side of the argumentation, or sheds light on one side when problematising a phenomenon.

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[11] In this section, ReadTheory is reffered to as the commercial and educational agenda in form of user manual and decriptions of their platform.
[12] Platform examples: Examples from www.readtheory.org reading platform, including, examples text passages, quizzes, feedback texts, assignments and descriptions regarding pupils' given answer to quiz questions.

I found it interesting to analyse and compare the views from two different sources, the views of the questionnaire-informants and the views from the ReadTheory developers. On the other hand, the researcher can draw upon issues or controversies from document analysis. This allows the researcher to employ multiple sources of evidence, which, without doubts, has benefits in the analytical procedure:

This study attempts to answer the research question, first through the questionnaire data, second the document analysis, and finally, through the analysis and interpretation of the data. Such cross-examinations reduce the impact of potential bias, and forces the study to approach the research focus from multiple points of views. The mixed-methods approach also guards the researcher against having a biased assumption, taking a strong stance in the argument, or giving a one-sided description throughout the study.

3.6 Data Analysis Procedures

Since the majority of the data were qualitative, I deemed the qualitative findings from the questionnaire and document analysis as the prime data for the study. Thus I chose to address the qualitative data in a more elaborative way than the quantitative data.

3.6.1 Analysis of the questionnaire data

Usually, the first stage of the analysis is to explore the data, a preliminary exploratory analysis in qualitative research consists of exploring data to obtain a general sense of the data (Creswell 2012, 243). Moreover, Cresswell (2012) suggests that the next step in the analysis is coding, this entails labelling and segmenting text from descriptions and themes in the data. The purpose of coding is to make sense of one's data in a systematic way, however, there are no set guidelines for data coding, thus reach researcher may code and label data in a best-suited way for the sake of the study. When analysing qualitative data, in this case, open-ended responses in a questionnaire, one would normally encode responses into thematic categories. This is done to observe and establish the most prominent categories for further discussion.

Further, responses to each of the open-ended questions were categorised and labelled using various categories. Some responses may include answers which overlap two or more categories, and may, therefore, be included in several categories when segmenting the responses. Due to a rather small data sample, a choice was made to present some of the response answers uncategorised where answers are shown as quotations together with the corresponding questions. Thus, the collected data sample was labelled and placed into tables

with corresponding questions. This entails that the tables present raw data, meaning that the responses from the questionnaire have only been transferred from the original SurveyXact questionnaire platform into tables. Direct quotations from various responses will be implemented into the presentation of results in chapter 4, and will provide chapter 5 with evidential findings to discuss. It should be noted that such a presentation of collected data material provides the study with a high degree of transparency.

Data transparency provide the study with access to the evidence or data used to support empirical research claims. This permits readers to appreciate the richness and nuance of what sources actually say, assess precisely how they relate to broader claims and evaluate whether they have been interpreted or analyzed correctly. In some qualitative research, critical text examination can be challenging and problematic – for instance, authors may rarely cite sources verbatim and rarely copiously enough to judge whether specific lines were cited in context. Those who would understand, critique, or extend existing work usually find it impractical to track down original sources (Moravcsik 2014, 48). On this background, the data-sets are presented as complete, and not fragmented as if encoded by the researcher, which provide the reader with an increased opportunity to understand the documents' influence in the study.

3.6.2 Analysis of the document data

A document analysis was conducted to seek the insight of claims of the developers of ReadTheory and their thoughts about the platforms' implication on English language reading practice and instructions. The present document analysis was carried out in the following way: First, documents concerns the document's content and look into aspects such as: type of document, the physical characteristic of the document, author or creator, circumstances, time and place, audience, source of document, authenticity, credibility, reliability of document, representativeness, what the document is about and purpose. The present documents were all distributed by the support team behind ReadTheory – and all were in electronic formate. The documents used for the present study sought to locate firm claims about how ReadTheory.org works, and to what extent it has the potential to promote 21st-century reading skills in a Norwegian EFL classroom. Further, I sought to find out if ReadTheory have affordances beyond what the developers of the platform claimsed as the didactical purpose. By evaluating features and functions of the platform together with the documents' information of the

platform's intentions – one may see opportunities (or limitations) for EFL practice. Such analysis calls for a systematic approach and is often presented through forms or tables.

The internal analysis investigates and evaluates what the external analysis reveals, and attempts to interpret what is conveyed through the documents. This interpretation will result in document findings, which will be valuable in the overarching discussion of the present thesis. This will provide the discussion with a different view than the questionnaire findings and can, therefore, strengthen, support or contradict those findings.

The analytic procedure entails finding, selecting, making sense of, and synthesising data contained in documents. Document analysis yields data—excerpts, quotations, or entire passages—that are then organised into major themes, categories, and case examples specifically through content analysis (Labuschagne, 2003 in Bowen 2009, 28). In a similar fashion as the questionnaire data, the document analysis is presented through tables, where data is labelled and connected the corresponding document. The purpose of analysing the selected documents was to shed light on the developers behind ReadTheory's claims of the language learning implications of employing their reading comprehension platform. All topics and themes from the document analysis will be analysed regarding the variables of the documents' external analysis, and the presentation of the findings will attempt to be as transparent as possible.

In addition to the text documents – this study also includes some example screenshots from the ReadTheory.org. These examples provide the reader with an overview of the main functions and features of readtheory.org – which may make it easier to understand the discussion regarding this platforms' potential impact on digital 21st-century english reading practice. A selection of examples from various text passages and tasks are introduced and described to support and exemplify the discussion concerning the platform's implications. Further details are given in section 4.3.

3.6.3 The documents

The material subjected to document analysis consists of six (6) documents: (1) D1-web-page, (2) D2- a preliminary study, (3), D3- e-mail, (4) D4- e-mail, (5) D5 e-mail, and (6) D6 -a series of clipart from the ReadTheory reading comprehension platform

(1) D1- web-page: This document takes the form of a standard web-page (www.readtheory.org). This document contains multiple modes – text, images, illustrations, quotes, hyperlinks. For a full overview of (1) web-page, see section 4.2.2 and appendix D.

(2) D2- a preliminary research paper: This document is an open-access research paper provided through www.readtheory.org and consists of eight (8) pages. The document describes a study: ReadTheory.org Data Collection Study 2.0 – A preliminary Study Concerning the Effectiveness of an Online Reading Comprehension and Writing Program. The document contains text and tables. A full overview of (2) a preliminary research paper is given in section 4.2.2. – for the original document, see appendix E.

(3)D3-, (4)D4-, (5)D5- e-mail: these documents have standard e-mail formate, containing pure text given through the interface of www.gmail.com and accessed through the researcher's private Gmail account. These documents are created in correspondence between the ReadTheory.org developers and me. These documents are included to provide the study with material which include the developer's claims about the ReadTheory platform. (3), (4), (5) e-mail will be described further in section 4.2.2, and given in original format in appendix F, G and H.

(6) visuals from the readtheory.org reading comprehension platform. This document is a collective document, containing example screenshots from ReadTheory. These documents are selected by the researcher for the present study and are randomly selected in order to illustrate ReadTheory.org's features. The documents consist of texts and images. Document (6) will be presented in 4.3.

3.7 Research reliability and validity

Validity and reliability are essential terms when reviewing a study's quality and characteristics. Cresswell (2014) states that validity does not carry the same connotations in qualitative research as it does in quantitative research. In qualitative research, one must separate validity and reliability: validity means that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher's approach is consistent across different researchers and different projects (Gibbs, 2007 in Creswell 2014, 201). Put, in other words, validity measures to what extent the conclusions were drawn by the researcher are trustworthy, while reliability questions the methods used to obtain the findings (Creswell, 2012).

Another important aspect of validity is transparency. According to Moravcsik (2014), the most broadly applicable tool for enhancing qualitative research transparency is an active citation. Active citation places essential components of qualitative analysis close to the reader, such components are - evidence, interpretation of evidence, and methodological selection criteria. This may strengthen their engagement with existing scholarship, and not just as passive readers, but as active critics and authors of future research (Moravcsik 2014, 48). To note the present study's reliability, I have attempted to describe the research in its entirety and to give full transparency regarding conducting and planning this study. Moravcsik (2014) suggest that research transparency has three dimensions: data, analytic, and production transparency.

Data transparency provides the readers of the research report with access to evidence or data used to support research claims. For purposes of transparency, both the questionnaire findings and results from the document analysis is provided to the reader in tables, and direct quotations are used in the discussion. This entails that the reader is permitted to appreciate the richness and nuance of what sources actually say, assess precisely how they relate to broader research claims, and review whether they have been analyzed or interpreted correctly (Moravcsik 2014, 48).

The last aspect of transparency concern the production- this aspect seeks to grant the readers with information about methods by which particular bodies of cited evidence, arguments, and methods were selected from various possible choices. Choice of evidence is highly important, and the researcher's observation is a concern – the researcher has selected only a subset of data that could be relevant to the research question. There is always a danger of selection bias, which can occur due to conscious manipulation or unconscious confirmation bias. The present study has aimed to include the best-fitted evidence among the evidence available – I attempted to chose a selection of document material with different character from different localtions as an attempt to give a nuanced and sufficient basis of answers to the research questions.

This is especially important to consider when using open-ended written questionnaires, because the respondents may be uncomfortable expressing themselves in writing and may choose to provide abbreviated, rather than elaborative, responses (Mackey 2005, 96). There is always a chance that respondents will answer untruthfully or

misunderstand questions. Such factors of uncertainty may indicate a lower degree of validity in the study.

On this background, I hold no assumption of this being the case, I find no reason to think that teachers would have an interest in either giving untruthful answers or any other false input that would make the data unreliable.

Another problematic aspect concerns the questionnaire's validity. The possibility of having questions that are influenced by the researcher's subjectivity is always present. However, I attempted to make use of literature providing guidance on how to design the questionnaire in order to guard me against such subjectivity. I also discussed the questions with my fellow students in order to further protect myself from subjectivity bias.

A mixed method-approach did provide this study with different sources of evidence. According to Creswell (2014), triangulation can add validity to the study by examining evidence from different data sources and using it to build a coherent justification for themes. The themes in this study are based on converging several sources of data (Creswell 2014, 201). Thus I claim that employing a mixed-method approach has strengthened the validity of this study.

3.8 Possible methodological limitations

Limitations and challenges within a study will always occur, and external factors will influence all stages in the research procedures. A typical limitation of a study comes from methods and data material. The researcher needs to make choices of data collection procedures and approaches to the data material wanted for the study. With this, the researchers also need to eliminate other possible approaches. Generally, most studies can be approached differently, and most approaches bear both benefits and drawbacks. Creswell (2012) defines limitations as: "potential weaknesses or problems with the study identified by the researcher." Further, Creswell states that limitations should be addressed one by one, and those typical characteristics of limitations are: loss or lack of participants, measurement errors, faults in measures of variables or small sample size.

3.8.1 Limitations of the questionnaire

Data from a questionnaire bear uncertainty and individual factors of each respondent affect the data set. Dörnyei and Taguchi (2009) suggest that questionnaires hold some serious

limitations and that this has led some researchers to question the reliability and validity of questionnaire data (Dörnyei and Taguchi 2009). Dörnyei disagrees with such claim in general but stresses that there are some disadvantages of employing a questionnaire in research. One of the major issues with the questionnaire is that it often results in superficial data because respondents are left to their own device when giving responses. It is further suggested that the questionnaire and its question must be sufficiently simple and straight forward to make sure the respondents understand. Further, the quality of the results may vary greatly from one individual to another, depending on the time and care they choose or are able to give (Hopkins, Stanley, & Hopkins 1990 in Dörnyei and Taguchi 2009, 7). Finally, Dörnyei (2009) points to the 'Halo Effect' and 'Fatigue Effect' which issues humans tendency to generalise, typically giving a false positive attitude towards a subject. Fatigue effect is simply getting bored or tired from a long and monotonous questionnaire – which may result in respondents giving short, inaccurate answers – or to the worst, chose not to respond or complete at all.

On the background of this presentation and analysis of data must consider this uncertainty. Possible faults or errors may also occur in the data analysis process. To design a well-functioning and sufficient questionnaire design for the study's purpose is demanding. Throughout the procedure of data analysis, one may discover possible insufficiencies in the overall questionnaire design or weaknesses in certain questions, or the inadequate cover of essential themes or phenomena in the study.

Further, there are additional potential problems concerning an analysis of data collected through a questionnaire. Responses may be incomplete or inaccurate – the researcher is never guaranteed that respondents are able to describe or retell learning-internal phenomena in the form of expressing attitudes or perceptions (Mackey 2005, 96). Thus, the researcher is not necessarily provided with full or as detail-rich as anticipated. Further, Mackey (2005) suggest that the researcher can control or eliminate bias by using questionnaires and that it is also possible, as with any type of elicitation device, that data elicited will be an artefact of the device (Mackey 2005, 96).

3.8.2 Limitations of Documents analysis

Document analysis has, as any other research designs, its disadvantages and potential limitations in a research context. Preconstructed documents are usually produced for some other purpose other than research. Thus documents consequently do not provide sufficient

details to give an answer to the study's research question. As opposed to a questionnaire or an interview, the researcher is in no position to collect direct answers or responses in keeping with the aim of the research. Documents contain a given amount of information, and the researcher must make the most out of what is available (Bowen 2009). Thus, the researcher has no perception of what to expect from the documents before the document analysis is completed.

Further, Yin (1994) in Bowen (2009) suggest that document analysis has two more disadvantages: low retrievability and biased selectivity. Among the millions of document available to a researcher, some are retrievable – others not. This has two implications, on the one hand, a deliberately blocked document or closed-accessed document would mean that it is unavailable to the researcher, or that such documents must be retrieved through purchase, request of access, however, this is not always possible. The researcher often chooses document analysis because of its efficiency, low-cost and low-efforts (Bowen 2009). Unretriavable documents may, therefore, be an obstacle in the research process. On the other hand, limited or blocked retrievability may entail lower transparency and reliability. Limited accessed documents call for sufficient transparency, and that the researcher provides the reader with insight to the given documents.

Biased selectivity is another cause of concern when the researcher chooses document analysis (Yin 1994 in Bowen 2009). As in any other research design, research bias is inevitable when conducting a document analysis. Research bias in documents analysis holds two aspects, bias of the author of the document, and bias of the researcher who is selecting the documents. For the present study, the bias of the author of the documents may be prominent. The documents included in a document analysis may hold various characteristics – for this study, documents can be categorised commercial. This entails that the researcher must keep the commercial agenda of the documents in mind when going through with the document analysis. Further, the document selection for this study is, to some degree, influenced by the researcher's bias – due to low retrievability of documents describing the research matter, a request for additional documents was sent out to ReadTheory. The researcher requested documents for the purpose of the present study through a range of questions in an e-mail dialogue between ReadTheory and the researcher. On this background, findings from the document analysis must consider such bias-limitations.

4 RESULTS

The scope of this study is to reveal perceptions, thoughts and experiences of teachers of English, concerning digital competence, skills of the 21st-century in general and in reading, digital teaching aids – and use of DTA in reading activities and digital reading practice. Secondly, it seeks to investigate ReadTheory.org, a DTA (Digital Teaching Aid) aiming to enhance reading comprehension and fostering 21st-century English reading skills. The study is based on teacher responses to a questionnaire, combined and supported by a document analysis based on a selection of documents provided by the developing team of ReadTheory.org.

The following sections in this chapter will present the collected quantitative and qualitative data, where the description will separate the quantitative and qualitative data. Results will be presented in keeping the theoretical background given in chapter two, concerning digital competence and use of digital teaching aids. Digital reading and will be further investigated and discussed in chapter 5, where these findings will guide the discussion.

4.1 Quantitative results

This section will cover the results of the quantitative study, responses to the close-ended questions in the questionnaire. Here, I will address the answers, given in percentages and scores. Nevertheless, one can point to indications of trends when variables are crossed with each other, in keeping with the categorising described in section 3.4.3.

Each of the 24 questions will be referred to as Q-1-24. The options for the close-ended questions are referred to as CR - Closed response 6.1-13.11. in the tables. A selection of the close-ended questions will be presented in crossed tables, see section (3.43).

The main aim of employing quantitative elements in this study is to address the potential tendency regarding use of DTA among the respondents. This means investigating the potential relationship between variables, and viewing findings isolated and in light of findings from other questions. a picture from those results. Thus interpret the close-ended responses to the survey questions alone, and connected to each other. The quantitative results will be divided into two sub-sections, concerning the main focus: teachers' thoughts on digital competence, digital teaching and DTA, and a sub-focus: the informants' use of the adaptive teaching aid Readtheory.org.

4.1.2 Close-ended responses

The questionnaire consists of a combination of close- and open-ended questions. For a full overview of the questionnaire, see appendix B and C. This section presents the responses to the open-ended questions in crossed tables, crossing two and two questions at a time. Each question is marked Q1-24, and the responses are labelled CR (Closed response) 6.1-13.11.

Table 1: Teachers' Digital competence

Q-6: Do you feel competent in the digitised classroom? This means: Do you think you have sufficient competence to make use of those digital aids you have at hand, and can fulfil the students' competence aims in digital skills?
Crossed with: Q-9: Do you have specific education or taken courses in the field of digital aids in school and in the classrooms?

CR 9.1-9.4:	9.1 Yes, higher education	9.2 Yes, seminar course/web-course	9.3 No	9.4 No, but I wish I had.	Total
CR 6.1-6.5:					
6.1 Very competent	1	0	3	1	35,7%
6.2 Fairly competent	0	3	2	3	57,1%
6.3 Neither	0	1	0	0	7,1%
6.4 Less competent	0	0	0	0	0,0%
6.5 Not competent	0	0	0	0	0,0%
Total	1	4	5	4	14

Table 1 shows reported digital competence of the teachers in correlation with their reported specific digital teacher education, either higher education or seminar courses. I will refer to the number of two crossing CR as 'match score'. The highest match score occurs between 6.2 and 9.2-9.4 – this suggests that among those who report that they are very competent, there is variety in their reported educational level regarding digital teaching.

Table 2: Digital competence and frequency of digital teaching.

Q-6: Do you feel competent in the digitised classroom? This means: Do you think you have sufficient competence to make use of those digital aids you have at hand, and can fulfil the students' competence aims in digital skills?
Crossed with: Q-10: How often do you use digital- or web-based learning aids in your teaching?

CR 10.1-10.5:	10.1 Every lesson	10.2 In most lessons	10.3 I half of my lessons	10.4 Not that often	10.5 Never	Total
CR 6.1-6.5:						
6.1 Very competent	2	3	0	0	0	35,7%
6.2 Fairly competent	0	5	3	0	0	57,1%
6.3 Neither	1	0	0	0	0	7,1%
6.4 Less competent	0	0	0	0	0	0,0%
6.5 Not competent	0	0	0	0	0	0,0%
Total:	3	8	3	0	0	14

The highest match score is between 6.2 and 10.2, showing that respondents that reported that they are fairly competent also use DTA or web-based learning aids in most lessons. This may indicate that those who feel competent tend to use DTA more frequent than those not feeling as competent. This is done as an attempt to gain insight into the respondents' attitudes towards their digital approach, thus aiming to exemplify the relationship between variables, in the matter of reported self attitudes and practice. By looking at the highest match score and a total absence of matching score between 6.4-5 and 10.4-5, one may argue that there to some degree is a relationship between digital competence and frequent use of DTA among the respondents.

Table 3: Development of professional digital competence

Q-8: Do you wish that development of professional digital competence was given more focus at your school?

	Respondents	Total
Yes	11	78,6%
No	0	0,0%
Neither	3	21,4%
Total	14	100,0%

Responses to Q-8 give a clear image of the responding teachers' wish for more focus on digital professional competence development at their representative schools. As seen from responses to Q-6 regarding how digitally competent the teachers felt, the majority felt fairly competent or more. This may indicate that professional digital competence is a priority among the teachers and that they seek to advance within the field.

Table 4: Rationale for digital teaching and frequency of digital teaching

Q-11: Why do you employ digital learning aids in your teaching?
Crossed with: Q-10: How often do you use digital- or web-based learning aids in your teaching?

CR 10.1-10.5:	10.1 Every lesson	10.2 In most lessons	10.3 In half of my lessons	10.4 Seldom	10.5 Never	Total
CR 11.1-11.6:						
11.1 To vary my teaching	2	7	3	0	0	85,7%
11.2 It is effective	3	7	1	0	0	78,6%
11.3 Because my students enjoy working through digital tools and platforms.	2	6	2	0	0	71,4%
11.4 Because I, as a teacher, like to work through digital tools and platforms.	1	6	2	0	0	64,3%
11.5 Because of school policy	0	1	0	0	0	7,1%
11.6 Because it facilitates learning better than the alternative.	2	2	0	0	0	28,6%
Total	3	8	3	0	0	14

Table 4 presents the results of why digital learning aids are being employed and how often they are employed. This cross table aims to present the relationship between why the responding teachers chose to use digital learning aids and the frequency of employment. The table shows all options from Q-10 and Q-11, and we find the highest matching scores between CR 11.1 and CR 10.2, and between CR 11.2 and CR 10.2. The single variable with the highest score: 10.2 – 'In most lessons' is linked with all responses from Q-11. Overall, Table 1.3 indicates the highest cross-frequency between 11.1 to 11.4 and 10.1 to 10.3. This gives the impression that frequent use of digital aids is connected to variables such as variation, efficiency and enjoyment.

Table 5: Digital tools and digital resources.

Q-12: What digital learning aids are accessible to you in your English teaching?
Crossed with: Q-13: What digital platforms or software do you use in your English teaching?

CR 13.1-13.11:	13.1 E-books	13.2 Encyclopaedia	13.3 Social media	13.4 YouTube	13.5 Netflix or other streaming platforms	13.6 Video games	13.7 Various apps on smartphones	13.8 Text handling software	13.9 Correction software/spell checkers	13.10 Translate platforms	13.11 Other	Total
CR 12.1-12.5:												
12.1 The students got own laptops	4	3	1	8	7	3	3	8	7	3	4	71,4%
12.2 The students got tablets (iPad or such)	2	2	1	4	2	1	1	4	3	2	2	28,6%
12.3 PC-room	2	2	2	2	1	2	1	2	2	2	2	14,3%
12.4 Smart phones	3	3	2	5	4	4	2	5	5	4	2	42,9%
12.5 Got no access to digital hardware	0	0	0	0	0	0	0	0	0	0	0	0,0%
Total	6	5	2	12	9	4	4	12	10	5	6	14

Table 5 shows what physical, technological learning aids the teachers report they have access to and what platforms and software they tend to use in their English teaching. When investigating digital habits and trends in digital English language teaching, I find it necessary to gain an understanding of the respondents' background and basis of digital teaching. This is done as an attempt to provide insight into how the responding teachers tend to handle their everyday digital teaching.

Table 6: Reading resources.

Q-18. If the session's main activity is reading, do you employ other resources that the textbook?

	Respondents	Per cent
No, I mainly use the textbook.	0	0,0%
I use the textbook in addition to other analogue resources: Books, newspapers, magazines, etc.	9	64,3%
I use different webpages or web-resources.	11	78,6%
I employ different reading platforms such as apps, video games or other reading platforms.	9	64,3%
Total	14	100,0%

Responses to Q-18 shows what resources the responding teachers tend to use in addition to textbooks when focusing on reading in the classroom. First, none report that they only use the textbook. Web-pages or web-resources are most frequently employed in addition to textbooks. They also seem to find it quite useful to employ digital reading aids such as apps, video games or other reading platforms. The informants seem to be frequent users of DTA and digital resources, strengthening the indications given by results from Q-6 – digitally competent teachers tend to employ DTA quite frequently.

4.2 Qualitative results

This section describes the informants' responses to the open-ended questions in correlation with the document analysis. The complete documents are given in appendix D-H. The qualitative data results from the questionnaires are sorted into categories and presented through tables. The responses have carefully been translated from the original questionnaire language, Norwegian, into English for the purpose of presenting and analysing the results. These results will further be elaborated on in chapter 5. The results are mainly presented through tables and charts, supplemented by explanations and comments.

4.2.1 Open-ended questionnaire responses

The respondents' answers to the open-ended questions are valuable in this study, as mentioned earlier, variables of attitudes, thoughts and experience are best studied through a qualitative approach. Results from the open-ended part of the questionnaire are presented in the following tables, Table 7-19.

Table 7 presents responses to Q-7: the respondents' perception of what the term 'digital competence' entails. A presentation of the opted response-quotes follows.

How do you interpret the term digital competence?	Distribution of responses	
1 Tech-skills	2	9.09%
2 Know how to use digital learning aids	8	36.36%
3 Know how to use digital tools (Word, teams, Power-Point, etc.)	7	31.81%
4 Competence in 'digital life'	2	9.09%
5 Critical skills	3	13.63%
	22	100%

Table 7 shows the five categories worked out to describe how the informants have interpreted the term 'digital skills'/ 'digital competence' in Q7. The categories which responses are sorted into categories reflecting the responses given by the informants. Within category 1, one finds responses like 'broad technical skills + knowledge about opportunities, benefits and risks', while examples of category 2 answers are in line with answers like: 'that one has competence in using digital learning aids to promote the students' learning, and that one has competence in the digital learning aids that the students use to promote learning'. Responses within category 3 may be exemplified by quotes like 'programs, web-pages, writing tools on PC. Use those things to promote own learning' and 'skills, knowledge, creativity and attitudes which everyone needs to be able to use digital media for learning'. Examples of responses within category 4: 'be able to handle everyday digital use. Knowledge, ability to think critically and conscious use of digital products …' and To have competence in using digital tools and navigate in a digital society.' Finally, responses placed in category 5 are in line with answers like: 'Be able to make use of digital learning aids and resources and to be critical to sources.'

Table 8. A selection of complete responses to Q-7.

Inf. No. 1	Inf. No. 2	Inf. No. 3	Inf. No. 4	Inf. No. 5
Students must be able to use digital learning aids in a functional way. Many students may be skilled in navigating on familiar platforms, but I often experience that students, for example, do not have competence in saving, systematic folders, etc. They often lack a basic introduction	That one has competence in using digital learning aids to promote the students' learning, and that one has competence in the digital	In brief terms: I compare it with reading competence. Competence in using digital resources to find information, use it and create it.	Be able to use digital learning aids in an expedient way and have positive attitudes to – and actively seek new knowledge on how to use PC, tablets, web-	The students must make use of digital apps, webpages and be able to produce books, films and more,

to simple commands in Word, which entails that they use unnecessary amounts of time to follow up on formal criteria in hand in assignments. Students also need to learn more about source criticism on the internet, and for them, it is challenging to navigate due to a large amount of information available to them.	learning aids that the students use to promote learning.	resources, coding etc.	to learn English.

As seen in table 7, the responses are distributed over the four categories – where responses of category 2 and 3 were most frequent, these findings aim to reflect the informants' perception of the term 'digital competence'. Table 8 presents a selection of responses that are categorised in Table 7. Several responses touch upon some of the same aspects in their descriptions of the term, and overarching findings from Q-7 indicate that the responding teachers, more or less, have a perception 'digital competence', however, some individual responses touch upon unique aspects or include other elements in their answers – some of these are presented through quotes in table 8.

Table 9. DTA - digital teaching aids.

DTA – Digital Teaching Aids	Distribution of responses	
1 Semantic teaching aids	5	33.33%
2 Didactical teaching aids	8	53.33%
3 Functional teaching aids	2	13.33%
	15	100%

Table 9 shows responses fitted into three categories worked out from the Danish model of dividing learning and teaching aids: semantic, didactical and functional teaching aids (See section 2.3.1). Each of the three categories reflects responses of the informants of Q-14 concerning which and how teachers tend to employ various DTA. Within category 1 one finds responses like "We use CdOrd and Quizlet – CDORD reads text our loud for the students and helps them with everything from mistakes and word-level to correlation between sections. Quizlet is used for practising vocabulary when working on a new theme" and " Showbie".

Responses fitted into category 2 can be exemplified with responses like: "ReadTheroy – can be adapted to each student – Quill – grammar, easy to understand, can be adapted to students.". While responses within category three are like this: " Word, Teams and smartbook are everyday working tools. Ordnett, Encyclopedia Britannica, Kamera iThoughts etc. are used for specific tasks and, e.g. The Sims is used for a single project" and Finally, an example of response within category 3 is: "I use YouTube and campus in own reversed teaching. Games which gives information through texts and speech is both educational and fun".

Responses from Q-14 show that the responding teachers have a vast repertoire of DTA among them – ranging from standard tools such as Word to The Sims.

Table 10. Teachers' user experience with ReadTheory.org and Duolingo

Question 15	Teachers' experience with use of ReadTheory and Duolingo.
Inf. res. 1	I have used both platforms in my teaching, but in different classes and groups with different aims. For example, I experience that some students with little experience with English more often make use of these platforms in their free time to improve their skills. However, I experience that reading through digital platforms do not have the same learning effect compared to reading on paper. The benefit of reading on paper is that I can provide reading strategies and that the students can mark and note in their texts while they read. The drawback is that the selection might be lesser and that it is the same for everyone. The benefit of ReadTheory is clearly that the students can read texts which are more adapted to their level and proximal zone of development. The drawback is that they have to do screen reading and that it is not possible to prepare adapted strategies due to constant shifts of text material. I experience a big difference in how students like to work with such platforms. Some enjoy that the tasks are specific and short, while others find them boring. In-depth learning is also challenging through such platforms, and other readings and language learning are of course, highly necessary.
Inf. res.2	The students like that the texts are adapted to their level, and they experience mastery when they reach a higher level. I use 15 minutes at the start of a double lesson to focus on reading.
Inf. res.3	Use for homework.
Inf. res.4	I use ReadTheory as extra tasks and extra voluntary homework. It is a good alternative for waiting in line, for those students who experience mastery with ReadTheory.
Inf. res.5	ReadTheory – just started using in a class, as extra work. DuoLingo – have used in Norwegian as second language teaching.
Inf. res.6	It is crucial that it is adapted to the students' level. The students like it too.
Inf. res.7	I use it as an aid, for example, when students are having one on one conversation.
Inf. res.8	I find it as a good idea, but do not find ReadTheory sufficiently suitable for my students. Duolingo is a good app, but when I used it only provided English to Norwegian, not the other way around.
Inf. res.9	Level based reading is good. Can follow each student and see eventual progress. Can also add written tasks, so that the element of writing is included. Can work on their own.
Inf. res.10	Have been using it mostly to provide reading practice in class. Also used as homework. Most of the students enjoy working with ReadTheory. I now teach at elementary school, 5. to 7. grade. Many had to skip-click through the mapping test, due to the level of difficulty. The students tend to like 15 minutes of working time. Have experienced that students used 'Google translate' on the whole text to be able to give the correct answer to the questions. Then it is the Norwegian language skills in which are tested. Have also experienced students that skip-click through without paying attention to the answers. These are exceptions.

	Another exception is a skilled 6. grader who had been working well through the summer holidays.
Inf. res.11	I have only been using it in the classroom, and the students enjoy it. I experience it to be working well though the programme adapts to each student and provide both the students and me a clear picture of their level.
Inf. res.12	Just started using, too soon to tell.
Inf. res.13	ReadTheory tends to become boring when one cannot choose the theme for oneself.

Table 10 presents complete answers to Q-15 and provide insight into how teachers report their use of RT, as well as their user-experience. Inf. res. 1-13 show in open responses description and example of the teachers' perception of RT – a presentation of full and uncategorised responses is chosen to illustrate the variety of use, and to show examples of use. From the responses given, one can also look at trends and patterns concerning the informants' overall attitudes towards the use of RT and Duolingo.

Table 11. 21st- century skills.

How do you read the term 21ˢᵗ-century skills?	Distribution of responses	
1 Life-skills	4	26.66%
2 Tech-skills/ digital skills	4	26.66%
3 Critical skills	3	20%
4 A combination of basic skills	4	26.66%
	15	100%

Table 11 shows responses to Q-21, the informants' answers are sorted into categories worked out to reflect the teachers' claims about the term "21ˢᵗ-century skills". Some of the responses to Q-21 contain answers in which are overlapping categories – meaning that an answer may fit in more than one category – it may be elaborate and rich in its description, the can be placed in more than two categories. As seen, there is a somewhat even distribution of responses over the five categories. Hence there is a broad perception of the term '21ˢᵗ-century reading skills' and what the term implies.

Table 12. A selection of complete responses to Q-20: "How do you read the term 21st-century reading skills?"

Inf. No. 01	Inf. No. 02	Inf. No. 03	Inf. No. 04
Reading – and writing skills, skills which entail general learning and skills of life.	Become critical to information and be able to adapt to skills.	The students shall be prepared, in the best way, to meet life of the world we live in now and will meet in the future.	Technological skills. Non-physical communication.

The response examples listed above in Table 12 presents a selection of complete responses to Q-20 and shows the informants' thoughts on what 21st-century reading skills implies. As seen, there is a rather wide perception of the term – and the response touched upon several different issues concerning skills of the 21st-century within the EFL subject.

Table 13. 21st-century reading skills.

How do you read the term 21st-century reading skills?	Distribution of responses	
1 Reading skills	4	23.52%
2 Navigation / orientation on the internet	4	23.52%
3 Critical reading	3	17.64%
4 Technology skills	5	29.41%
X Not answered	1	5.88%
	17	100%

Table 13 shows responses to Q21. Some of the responses to Q-21 contain answers in which are overlapping categories – meaning that the responses may be placed in more than two categories. As seen, there is a rather even distribution of responses over the five categories. Hence there is a wide perception of the term '21st-century reading skills' and what the term implies.

Table 14. A selection of complete responses to Q-21: "How do you read the term 21st-century reading skills?"

Inf. No. 01	Inf. No. 02	Inf. No. 03	Inf. No. 04
I think it concerns the flexibility of various skills. E.g., just knowing how to read novels is insufficient, reading is more complex and includes	Source criticism, among other things, intertextuality and that reading stamina must be trained in new ways.	Know how to navigate in the digital world, be critical, and know how to use various learning aids.	Problem-solving, communication, information and mastery of life.

other skills. The students shall not read and accept (compared to reading in a printed encyclopaedia 20 years ago), they must be able to consider and interpret.

As seen from table 14 the informants think '21st-century reading skills' concerns several aspects – and among the informants, the four categories were chosen, there is a quite even distribution. This may indicate that the understanding of the term is quite wide – and the term carries a complex concept. Table 14 presents a selection of the responses to Q-21 and illustrates the informants' descriptions of '21st-century reading skills'

Table 15. Readtheory's potential to promote 21st-century skills- and reading skills.

To what degree do you think ReadTheory promotes 21st-century skills and reading skills?	Distribution of responses	
1 To a high degree	3	30%
2 To some degree	4	40%
3 To a small degree	3	30%
	10	100%

Table 15 shows the distribution of responses given to Q-22 – asked whether the informants find ReadTheory as a fitting tool to promote 21st-century reading skills. Seemingly there is no common perception whether it promotes such skills or not – and described experiences reflect advantages and disadvantages with the use of ReadTheory. It is interesting to see that there are such noticeable discrepancies among the answers. Implicitly, this may further be interpreted that there is no guarantee that the use of DTA will be used in the same way – or give the same results for each class or each teacher.

Overarching results may point to that RT can promote 21st-century reading skills, to a high degree and to some degree. An example response argues for his/her statement: "In a good way. The more advanced texts require that the students use strategies to find answers to the tasks, not just jump back to the text and look for the 'correct' word or sentence." Another response quote claims that RT does not promote 21st-century reading skills, however he/she

addresses its positive consequences for reading skills, and that it promotes 'traditional skills' in keeping with 'the 4C'.

Table 16. Readtheory.org adaptive feature.

Q-19: To what degree do you think the adaptive function in ReadTheory works?

CR: 19.1-19.5		Total
To a high degree – works well.	3	21,4%
To an adequate degree – works well enough.	10	71,4%
Neither – Works to some degree.	1	7,1%
In a lower degree – works badly.	0	0,0%
Total	14	100,0%

The majority of responses seem to think that the essential adaptive function in RT works well – or well enough. The adaptive feature is the cornerstone in RT design, and the whole platform is built around a well functioning adaptive system. The fact that a majority of the respondents seem to think it works adequately may indicate that RT, to some degree, keeps their promise of a well functioning adaptive reading platform. This entails that the responding teachers have experienced that their pupils are provided with 'correctly' level scaled texts when using readtheory.org. However, the adaptive function is just one element of the DTA and learning experience. Thus, such results are insufficient evidence in terms of suggesting that readtheory.org is a well functioning and valuable DTA in the EFL classroom.

Table 17. Benefits of using Readtheory.

Benefits of ReadTheory	Distribution of responses	
1 adaptivity	11	52.38%
2 efficiency	1	4.76%
3 progress reports / pupil follow up	6	28.57%
4 user friendly	3	14.28%
	21	100%

Among the categories sorted out to reflect answers given to Q-23, adaptivity is the most prominent category. Seemingly, adaptivity is the most valued feature of ReadTheory – this result is not unexpected, ReadTheory promotes itself as an adaptive platform seeking to provide the learners with individual level scaled text passages. This result seen together with results presented in table 16, indicates that RT's adaptivity is valued – valued because it is

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working rather well. However, one may usually anticipate a discrepancy between the description of the platform and the user experiences. Progress rapports or the follow-up-feature is the second most frequent category presenting the responses to Q-23. Responses within category 1 and 3 matches result from Q-15, Q-22 and Q-23 where the informants describe their experience with the platform.

Table 18. Disadvantages of using Readtheory.

Disadvantages of ReadTheory	Distribution of responses	
1 insufficient reading practice	3	23.07%
2 individual learning	2	15.38%
3 difficult / not interesting texts	3	23.07%
4 other	5	38.46%
	13	100%

Table 18 shows responses to Q-24, and the worked-out categories aim to reflect the informants' thoughts concerning the drawbacks of ReadTheory. There was a large variety among the answers, and none of the categories is prominent. Category 4 'other' were most frequent – examples responses from this category will be presented in table 19.

Inf. No.1	Inf. No.2	Inf. No.3	Inf. No.4
Hard to teach reading strategies. Students acquire better reading skills by reading on paper (reference, PISA). Everyone read different texts, which means reading must happen in another context, not following the context of a given theme of the rest of teaching.	Rigid, must be supplemented with discretionary assessment and more flexible forms of teaching.	Difficult texts, texts are not interesting.	Do not substitute books- and the good reading experience.

The selection of complete responses given to Q-24 shows which aspects of using readtheory.org are unsatisfactory according to the informants. Among them, the texts seem to be sub-optimal in their use of the platform. Seemingly, there is more than one problem: texts do not match a given curricular theme or subject in class, texts are too difficult or not interesting – and the text passages cannot replace other reading activities.

To summarise the informants' comments on digital competence and experience with DTA, there seems to be a rather wide range of user experiences. Seemingly the responding teachers report a high degree of digital competence amongst them, and that they tend to employ digital teaching aids rather frequently. Accordingly, the responding teachers have a wide repertoire of digital teaching aids between them – efficiency is a valued factor when English teachers choose to work digitally. Additionally, teachers and pupil enjoy working in digital learning environments, and because it is an easy way to vary their teaching.

Concerning competencies of the 21st-century, and perceptions of digital competence, the responding teachers seem to include critical thinking and source criticism as essential aspects when describing digital competence and digital skills in the 21st-century. Further, when the informants describe their experience with various DTA – digital innovations is prominent. The overall results describe the teachers as digitally competent – and this high degree of digital competence is reflected through their choice of – and described experience with such DTA. The implications of the informants' perception of digital competence and employment of innovative and adaptive DTA will be discussed further in chapter 5.

4.2.2 Document analysis

This section presents the document analysis and will be reviewed in light of the aspects of DTA (digital teaching aids) and 21st-century reading skills given in chapter 2. The documents analysis aims to reveal the developers' claims about readtheory.org. Claims regarding readtheory.org as a DTA in reading practice in the EFL classroom – and whether it may enhance reading skills of the 21st-century among its users. Further, it seeks to point to evidence that in comparison with teacher reports either give matching results or point to discrepancies of whether readtheory.org may foster 21st-century reading skills or not. The results of the document analysis will be presented in table 19, followed by some illustrative screenshots from the platform through figure 4-10. These screenshots will be referred to when discussing findings from both the questionnaire and document analysis. The main objective of

the document analysis is to attempt to bring the developers' claims into the light and further, it is interesting to match these claims with findings from the teacher questionnaire: thoughts and user experiences from the teachers who have employed readtheory.org in their teaching.

The document analysis consists of 5 text-documents - for a full overview of the documents included in the document analysis, see appendix D, E, F, G and H. As mentioned in section (3.5), the documents, generally, serve different purposes and have different audiences and therefore need to be interpreted considering such differences.

Table 19: Document analysis

Document:	Document evidence:
Document: D1 *Document type: Web-page* *Author: the developers of readtheory.org*	DE1: "Improve your students' reading comprehension. It's free." "Personalized reading comprehension exercises for K-12 and ESL students." This quote from the www.readtheory.org claims that readtheory.org will improve the teachers' students reading comprehension. The message is direct and the language has a 'commercial character'.
Document: D1 *Document type: Web-page* *Author: the developers of readtheory.org*	DE2: "Tracking & analysis Track your students' progress throughout the year with easy-to-understand reports. Easily identify struggling students and high-performers. Quickly analyze performance on the individual level and class level." DE2 contends readtheory.org's ease of use and states that its tracking function is advantageous for the teacher in their follow-up work on students.
Document: D1 *Document type: Web-page* *Author: the developers of readtheory.org*	DE3: "Adaptive ReadTheory's reading comprehension practice is adaptive and caters to the individual's needs. Our solution automatically recognizes the student's reading level and matches them with the appropriate text and questions." DE3 conveys information concerning readtheory.org's adaptive feature – and states that the platform adapts to individual needs – adaptively and automatically.
Document: D2 *Documents type: research paper* *Author: the developers of readtheory.org*	DE4: "Similarly, over 70% of educators who noticed an effect on ReadTheory on student grades reported that ReadTheory had contributed to an increase in student grades." DE4 presents numeric data regarding readtheory.org's 'effect' on students' grades and claims that it is a contributor to an increase in students grades.
Document: D3 *Document type: e-mail* *Author: the developers of readtheory.org*	DE5: "While using our program, students are only ever faced with texts that are just at the edge of their abilities. This puts them in the "stretch zone" which is the ideal amount of difficulty in order to push readers to improve their abilities."

	DE5 indicate a didactical aspect in the platform design – where it states that the program operates with texts which are in the stretch zone and ideal amount of difficulty for the readers.
Document: D3 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE6: "All texts are aligned using the Lexile framework and the subject matter and questions are all based on the Common Core State Standards." DE6 points to the standards of the texts within the platform by stating that all texts are aligned and based on the two American curricular frameworks: 'Lexile framework' and 'Common Core State Standards'
Document: D4 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE7: "[…] ReadTheory functions best (and was designed for) when a teacher follows up with students and uses the data to guide classroom instruction." "[…] our current focus is more of a "substitution" of traditional reading comprehension practices done in class on paper, rather than something uniquely additive." DE7 suggest the classroom functionality of the platform and states that the platform is most functional when guided by the teacher and used as a supplement to other curricular work in the English learning classroom.
Document: D4 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE8: "Our focus is primarily reading comprehension. While we know many thousands of users utilize the site as part of an ELL curriculum, we can't say the site was explicitly designed for this purpose." DE8 conveys claims of the developers regarding how to use the readtheory.org platform – and addresses to what purpose it was designed, but also how it may cover other parts of curricular work within the subject of English.
Document: D4 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE9: "As a digital platform the site fosters basic 21st century reading skills." DE9 presents the developers' claim concerning to what degree their platform enhances 21st-century reading skills.
Document: D5 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE10: "Many of ReadTheory's articles are based around non-fiction mass-information texts. We actually have a partnership with the North Carolina Department of Natural and Cultural Resources wherein we adapt their encyclopedia entries into comprehension passages for younger students." DE10 addresses readtheory.org's content and conveys their collaboration with an American university when choosing their text passages.
Document: D5 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE11: "ReadTheory does not emphasize digital multimodal reading." DE11 states that readtheory.org claims that their platform does not include multimodal reading.
Document: D5 *Document type: e-mail* *Author: the developers* *of readtheory.org*	DE12: "Our passages range in ability level from 1st to 12th grade. Many of our higher level passages present strong viewpoints and the questions then challenge those viewpoints. While our focus is largely in comprehension, at the higher levels we strive to ensure that critical analysis is part of the work a student is doing while utilizing the site." DE12 addresses the aspects of critical and analytical reading when using readtheory.org and shows the developers' claim regarding this matter.

Table 19 presents a condensed version of the document analysis – it presents claims in the form of direct quotations from the developers of readtheory.org and serves as document evidence for this study. It aims to portray the claims of the developers of readtheory.org about their digital adaptive reading comprehension platform and whether it is a digital platform suitable for English reading practice.

D1 communicates towards English teachers looking for a digital teaching aid helping them in reading instruction – the short text passages are seemingly aiming to "sell"[13] the product as an innovative and smart way to reader practice. D1 convey general claims about how readtheory.org is an appreciated digital tool around the world – and how it aids teachers when teaching reading practice. DE1 is an excerpt from readtheory.org's main web-page and claims that the platform will improve one's students reading comprehension. There are no further details of how this will be achieved, nor descriptions of how this improvement will occur. The credibility of such a statement is questionable due to little or no presented evidence of such, however, it is not to be viewed as untrue either.

DE2 is also an excerpt from D1 and describes one of the features of readtheory.org – seemingly, it attempts to communicate the advantages of the platform and highlights the tracking-feature.

DE3 has similar characteristics as DE2, with the same audience and agenda it is aiming to convince teachers that readtheory.org is a suitable DTA in their teaching. Neither DE1 nor -2 mentions reading skills, nor 21st-century reading skills. In fact, the terms are left out in D1 entirely. Through D1 the developers of readtheory claim that their platform is designed to enhance reading comprehension – and that it contains features and functions that may be appreciated by English teachers.

DE4 is a quotation from D2, a preliminary study conducted by the developers of readtheory.org – its scope is to reveal whether readtheory.org has a positive impact on students' grades or not. D2 is a research paper displaying the completed study which was conducted among American teachers and students. DE4 conveys overall results from the study and indicates that findings from the study point to the fact that readtheory.org contributes in a positive way regarding students' grades. As a published research paper D2 is

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[13] Readtheory.org is a free-to-use platform.

to be considered as a credible source – however, the fact that the study is designed and authored by readtheory.org themselves needs to be considered as a potential issue of bias. Nonetheless, one should not undermine the findings from this study either nor view them as unconsiderable.

DE5 elaborates on readtheory.org's adaptive feature and suggests that while practising reading on their platform one is only faced with reading material within the "stretch-zone" of ones' reading skills level. D3 is authored by the support team of readtheory.org where they are definite in their phrasing when describing students' user experience while using readtheory.org. Phrases like: "only faced with", "on the edge of their abilities" and "ideal amount of difficulty in order to push readers to improve their abilities" indicate that readtheory.org have a clear understanding of the platform's potential to improve students' reading skills – and that its adaptive feature will provide the students only with texts matching their level.

DE6 describes the text standards in readtheory.org and is an excerpt from D3 where the support-team of readtheory.org state that all their texts are in keeping with standards of American frameworks of reading in education. Such a claim can be read as an attempt to build credibility around their platform's impact on reading development.

DE7 points a central aspect of student and teacher user experience with the platform – this quote from D4 states that the developers stress that their platform demands guidance and instructions from teachers in order to function in the best way. This evidence indicates that readtheory.org is considered as a supplemental DTA – used as a part of comprehensive reading instruction in the Egnlish classrooms.

DE8 shows readtheory.org's claim about their primary focus of the platform – it stresses their focus on reading comprehension – nonetheless, they also claim their platform is utilised to cover other parts of the curriculum as well but disclaims that this is was considered in their design.

DE9 shows that the developer's claim about to what degree readtheory.org fosters 21st-century reading skills. Their claim suggests that it does, but not beyond basic skills.

DE10 is a quote from D5 and shows the developers' thoughts on the text passages in their platform. It is stated that the developers have a partnership with the North Carolina

Department of Natural and Cultural Resources – and explain how this partnership influences the texts on the platform.

DE11 shows that the developers of readtheory.org claim that their platform does not emphasise multimodal reading – they use the word 'emphasise' here, which may indicate that it is not exclusively ruled out or that multimodality has not been given focus in their design.

DE12 shows the developers' thoughts on whether readtheory.org enhances critical reading and critical analysis. Seemingly, they claim that they strive to ensure that critical analysis is an aspect which is given focus – at least at some levels within the platform.

4.3 Interface and features of ReadTheory

This section provides a brief overview of the main features of ReadTheory. Document 6-11 are presented in Figure 4-9, which illustrates examples from the www.readtheory.org platform, including text passages, the reading comprehension quizzes, feedback, response rapports and question feedback explanations. I find it important to present these examples to provide readers who are unfamiliar with readtheory.org with insight into the functionality of the platform. However, it should be noted that this is not a full review of the features of readtheory.org. A detailed and thorough analysis of the platform will not be given, but may belongs to future research.
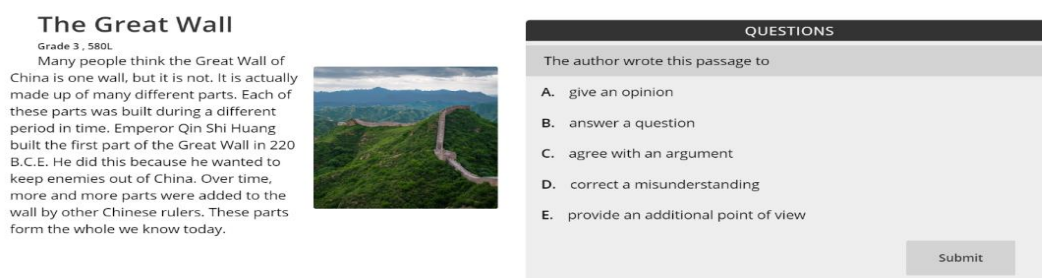
Figure 4: ReadTheory pre-test quiz.

Figure 4 illustrates how a pre-test at the ReadTheory platform can be displayed to students. This is a random example taken from www.readtheory.org – and show the interface which the language learners meet at the platform: a text passage and a corresponding quiz-question, see section 2.6 for a step-by-step description of how the platform works.

Figure 5: ReadTheory reading comprehension quiz.
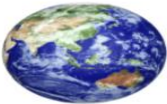
Figure 5 illustrates a typical text passage and corresponding quiz. Figure 5 does not show the whole text, however, illustrates how the platform works. In a similar fashion as the pre-test, pupils read the text passage and give answers to the corresponding questions. The example quiz here challenges the reader to recognise a specific piece of information in the text. As the screenshot shows, text and questions are presented at the same time. ReadTheory focus on reading comprehension. Thus the reader will have the text passage available while giving responses to the questions.

Figure 6: ReadTheory quiz example - Wrong answer explanation.

Figure 6 presents an example of a reading comprehension quiz. It shows the interface which the user is presented with: text passage, question and here, a given explanation of why the given answer is incorrect. As shown, the text boxes provide the reader with extensive feedback on her/his given answer and give detailed instruction of each alternative answer and why they are correct/incorrect. Evidence from Figure 6 will be elaborated upon in chapter 5, section 4.3.4.

Figure 7: ReadTheory quiz example - answer explanation.

Figure 7 shows another text passage, corresponding, one of eight questions and answer description. As mentioned in section 2.6 – ReadTheory, the reading comprehension platform holds interactive features, and reading is just one part of the complete reading comprehension practice. Figure 4.4 illustrates the potential value and strength of the quiz features of RT. As shown, the answer explanation, first states the type of question the reader is dealing with, a detailed explanation of each paragraph is given, and instructions of why one's given answer is correct or not, and rationale for why the answer alternatives are considered correct or incorrect. Chapter 5 will discuss findings from Figure 4.4 further and address its implication on the promotion of reading comprehension and 21st-century reading skills.
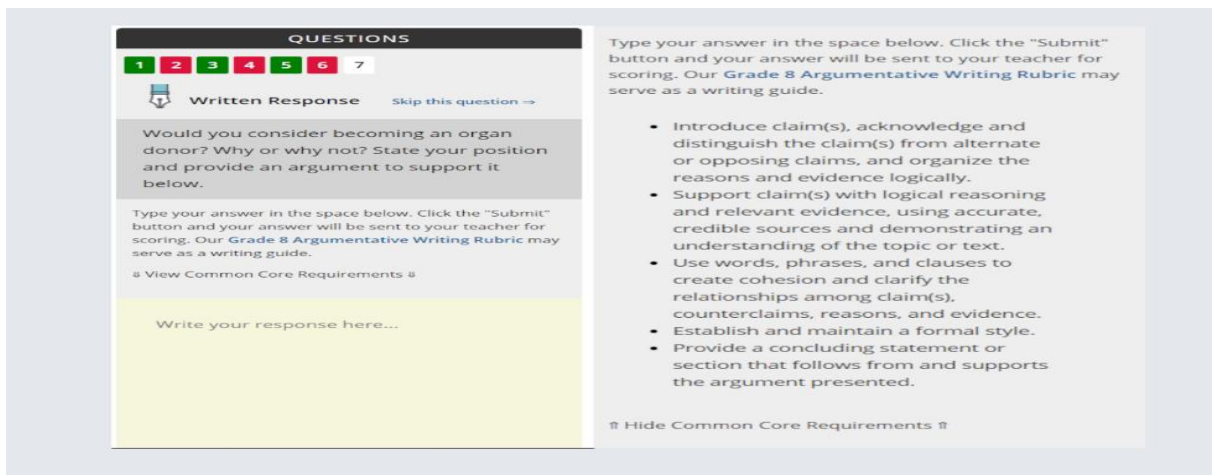
Figure 8: ReadTheory's written tasks

Readtheory.org has several features, Figure 8 illustrates a writing task at the ReadTheory platform. It shows how the interface of such a task may look like – a question, a text-box for the pupil to write her/his answer and 'a writing guide'. These tasks are like all other, connect to a text passage – and the pupils are asked to give their response in correlation to the text passage they have read. Written responses are toggleable by each teacher, this entails that teachers may activate or deactivate such task for each individual pupil – and at any time make such task available or unavailable to the learners.
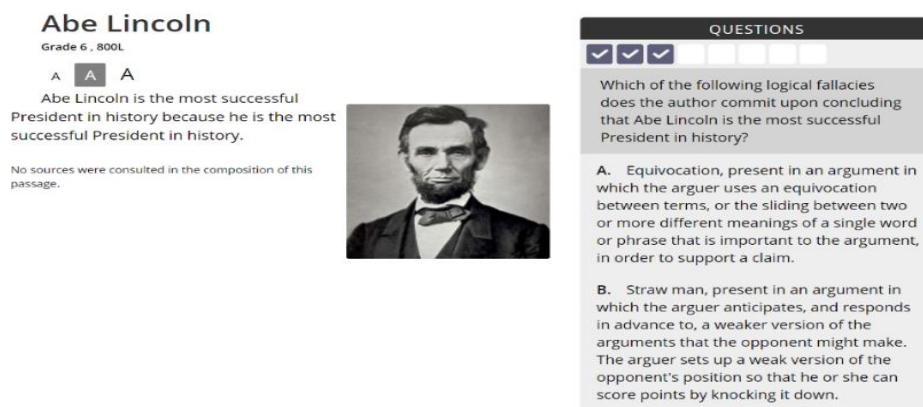
Figure 9: Quiz-question example.

Figure 9 illustrates an example of a reading comprehension passage and one of the corresponding questions. Figure 9 shows one of many various reading comprehension questions, which aims to challenge the reader to interact with the text and to practice reading comprehension skills by showing an understanding of the passage of the given text. Here, the learners are faced with a question concerning arguments within a text.

Such questions exemplified by Figure 9 are an essential part of RT's function and play an essential part in the reading comprehension training for the learners – the responses to these question also 'feed' the algorithms with data from each pupil, to further determine level scaling.

Figure 10: Text passage example with citation.

Figure 10 shows an example text passage from ReadTheory, which includes citation and author of the text passage. This text passage is an example of how learners may practice mass-information reading. By reading the whole text, combine the information pieces gathered through the text, then put them to use when attempting to answer the quiz question.

4.4 A brief summary of the findings

Seemingly, findings from the questionnaire and the document analysis were both general – concerning terminology regarding digital English teaching and specific, concerning the use of the reading comprehension platform readtheory.org. There is more or less an equal self-reported digital competence among the responding teachers, where few report that they have additional education on the matter – still the majority wish for a stronger focus on PDC development (Table 1 and 6). Allegedly the informants' perceptions of digital competence and digital teaching in the EFL classroom are somewhat similar. Further, a high degree of digital competence and frequent use of digital resources seem to be prominent. Findings also

suggest that the rationale for employing digital teaching aids are more or less the same among the responding teachers – and that efficiency, variation and enjoyment among teachers and students are key factors. Finally, the informants describe a technology-rich learning and teaching environment in their classroom – with access to digital devices and a range of web- and digital resources.

Concerning digitisation of reading activities, the informants seem to make use of digital resources frequently, texts accessed through the internet, and through other sources such as video games and mobile applications. Thus, such findings may indicate that 21st-century reading skills are issued in the informants' teaching environments. Presented findings from Table 1-6 will further be discussed in chapter 5. There is seemingly a common perception of the term digital competence among the informants. Their descriptions address issues such as being able to navigate, make use of and handle digital tools and resources. Information and source criticism are frequently mentioned aspects both in the responses to digital competence, but also responses to the informants' read on 21st-century- skills and reading skills. Implicitly, this may further be interpreted as a correlation of the matter.

Regarding the use of readtheory.org, the responding teachers claim that its adaptivity is more or less working well and that its efficiency and adaptive features are important factors why they employ the platform in their teaching. In addition, some claim it to be easy to use and state that their students enjoy working on the platform. There is a tendency that the platform mainly is employed as a supplementary resource (Table 9 and 12), and that there is a varied perception of whether readtheory.org has the potential to foster 21st-century reading skills, the responses suggest that there is a split view of to what degree it fosters such skills.

Findings from the document analysis of documents suggest that ReadTheory claim that their platform has beneficial affordances and is a suitable DTA for teachers seeking a tool for digital reading practice. Concerning 21st-century- skill and reading skills, ReadTheory suggest that as a digital platform it enhances such matter at a basic level. Moreover, the documents contend that the features of readtheory.org may improve reading comprehension skills and potentially promote other aspects of EFL learning – but modestly declaims itself as a teacher substitute in EFL reading practice and stresses that their platform requires instruction from a teacher in order to reach its potential as a DTA.

5 DISCUSSION

This chapter provides an analysis and discussion of the key findings presented in chapter 4. The analysis is carried out with reference to the main aim of this study, investigate Norwegian EFL teachers' perception of digital competences, use of DTA (digital teaching aids) and 21st-century skills in the context of reading. In addition, the subordinate research question seeks to investigate the adaptive reading comprehension platform: readtheory.org, and whether it is a suitable digital tool for 21st-century reading practice in the EFL classroom. Further, this discussion will be carried out in light of the background given in chapter 2, involving aspects of professional digital competence, 21st-century skills, DTA, the PDCFT and central aspects regarding reading and digital skills from LK06/13. In specific terms, this chapter aims to discuss thoughts and perceptions of teachers regarding the digital competence term, and their experience with DTA, especially DTA employed in reading practice. In addition, the reading comprehension platform readtheory.org will be discussed from two perspectives: I will attempt to shed light upon how readtheory.org may promote 21st-century reading skills by including teachers' reported experience with the tool, and the developers' claims of what their platform may offer in en EFL reading practice context.

Digital English learning environments demands a particular set of skills – both for students and teachers. As addressed by Røkenes (2019), English is the language of the internet – so to succeed in the digital society, sufficient digital competence, digital skills and reading skills are paramount. On this background, I suggest that one must view these competencies in relation to each other when looking at reading in English language education.

In the introduction of this thesis, I stressed that the rapid development of digital technology is evident and that one is facing an increasing landscape of digital teaching aids developed with pedagogical purpose and commercial ones. The learning opportunities are abundant through the advent of such technology, but the need for sufficient competence is also evident. Thus, this calls for a discussion of how today's English teachers view the term 'digital competence' and '21st-century skills' – and how such skills display themselves in Norwegian EFL teaching and learning. Herein, several aspects of the terms are interesting in a discussion of technology-rich English language learning environments – especially regarding the digital adaptive reading environments that this thesis seeks to explore.

5.1 Digital competence in the 21st-century

Of all subjects in the lower- and upper secondary school, I would argue that the English subject especially demands sufficient digital competence. English language education aims to provide the students with the tools to communicate, to acquire new knowledge and to take part in the increasingly globalised society. Our interconnected digital society allows one to take part in political, religious and cultural communities – where one is faced with an extensive amount of expressions, manifestations through numerous media and formats. Communication includes expressing oneself and interpreting others – such interpretation often starts with reading, in the 21st-century, this often means digital reading.

Through the qualitative findings shown in table 7 and 8, the respondents convey that 'digital competence' mostly concerns the 'technical' ability to use and handle technological and digital- tools, aids and resources. This aspect of the term is clearly stated in the English subject curriculum as "being able to use a varied selection of digital tools, media and resources …" (Udir, 2014). Descriptions of 'technical skills' are also coherent with Erstad's (2015) notion of media literacy, see section (2.1.2.).

Sufficient digital skills are essential to EFL learners, as such, the level of digital competence should be taken into consideration when deciding on digital learning activities. Seemingly, digital competence is also understood as skills that go beyond 'technical skills'. Some respondents also reflect over other aspects, such as navigation within digital tools and resources, have knowledge and understanding of how implications of digital tools and resources, to think critically and source criticism. Findings suggest that the term is viewed as intricate and that the teachers have no clear common understanding of it, pointing to the fact that there is no absolute agreement about the term. This is in line with Lund's (2019) notion digital competence, where he suggests that it has no established concept and that this matter calls for a discussion to gain an understanding of the conditions of the term.

Moreover, Kelentrić et al. (2017) suggest that digital competence involves more than the 'technical' abilities to handle digital resources and that it also implies an understanding of how one utilises DTA in a given EFL context- concerning the relationship between aims, content and individual preconditions among pupils. The qualitative findings from Q-7 responses further show that almost half of the descriptions of digital competence also make an account for cognitive aspects, and describes approaches to digital learning for ones own learning, e.g., 'competence in using learning aids to promote learning', 'Knowledge, ability to

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think critically and conscious use of digital products'. These responses pointed to the ability to facilitate- and promote learning by using digital learning aids as a part of being digitally competent. This reflects thoughts concerning digital competence that go beyond technical skills. Such view is further supported by Ørevik's (2018b) suggestion, that in addition to more technically oriented digital skills, one needs to develop "digital Bildung" being an important aspect of digital competence.

Seemingly, there is no apparent awareness of "digital Bildung" as an aspect of the digital competence concept among the responding teachers. This may indicate that "digital Bildung" is not an acknowledged aspect of digital competence among Norwegian EFL teachers – despite this, this does not necessarily derive from teachers having a sufficient conception of the term, but as suggested by Ørevik (2018b, 246), Bildung in connection with digital skills could be stated more clearly in the EFL subject curriculum. On this background, digital Bildung as a facet of digital competence may lack focus among the teachers. However, nuances of digital Bildung are reflected in some of the teachers' responses when they include words and phrases like: 'risk', 'to be critical to sources' and 'to think critically and conscious use of digital products'. Thus, I suggest that 'critical thinking' and 'source criticism' as outlined aspects of digital competence are important facets of "digital Bildung" - these elements are also mentioned in the English subject curriculum in the section of *digital skills*.

According to Ørevik (2018b), digital skills cannot be seen in isolation and is connected to and dependent on the other basic skills. One of the informant's answer illustrates this understanding: "Shortly said: I compare it with reading competence. Competence in using digital resources to find information, use it and create it" (quote from response to Q-7) he/she suggests that the term as related to reading skills. Further, 'find', 'use' and 'create' are actions of learning within an English language classroom – and can be viewed as the basis of most teaching and learning activity within the EFL classroom. This strengthens the notion of digital competence as a broad set of skills, and that it may be involved in any teaching and learning activity in the EFL classroom.

One may argue that digital skills in the EFL classroom concern two aspects: on the one hand – to possess the skills to locate, create and produce curricular content through a variety of platforms and resources. One the other hand, have critical awareness in encounters with digital texts and have an understanding of one's learning opportunities in digital environments. When describing digital competence, one of the responding teachers chose to

compare digital competence with reading competence - this means being able to "use digital resources to find information and use it". In the 21st-century reading context, this is an interesting description and, seemingly coherent with Alexander's (2012) notion of what reading in the 21st-century implies, see section (2.1). In keeping with Alexander's (2012) exploration of 21st-century reading, I find room to suggest the similarities between the respondents' descriptions of digital competence and 21st-century reading skills.

It is interesting to compare the respondents' descriptions of digital competence and 21st-century skills and 21st-century reading skills. Between the majority of responses, these terms are described with more or less similar facets. As already mentioned, source criticism and critical thinking are aspects often tied to digital competence – this is evident for 21st-century skills and 21st-century reading skills as well (Alexander, 2012). Mainly, it is described as being able to handle information through digital aids and to be critical towards the information encountered. Reading through digital platforms often entails multimodal reading which means interaction with multiple mediums at the same time. When pupils interact with such documents, documents of multimodal character, careful source criticism is highly important. Digitalisation has brought up new ways of approaching and encountering learning objectives in the EFL subject – this demands that both teachers and pupils develop and advance their multiliteracies (Ørevik 2018b, 245).

Unlike digital competence, '21st-century skills' is not embedded as a concept in the curriculum, however the results show that the responding teachers have a rather clear picture of what it implies. The results point out 'source criticism' as an essential element in 21st-century skills and emphasise that skilled readers have a more interactive approach to the texts they read.

A teacher quote addresses a challenging aspect of digital 21st-century reading in today's information society: "Become critical to information and to know how to divide between truth and 'fake news'." This became evident during the COVID-19 outbreak, – state -leaders, politicians, doctors, teachers, parents and students - all people around the world faced an extensive information challenge. The digital information society allowed information to spread with a click and allowed information in numerous forms and genres - ranging from official documents from WHO, tweets from Donald Trump and Instagram posts from an Italian nurse to be accessed across borders. This situation created a massive flow of new and important information which concerned everyone. In this situation, less skilled and

experienced 21st-century readers might experience this as a challenge, first of all, in the navigation process – to locate 'correct' information. Secondly, with such an extensive situation, involving a large number of people, the information will emerge from a large number of sources – herein, the authors behind these sources will all have a different background, different agendas and seek different audiences. An able digital reader will combine these three factors – author, agenda and audience in her/his judgement of whether this source contains 'correct' information or may be viewed as 'fake news'.

As claimed by one of the informants, skills concerning critical awareness and source criticism can be hard to define and can be challenging to teach. Although, it is defined in the English subject curriculum as the skills and knowledge to approach sources critically and independently. The PDCFT states that a digitally competent teacher possesses the skills to teach source criticism and correct use of sources (Kelentrić, Helland, and Arstorp 2017). With a growing focus on digital material use in the EFL classroom and a lesser focus on traditional learner's books, there is no doubt that source criticism skills are paramount when navigating in a massive information landscape in the educational – both also today's societal context.

5.2 Digital teaching in the EFL subject.

The teacher is a key figure in nurturing and progressive digital learning environments for today's English students (Kelentrić, Helland, and Arstorp 2017; Lund 2019; Ørevik 2018b). Results of the teachers' digital competence and frequency of digital use indicate a potential relationship between the two variables. With a combined percentage score, 92,8 per cent of the responding teachers state that they are either very – or fairly competent in the digital classroom. This 92,8 per cent also stated that they used digital- or web-based learning aids in either every or in most lessons. Numbers from a study by the Norwegian ICT centre, directed by the directorate of education, shows that 60 per cent of upper secondary teachers use DTA every day, while the number fro lower secondary school is only 10 per cent (Gilje, 2017, 37-38). Thus, a high degree of digital competence may affect how frequent teachers chose to use DTA. Krumsvik (2013) states that one of three teachers find their digital competence insufficient – the informants of the current study give an overall score well above this. Despite this, only one teacher reported having higher education in digital teaching. This may suggest that teachers feel digitally competent enough to handle frequent digital learning environments, even with no nor little special training within the field.

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The link between teachers' digital competence and their digital teaching habits seems to be evident: a high degree of digital competence accumulates into frequent use of digital teaching aids. Lund (2019, 156) suggests that the teacher role is not merely an executor of the curriculum but a knowledge designer of learning environments – accordingly, these learning environments are now digital – and the 'knowledge designer' is able in this environment. Digitalisation has expanded and opened up new exciting ways of approaching the EFL subject – seemingly, most EFL teachers have embraced the digital classroom and adapted to it. Thus, today's teachers seem to appreciate digital teaching aids when being "knowledge designers of learning environments". Despite this, it should be noted that none of the responding teachers stated that they were less- or not digitally competent, and therefore there is no room to claim that such described relationship is absolute and exclusive.

Further results from the second section show teachers' thoughts concerning rationales for employing DTA. Reflections concerning this include several aspects – overall, the informants claim that enjoyment among both students and teachers is an important factor of why digital teaching aids are being used in EFL education. These are no surprising findings, scholars have stated that students tend to find digital learning environment more amusing than 'traditional' ones (Krumsvik, 2013). Moreover, efficiency and variation were also prominent factors in why they chose to teach digitally. These findings are in line with the PDCFT's notion of the competent digital teacher, where it is stated that teacher must have a broad repertoire of working methods in a digital environment, with digital teaching materials and digital learning resources (Kelentrić, Helland, and Arstorp 2017). As mentioned, digitalisation expands and introduces new ways to teach in the EFL subject – so employing DTA to vary one's teaching would be an easy way to meet the standards of PDCFT.

Efficiency and learning/teaching have a complicated relationship - a number of studies have attempted to measure learning outcome and effectiveness through digital tools and resources. A rapport from OECD published in 2015, points towards two important aspects concerning the relationship between digital technology and learning outcome. First of all, findings from OECD suggest that countries which rarely uses technology in education, like South-Korea and Japan, come out with good results on international tests like TIMMS and PISA (Gilje, 2017). This indicates that digital teaching is not a requirement for succeeding in today's education. Secondly, the report shows that it is quite challenging to point to the 'cause and effect' relationship between digital technology and learning outcome (Gilje 2017, 111). A summary of the reviewed studies from ARK&APP shows that the students had a good

learning outcome from digital learning environments, nonetheless Gilje (2017) stresses that it is hard to indicate which factors contributed to an increased learning outcome.

As mentioned, teachers have been criticised for lacking professional digital competence – the current findings show that there are no reports of 'less competent' or 'not competent', but 28,6% report that they wish they had specific education in digital teaching. In view of this, findings suggest that the teachers feel competent in their digital teaching environments, but seek to improve their competence or prepare themselves for the digital classroom of tomorrow – this may also indicate that Norwegian EFL teachers acknowledge insufficient focus on digital competence and digital teaching. Røkenes claims that there is a critique of the Norwegian teacher education institutions, where the critique concerns their slow uptake and tool-focused and teacher-centred teaching practice (Røkenes, 2019, 163).

Further, almost 80% of the responding teachers answered that they wanted more focus on the development of professional digital competence at their representative school. Accordingly, Norwegian teacher education institutions have been criticised for their focus on professional digital competence Røkenes (2019, 163). He further suggests that the increased use of technology in language teaching demands a more substantial focus on PDC development, in order to teach in the digitalised schools (Røkenes 2019, 167-168). Results from Q-8 may, therefore, imply that teachers acknowledge the need for a more robust PDC in general and that the teachers acknowledge the fast-moving digital advancements in the field. Since the introduction of the term, substantial changes have taken place – and this demands the ability to handle the technological advancements and the pressure from steering documents emphasising the importance of such development. The *Professional Digital Competence Framework for Teachers* stresses this fact – and suggest that all teachers must seek improvement of their own digital competence in order to facilitate the students with a nurturing digital learning environment (Kelentrić, Helland, and Arstorp 2017).

5.3 Digital teaching aids – digital teaching habits in the EFL classroom.

Gilje (2017) contends that there are no established standards of digital teaching aids in Norway, this is reflected through the teachers' described experiences with tools and resources in their English subject teaching. The affordances and implications of digital technology in the EFL subject may be many – Lund (2009) points towards three central impacts: *new contexts, new genres and different ways and routes of learning.* When addressing their own digital teaching habits, most teachers reflected upon these three aspects. According to the

informants, their digital teaching is frequent and includes a range of various digital tools and resources. Digital teaching can facilitate learning environments where students encounter the three dimensions of digitalisation suggested by Lund (2009).

Further, results concerning digital resource and reading show that webpages and web-resources often are used when reading is the main activity in class and that the majority of the responding teachers tend to employ other reading aids such as applications, video games or other digital reading platforms. When asked what kind of DTA the teachers mainly used in their EFL teaching, they listed various digital resources, such as standard text management software, web-resources, streaming platforms, mobile phone applications and video games. Between the listed tools, text handling program such as Word, google docs, and open office, together with the video streaming platforms Netflix and YouTube were most frequently used. Among the mentioned teaching aids, the majority of them were in the category of didactical teaching aids, while some were functional and semantic.

The Reading Centre at the University of Stavanger state that reading can no longer be considered as linear and static – and through the advent of new media and access to the internet reading as an educational activity is now compounded and dynamic (The Reading Centre, 2020). Hence, digital and multidimensional texts are therefore included in English language reading practice – this is also evident among the responding teachers – where the majority claim that they employ digital resources beyond the standard textbooks when reading is the main activity in English class. These resources range from e-books to video-games, application, and video games in education is a hot topic. We witness this as a growing trend and that these environments contribute to forming English students' encounters with non-linear and non-standard facets of the English language, such as variations of English influenced by the internet. Lund addresses the terms *Netlish* and *Netspeak,* first coined by Crystal (2001)*,* both terms reflect the development of English through the advent of the internet – a language arena where non-standardised language form flourish (Lund 2019, 144).

5.4 Readtheory.org – an adaptive 21st-century teaching aid for reading

The subordinate research focus of this study concerns whether the adaptive reading comprehension platform readtheory.org is a suitable DTA for 21st-century reading practice. This question will be addressed by addressing claims about the platform from two perspectives – EFL teachers'- and the developers' claims. On the one hand, the quantitative and qualitative results from the survey give a picture of the teachers' views and experience

with readtheory.org. On the other hand, the findings from the document analysis display claims of developing team behind readtheory.org. The selection of example screenshots support these claims and illustrates the described features and functions.

The current findings from the document analysis convey that readtheory.org first and foremost is a reading comprehension platform, not specifically designed and developed to promote 21st-century reading skills. However, as a sophisticated, algorithm-driven reading platform designed in and for the 21st-century English classroom, I suggest that there is room to discuss further EFL reading potential, either way.

Figure 4-10 aim to exemplify and illustrate the most important platform features of readtheory.org, see section (2.6), ranging from text-passages and comprehension quizzes to progress rapports. Readtheory.org state their quest to be providing both teachers and students with an innovative and advanced contribution to practice reading. Moreover, ReadTheory claim that their adaptive function caters individual needs and improves reading skills. Further, ReadTheory states that the students' individual needs are met with texts and reading comprehension tasks which matches their level. Findings from D1 present claims from the developers of readtheory.com suggesting that that adaptive feature is the main reason to employ their platform in English language reading instruction. D1 findings further suggest that readtheory.org will improve ones students' reading comprehension and that it will provide pupils with personalised reading comprehension exercises: "Improve your students' reading comprehension. It's free." (Quote from D1) and "Personalized reading comprehension exercises for K-12 and ESL students." (Quote from D1)

Moreover, Findings from Q-23 responses underpin that readtheory.org's most advantageous facet is the adaptive feature – which aims to provide the pupils with level-scaled text passages. Hence, the respondents point towards adaptivity as the most beneficial feature of readtheory.org, and 71,5% states that the adaptive function works rather well. Accordingly, the platform's aim to provide each student with individually level scaled texts is rather successful – and a valued facet among the EFL teachers. Language learning occurs in different modalities, traditional flat or linear presentation of the material may not be ideal for every student in every context (Smith 2016). One may argue that 'personalised' presentations of curricular content may foster a better learning environment for each student regarding progression and reading development. Compared to traditional textbook reading, reading with the help of readtheory.org, the individual learner is met with his/her reading level in a

controlled and systematic context. Accordingly, ReadTheory's claim to be a high functioning adaptive learning platform is, to some degree in keeping with the EFL teachers' experience with a well functioning – and valued adaptive reading platform.

Despite this, readtheory.org's level-scaling mechanisms need time and require frequent use in order to provide the pupil with a germane reading level. A teacher quote problematises the reading experience within the platform: "Difficult texts, texts are not interesting.". According to D3, the platform is designed to only provide the reader with adequately challenging text passages in keeping with their level. A quote from D3 conveys the following: "While using our program, students are only ever faced with texts that are just at the edge of their abilities. This puts them in the "stretch zone" which is the ideal amount of difficulty in order to push readers to improve their abilities." Seemingly, one may suggest that readtheory.org, to some degree, are successful with providing the students with a correctly level-scaled text.

In addition to the adequately well-functioning adaptive function of the platform - teachers claim that progress rapports and 'student follow-up' are valued features of readtheory.org. 'Measuring' and defining reading skills and reading levels may be a challenging task, as addressed in section (2.4.1), reading is rather complex, individual feedback and follow-up rapports and progression rapports for each student are considered valuable among teachers. Findings from D1 also address this aspect of readtheory.org and claims the following: "Tracking & analysis. Track your students' progress throughout the year with easy-to-understand reports. Easily identify struggling students and high-performers. Quickly analyze performance on the individual level and class level." Accordingly, this is one of the major benefits of employing digital adaptive aids.

This suggests that the tracking feature is rather beneficial for teachers in their quest to support the development of reading skills for their pupils. Digital teaching in the 21st-century may be challenging, and the environments in which we read provide new media and new genres for the students. Adapting to new reading contexts requires a new aspect of reading development – this is coherent with Alexander's (2012) suggestion that reading is a life long developmental process and that the multidimensional reading contexts of the 21st-century demand a shift in how one approaches reading practice and development of 21st-century reading skills. Thus, personalised feedback may be a rather helpful tool when practising for further reading advancement.

Compared to computer-powered systems, teachers are unable to track and analyse each reading pupil to the same extent, at least not in an extensive and thorough way – meaning assessing and measuring each students' level of comprehension. Readtheory.org claim that their platform is able of this – and that it does so well. In keeping with Alexander's (2012) claims regarding reading as a lifelong pursuit, and that reading competence cannot be achieved within the first years of schooling – such individual progress reports provided by readtheory.org's adaptive feature may provide EFL teachers with valuable information concerning their students level of reading. With sufficient information and knowledge of the individual student, one may further facilitate nurturing and progress-oriented reading instructions – both those who struggle with basic reading skills and those who seek more challenging reading and aim to advance at a higher reading level.

As addressed in section (2.6), among the affordances of DTA, efficiency, ease of use and time saving are generally appreciated factors when choosing to use DTA in teaching. Accordingly, among the respondents, efficiency is an important facet of readtheory.org. Findings from D1 suggest how this may be: "Save your time. Avoid spending countless hours creating new reading comprehension worksheets and tests […].". Among the responses to Q-23 which concerns the benefits of readtheory.org, only one responded with 'efficiency': "Efficient". However, other example responses indicating efficiency, e.g., " […] Easy to administrate for the teacher who is freed from observing/guiding […]"

The teacher-quote above addresses an important aspect of DTAs in general, which concerns readtheory.org as well, where it is claimed that the teacher is freed from observing/guiding when employing readtheory.org. According to Alexander (2012), reading competences for the 21st-century will not be achieved easily or without extensive guidance and practice under watchful eyes of more knowledgeable others. Consequently, this means two things, readtheory.org can provide EFL teachers with an opportunity to remove herself/himself from the actual reading activity, while still being able to track the learning outcome from such activities. Progress rapports and numeric graphs of each student is provided through the teacher site on the platform. Claims of the developers underpin this, "[…] ReadTheory functions best (and was designed for) when a teacher follows up with students and uses the data to guide classroom instruction." ReadTheory developers stress the importance of the teachers' role while employing their platform, and acknowledge that competent teachers are a requirement when students practice the English language in a digital learning environment. This is in line with the PDCFT, which suggests that digital learning

environments demand thorough instruction from the teacher (Kelentrić, Helland, and Arstorp 2017). Seemingly user experiences from the EFL classroom may deviate from developers' intended use of readtheory.org as a digital reading practice tool.

To summarise, adaptivity, user-friendliness, and student follow-up are facets claimed to be advantageous and valued among EFL teachers who have classroom experience with readtheory.org. The developers claim that their platform will adapt to each student and that their text passages will match each students' reading level, - in addition, provide teachers with information concerning reading-level and progress of each learner. Teachers' claims regarding the adaptivity seem to confirm that readtheory.org's adaptive function is working rather well. Seemingly, these features are the main reasons readtheory.org is being employed in Norwegian EFL classrooms.

5.4.1 21st-century reading skills development with readtheory.org?

Alexander (2012) raises the question: "What can those who seek reading competence for themselves or who support the development of competence in others do to harness the possibilities of this age while responding to its challenges?" Today's reading contexts differ from our past generation – reading instructions must keep up with this advancement and prepare readers by providing reading instructions and practice matching the modern reading contexts.

21st-century reading skills deviates from 'traditional reading' and involve several dimensions, bringing elements from other basic skills together in order to approach curricular content and information in new ways – through new formats. Above, I addressed how teachers viewed digital competence and suggested that it may share some facets with 21st-century skills and 21st-century reading skills.

Findings from the qualitative part of the questionnaire indicate that this involves several facets, a response quote exemplifies why 21st-century reading skills are considered as complex: "be able to orientate in texts that contain more than pure text". Seemingly, the competent reader of the 21st-century must possess knowledge about a wide range of genres, existing ones and newly emerging ones, read through an extensive range of media, traditional ones, and media of the 21st-century. Further, 21st-century reading and digital reading often entail multimodality, readers often have to decode more than pure text, e.g. pictures, sound, video, hyperlinks, animations, graphs, etc.

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Reading multimodal documents require skills on how to handle and approach different types of information, how to interpret them, and how to see these elements in relation to each other. Results from table 12 and 13 indicate that teachers point to skills concerning navigation and orientation in information through digital documents as important elements of 21st-century reading skills. In addition to this, the current results point to critical reading and source criticism as essential aspects of 21st-century reading. How does the development of these skills display themselves through using readtheory.org?

Concerning readtheory.org's potential to foster 21st-century skills – the teachers are split in their claims. One informant elaborates on the question, states the following when answering whether readtheory.org fosters 21st-century reading skills: "The more advanced texts require that the pupils use strategies to find answers, not just jump back to the text and look for the 'correct' word or sentence." Encounters with advanced texts are not exclusive to the digital reading environment, but as seen, these environments may facilitate more frequent and varied encounters with more advanced texts for the EFL student. This may entail reading multimodal or hyper-texts where students must navigate through a chain of texts with different authors and different sources – as well as "reading" images, videos, animations, etc.

Findings from D4 denote that the developers claim that readtheory.org potentially only fosters basic 21st-century reading skills: "As a digital platform, the site fosters basic 21st-century reading skills." Seemingly, some teachers claim that readtheory.org fosters 21st-century readings skills to a larger extent than the ReadTheory developers themselves – teachers' classroom experience with the platform may present them with new aspects of the DTA and allow for a 'broader' field of use than intended by its designers. Seemingly, functionality, content and accessibility may encourage use beyond its didactical design, - and may as well be employed as a semantic or functional digital teaching aid. And, thus, fosters the development of skills and competences beyond its original purpose.

5.4.2 Reading with readtheory.org

As stated, readtheory.org aims to ensure that students will encounter a more personalised reading experience with texts scaled to their respective level of reading. The teachers' perception of readtheory.org's level-scaling function corresponds with the claim of the developers. One of the teachers claims the adptive feature to be beneficial, "The benefit of ReadTheory is clearly that the pupils can read texts which are more adapted to their level and proximal zone of development." Quote from readtheory.org developing team: "While using

our program, students are only ever faced with texts that are just at the edge of their abilities. This puts them in the "stretch zone" which is the ideal amount of difficulty in order to push readers to improve their abilities." Thus, reciprocal perceptions of the platform's strongest functions are evident, this evidence does not directly support a claim of whether readtheory.org may promote 21st-century reading skills or not – but is essential in the overarching discussion of readtheory.org as a DTA being used in the Norwegian EFL classroom. However, basic principles of reading suggest that reading development only takes place in nurturing reading environments, with a balance of exciting and challenging texts. Hence, reading practice in the 'right zone' adapted to one's level may be advantageous also when practising 21st-century reading skills. As addressed in section 2.4, reading is mainly an individual learning activity, and the process consists of several elements that the skilled reader seeks to master: decoding, understanding, interpretation, vocabulary and fluency – individually scaled texts may therefore be beneficial when aiming to advance in such skills.

The basic ideas of readtheory.org as a reading comprehension tool are to foster reading skills - and when this takes place through a digital platform, both the teachers and developers suggest that it additionally enhances basic digital skills. As argued – the 21st-century reading environment demands both reading skills and digital skills in order to take advantage of digital resources. Presumably, most encounters with text stimulate reading skills, but what do the 21st-century reading contexts demand concerning skills, and do students achieve such skills through learning and reading with the help of digital technology?

5.4.3 Reading mass information

Findings from D5 concerning 'mass information reading' suggest that pupils using readtheory.org in their English reading practice have the potential to advance their mass information reading. Alexander (2012) states that 'mass information' reading is a central aspect of in the 21st-century reading contexts – e.g., the internet provides today's students with abundant opportunities to encounter extensive amounts of curricular content. Further, Alexander (2012) claims that the "competent reader can see the relation between text structure and the author's purpose or argument" (264). Some examples of text passages, presented in Figure 4-10, indicate that EFL students who read through the platform are faced with large amounts of information and that the comprehension quizzes challenges the students' comprehension of the texts. The digitalisation of language learning has in recent years led

some Norwegian secondary and upper secondary schools into pilot projects, where classrooms without traditional textbooks are the new standard. Digital substitutes have replaced printed paper, either in the forms of e-books or a selection of different digital resources. Hence, with its extensive database of information-rich text passages – combined with comprehension quizzes which challenges the students' understanding of the text passages, language and text structure, readtheory.org could be a digital resource functioning as a supplemental device in the Norwegian EFL classroom.

Alexander (2012) addresses that not only are there new ways of presenting texts in the 21st-century reading contexts, but the way in which individual engage with these formats may be changing as well. Results from table 2, which presents open responses answers to Q-7 illustrates such 'new engagements' through digital competence. As discussed above in section 5.1, there is more or less a common perception of what digital competence entails. I would argue that digital competence and 21st-century readings skills share some of the same facets, and that the 21st-century reading contexts demand a combination of these. The two terms imply interaction with information available through digital resources in a learning context. Q-7 responses describe what digitally competent pupils (and teachers) entails, and suggest that information and dealing with information in texts are paramount.

One of the teacher responses to Q-7 suggests an interesting view on digital competence: "Shortly said: I compare it with reading competence. Competence in using digital resources to find information, use it and create it." (Quote from Q-7). This claim is coherent with Brox and Pötzsch (2019), where the two competencies are seen in relation to each other and their place in the Norwegian national curriculum:

> […] *digital skills* have been included as basic skills in the national curriculum since 2006, thus reflecting this new way of thinking about the growing significance of digital media, where digital skills are regarded as a crucial aspect of modern literacy on par with skills such as reading, writing, oral skills, and numeracy. Digital skills are perceived as integral to all aspects of learning and therefore to be integrated into educational practices in all subjects. (Udir, 2013)

On this background, there is reason to argue that the growing significance of digital media demands an increasing focus on digital skills as a part of – or as an equally important element to consider when aiming to develop reading skills. Findings from Table 19 presents the

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readtheory.org developers' claim about the platform's potential to facilitate mass information reading practising.

> Many of ReadTheory's articles are based around non-fiction mass-information texts. We actually have a partnership with the North Carolina Department of Natural and Cultural Resources wherein we adapt their encyclopedia entries into comprehension passages for younger students. (Quote from D4)

As stated above, the developers state that the texts passages in readtheory.org are created as modified higher level mass-information passages. Hellekjær (2019) stresses that higher education relies on the English reading practice in lower- and upper secondary school to provide students with sufficient skills to master the university level, where the majority of research articles and literature mainly are written in English. Hence, reading practice with the help of readtheory.org may allow students of lower- and upper secondary challenge themselves with texts passages which will prepare them for more advanced literature in higher education.

According to its developers, readtheory.org aims to provide students with a variety of texts – ranging from short stories to longer factual passages. This is pursuant to LK06's suggestion regarding reading in the general curriculum and the English subject curriculum - where it is stated that students shall read a variety of texts, acquire information and knowledge on different themes through various sources. Further, findings from Table 13 show that the teachers claim that 'variety' and 'variation' are valued facets of readtheory.org. This proposes that readtheory.org has the potential to facilitate reading contexts in keeping with competence aims of the English subject curriculum. However, on the one hand, some of the informants claim that the text passages in readtheory.org are too difficult, not interesting, boring or not relevant for their curricular teaching plans. This may be one of the main struggles of readtheory.org and the main reason it will, by most teachers, considered as a supplement to other reading environments. On the other hand, the developers claim that their platform is designed to provide students with captivating content

Mass information reading practice is valued when aiming to develop ones 21st-century reading skills, both in educational and personal contexts (Alexander 2012). I have argued that substantial amounts of reading are and will remain digital in today's- and in future learning language learning, despite that, one should not consider printed text reading as a thing of the past. Nor should one consider 21st-century reading skills as applicable only to a digital

context. Alexander (2012) stresses that the structure of linear online texts differs little from that of the printed text. One may assume that skills required through digital text encounter may as well be applicable to traditional text reading.

5.4.4 Reading comprehension in the 21st-century reading context

The adaptive and interaction features of readtheory.org are in keeping with *The national Reading Panel's* notion of essential aspects reading comprehension: "summarising, forming questions, answerings questions, activating prior knowledge, monitoring comprehension, using text-structure awareness, using visual graphics and graphic organisers and inferencing (guessing/theorising based on information in the context)" (The National Reading Panel 2000, Grabe, 2009 in Ørevik 2018a, 104). Findings from D4 stresses that readtheory.org is first and foremost a reading comprehension platform and aims to provide teachers and pupils with a tool which promotes such skills. Nonetheless, the current qualitative results suggest that readtheory.org may provide the pupils with affordances of English language reading beyond just reading comprehension.

Reading comprehension is an essential part of reading instruction, read comprehension entails, according to Bråten (2007), "extracting and creating meaning by scrutinising and interacting with written texts". In keeping with Bråten's definition, readtheory.org has the potential to be a suitable digital platform for reading instruction – as it is aiming to foster reading comprehension skills. Findings from D4 show ReadTheory's claim their platform's place in digital teaching: "[…] our current focus is more of a "substitution" of traditional reading comprehension practices done in class on paper, rather than something uniquely additive." Further, ReadTheory state that their platform aims to support the development of reading skills beyond comprehension skills: "[…] While our focus is largely in comprehension, at the higher levels we strive to ensure that critical analysis is part of the work a student is doing while utilizing the site." (Quote from D4)

Thus, readtheory.org suggests that in the higher-level texts, the ones one would expect at lower- and upper secondary school level, a focus on critical analysis is evident. On this background, I suggest that higher-level reading comprehension to a large degree concerns the reader's critical evaluation of the text and competencies of encountering texts critically concerning content and source. Reading comprehension is often defined in the research literature as: "understanding, using, reflecting, on and engaging with written texts, to achieve

one's goals, to develop one's knowledge and potential, and participate in society" (OECD, 2010, p.23 in Ørevik 2018b). In light of the current qualitative findings, readtheory.org may potentially enhance pupils digital reading comprehension skills in keeping with 21st-century reading.

In sum, practising mass-information reading is an important element of 21st-century reading – digital reading contexts tend to offer mass-information passages and/or hyper-texts linking significant amounts of texts together. As suggested by Alexander (2012), such context demands sufficient practice in navigating these texts and require a sub-set of reading- and digital skills. On this background, one I find room to argue that readtheory.org provides the teacher with a DTA that makes such matter easy and efficient.

The post-quiz feature, which provides the student with extensive feedback - guiding and explaining his/her given responses and why their answers are correct or incorrect. These in-depth reports are valued among the EFL teachers because they allow the pupils to understand the text more elaborately, especially concerning content and structure. This feature promotes interaction between text and reader and permits students to approach the texts more analytically. Interactivity and a more elaborate understanding of the text may enhance the students' reading experience and promote further reading skill development. Ørevik suggests that EFL teachers can play an important role in fostering students' development of reading and reading comprehension, by seeking out a varied and motivating reading matter in cooperation with the students (Ørevik 2018a, 113-114). Seemingly, readtheory.org can be a helpful tool the teachers seeking to grant their students with reading material.

5.4.5 Critical and analytical reading

21st-century reading skills entails other aspects than 'traditional reading'. The informants claim that critical approach and source criticism are central aspects of teachers' understanding of digital competence. A critical and analytical approach to reading- including source criticism and critical analysis are essential aspects for developing into a skilled 21st-century reader (Alexander, 2012). Findings from D5 show readtheory's claim concerning this aspect within their platform design:

> "Our passages range in ability level from 1st to 12th grade. Many of our higher level passages
> present strong viewpoints and the questions then challenge those viewpoints. While our focus

is largely in comprehension, at the higher levels we strive to ensure that critical analysis is part of the work a student is doing while utilizing the site." (Quote from D5)

ReadTheory developers suggest that critical and analytical reading belongs to the higher-level readers and that text passages and quiz-questions aim to facilitate critical practice. Scholars[14] state that competent readers will need more than the typical litany of reading-specific skills or procedures and that they will require the ability to think critically and analytically about text and the content and intentions those texts convey (Alexander 2012). In keeping with the perspectives of mass information reading and digital competence, critical reading seems to be a valuable competence for the 21st-century EFL student. However, as exemplified by a teacher quote, readtheory.org may not be a preferable tool concerning instructing source criticism:

> One thing that is not that easy to practice through ReadTheory is source criticism, because the sender of the texts does not have an agenda to reveal. One example which I have experienced is that students read 'research' and do not think about whom the 'researcher' works for. When they are to find out such matters, it requires different skills than what it takes to consider the trustworthiness of a source which is fake (e.g., false Facebook articles which are viruses, or scam e-mail.) Such skills are very necessary in the future, and that is challenging to teach. (Quote from Q-7)

As suggested above, source criticism and critical and analytical text approach are necessary skills in the future and when aiming to become a skilled 21st-century reader. This is also coherent with suggestions from LK06/13 concerning *reading skills* and *digital skills*. As claimed by the quote above, readtheory.org may not be experienced as a proper tool to develop source criticism sufficiently. On the one hand, in some of the text passages, the reader is not provided with information about the author, source or any other information about the text. Thus, a fundamental facet of this source criticism skills is not evident, and practising source criticism can therefore be challenging. On the other hand, being critical towards text entails more than just reviewing the source – there is room to argue that readtheory.org allows the reader to critically and analytically engage and interact with the text material.

Figure 4-10 show a selection of texts with corresponding comprehension questions – these examples show a random selection of texts and quizzes students can be faced with. Seemingly through readtheory.org, the readers are challenged with a lot of various texts,

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[14] Chinn and Anderson (2000); Clark et al., (2003); Murphy and colleagues (2009)

concerning content and structure – and must show understanding of language structures, argumentation and factual information. In light of these examples, I suggest that readtheory.org is a digital reading environment which fosters analytical and critical skill among its EFL student users. Moreover, Figure 10 shows that some of the text passages in readtheory.org are article excerpts with author and full citations provided, these passages together with adapted comprehension questions would provide a good digital environment for practising 21st-century reading skills. Even though some teachers think that readtheory.org fails to promote source criticism, one may argue, based on findings from Figure 10, that it has as much potential for such matter as any other reading activity which includes an online article with access to author and information about publishment.

In sum, readtheory.org is first and foremost, a digital platform designed to foster reading comprehension skills – as claimed by its developers. Reading comprehension is also an important facet of the competent 21st-century reader – however, in keeping with Alexander's (2012) understanding of the 21st-century reader, I would argue that use of readtheory.org in English reading practice will promote 21st-century reading skills beyond comprehension. Examples showed through Figure 5-10 give rationale to claim that readtheory.org potential to promote the analytical reading practice, as suggested by Ørevik (2018a) interaction and engagement with texts is paramount when seeking to become a skilled reader. Readtheory's platform design facilitates such matter and allows the learner to take an active role in the reading activity – and thus, potentially enhances further reading skills.

5.5 A summary of Readtheory.org

To summarise, the current study set out, as a sub-focus, to investigate whether readtheory.org is a fitting digital teaching aid for 21st-century English reading practice in the Norwegian EFL classroom. On the background of experience from Norwegian EFL teachers and claims of the platform's developers, one may argue that readtheory.org has succeeded in their quest to provide English language teachers with a well functioning adaptive reading platform - to some degree. However, the 'perfect' digital adaptive reading practice tool may not exist – yet. As exemplified by a teacher's response to: *To what degree do you think ReadTheory promotes 21st-century skills and reading skills?* "To some degree. It is first and foremost an adaptive reading tool, not a 'miracle maker'."

The respondent's quotes give a befitting summary of the teachers' overall perception regarding readtheory.org and how it may support the development of foster 21st-century

reading skills. On the backbone of the current qualitative findings, I denoted two main drawbacks of readtheory.org, which may limit its potential for English language reading practice.

The platform's functions emphasise on individual learning, which by no means is a disadvantage in itself. Nonetheless, such matter may limit other aspects of the English subject learning, especially the in-class communicative setting. Each pupil read different texts, neither teachers nor students are able to choose themes nor topics for the texts. This means that readtheory.org would mainly be employed as a supplement to standard curricular teaching. To exemplify: an eighth-grade class is working on English speaking nations and is currently learning about Australia. Employing readtheory.org in such context would be challenging though each student will read about everything else than Australia. This issue is further supported by two teacher quotes regarding the disadvantages of readtheory.org

> […] Everyone read different texts, which means reading must happen in another context, not follow the context of a given theme of the rest of teaching. (Quote from Q-24)

> We cannot have classroom- discussions or tasks. (Quote from Q-24)

I suggest that this is one of the reasons that readtheory.org will only be regarded as a supplementary aid in the EFL classroom. A substantial element in the 21st-century education concerns communication, considering the quotes above and the individual learning focus conveyed in D1-5, one may argue that readtheory.org fails to facilitate the development of the full range of 21st-century skills. ReadTheory claim that their platform provides the readers with captivating and interesting text passages: "Captivating content. Our content fits every culture and every country and is one of the main reasons why students around the world love using ReadTheory."

The developers of ReadTheory state that their platform's text passages and content fit every culture and country and that these are appreciated among worldwide users. However, some teachers state that their students find readtheory.org's text-passages uninteresting and boring. I would argue that readtheory.org contributes to a limited English reading environment – and may even neglect important aspects of reading practice in the English subject. Such as reading texts concerning social issues, intercultural texts and fictional reading. Moreover, students need to read texts that are engaging and interest them in order to

develop into good readers (Williams 1986 in Ørevik 2018a). Through six years of lower- and upper secondary school, the various text encounters are many and reading tasks, including unengaging and non-captivating texts, are inevitable - this may limit students progress of reading skills. Further, Ørevik (2018a) suggests that texts need to be read, interpreted, reflected and related to other texts in order to acquire a deeper understanding of curricular topics. Hence, nurturing and progressive English reading training should include a variety of texts, including various topics and genres and ideally be of interest of the student. In light of the developers' claims, one may argue that readtheory.org facilitates such reading practice – classroom experience from the Norwegian EFL teachers suggest a slightly different point of view. Accordingly, the adaptive functions which provide students with a personalised and more individualised reading training is an innovative and valued facet of readtheory.org. Overarching findings from teacher reports suggest that Readtheory.org, to some degree complete their quest in designing a DTA which enhances 21st-century reading skills – through its adaptive platform. In sum, readtheory.org's contribution to the English language instruction is limited, but not without potential for individual development.

6.CONCLUSION

The present thesis' final chapter presents a short summary of the study and provides a conclusion of the investigation of teachers' views and thoughts regarding digital competence, and 21st-century – skills and reading skills in the English subject. In addition, this study has had two sub-focuses concerning teachers digital teaching habits and experiences with digital teaching aids and – as well as an exploration of readtheory.org, an adaptive reading comprehension platform.

The current research attempts to shed light upon what an able digital EFL teacher is - through teachers' digital teaching habits and perception of digital teaching aids in general and in modern and digital reading practice. Further, it seeks insight into a limited group of teachers' perception and experiences with digital teaching and readtheory.org – this contributes to a sufficient foundation within the frames of this thesis, but cannot state general trends and tendencies. It should also be noted that the current thesis does not attempt to address the learning effect/learning outcome in the form of test results and assessment, but pursues to draw a picture of its didactical potential and contribution to digital English language teaching. I stress that more research on the field of digital adaptive language learning is required in order to draw a more complete and nuanced picture of how one may foster 21st-century reading skills through digital algorithm-based adaptive language learning platform such as readtheory.org.

6.1 Research question

The current study set out to explore *What are teachers' perception of digital competence and skills concerning the digitised 21st-century English reading context?* Further, it sought to shed light upon teachers' experiences digital teaching aids and a review of the digital adaptive reading comprehension platform readtheory.org. The last focal point was further supported by perceptions and claims from the developers behind ReadTheory, as well as an analytic review of the platform itself.

6.1.1 Teachers' views on skills and competencies of 21st-century EFL

To conclude the present thesis, the findings indicate that teachers of the English subject are rather familiar with digital teaching – seemingly, the majority feel quite digitally

competent and state that they have a wide repertoire of digital tools and resources – both functional, semantic and didactical teaching aids are used in the EFL classrooms.

Further, findings suggest that teachers' perceptions of digital competence concern multiple important facets of the English subject in the 21st-century. Accordingly, EFL teachers acknowledge that digital competence is an intricate term – and that it concerns many aspects of digital teaching and learning environments. Mainly, descriptions of the term included abilities to handle digital technology in general "technical skills" – and to operate various tools and platforms in English language learning activities. Competence in using digital tools and resources is, of course, an essential part of mastering the digital environment. However, digital competence is also regarded as knowledge and understanding how one uses the technology in one's teaching and learning – and to have a critical and analytical approach to texts and content in the digital environments.

In addition to digital competence, this study attempted to give a picture of teachers perception of two other terms: 21st-century skills, and 21st-century reading skills. Seemingly, reports describing the three terms reveal that they share som central aspects – and that all point to essential competencies of today's EFL subject – thus, I would argue that the 21st-century reading context demands both digital competence and 21st-century reading skills when encountering digital texts and reading on the internet. The aspects of mass information and critical and analytical reading is prominent as valued and required skills.

6.1.2 Digital teaching

In the quantitative and qualitative questionnaire, where informants were asked about their digital teaching habits in their EFL teaching, the majority stated that they used digital tools or resources in almost every class. Further, among them, they have quite a repertoire of digital resources, ranging from standard text management-platforms such as Word, to mobile applications and video games. Efficiency, variation and enjoyment where the profound reasons why digital teaching is prominent in the informants' EFL teaching. Moreover, on the question of digital resources and reading, almost all of them claimed to use digital reading environments as a supplement to textbooks. In sum, the informants' digital teaching was frequent and included a wide range of tools and platforms.

6.1.3 Readtheory.org

A number of Norwegian EFL teachers have chosen to employ the digital adaptive English reading comprehension platform readtheory.org in their teaching – where some report that it has the potential to foster 21st-century reading skills among Norwegian pupils. Teachers' experiences with readtheory.org are somewhat split regarding its adaptive function, text-passages and reading comprehension quizzes. Adaptive learning is considered a hot topic, and more focus is given to this technological contribution to language learning. Claims of the teachers of the present study may indicate that digital adaptive platforms such as readtheory.org might have a place in the future EFL classroom, however, its contribution as of today is limited. Moreover, research results suggest that their perception of the platform, to some extent, matches the developers' claims regarding the platform functions and features. Accordingly, some of the teachers value the platform's design and functions, but points to essential flaws or issues which limits its potential as the right environment of 21st-century English language reading development.

6.2 Concluding remarks

This study has explored a broad field – the aspects of EFL education in this study are multidimensional and complicated. Digital technology in language learning is still a young field of research and has many unexplored corners and we still have a long way to go before one can truly see the didactical and pedagogical possibilities and challenges which present themselves when digital technologies enter the classrooms.

Through the process of this project, I have not encountered theoretical perspectives on digital adaptive EFL learning in Norwegian lower- and upper secondary school. Thus, this thesis attempts to scratch the surface of this newly emerged concept of language learning and teaching. I would argue that this research design can be considered as explorative and findings are interpretations of data from two different sources. It should be noted that cohesion between all findings and results may not be evident, but are in reference to data collected through documents and informants of the current study.

6.3 Didactical Implications

The findings of the current thesis might contribute to rethinking and further conceptualisation of digital competence, 21st-century reading skill and digital teaching with digital adaptive

platforms. It is evident that Norwegian EFL teachers have an understanding of what this matter implies, but unquestionably the relationship between language learning and digital technology is dynamic and advancing – at a swift pace.

Accordingly, teacher substitutes are not in near sight. In fact, the able and competent teacher is, and will be the most important factor in a well-balanced and nurturing language learning environment where students interact with digital technology.

6.4 Potential limitations and suggestion for future research

The current study has an explorative character and has its limitations. The centre of attention concerns a rather complex and broad field of English didactic but targets a small group of participants and a single digital language learning platform. Thus the findings from the present study can not be generalised, and it should be noted that this thesis heart of the investigation is considered a 'hot topic' and is a fast-changing and developing concept – thus, other contributions to this field of research may have reached the surface in the process of this writing this project. It is also worth noting that the present thesis only shed light upon this field from two selected perspectives, the teachers' and the software developers', its scope does not include views, experiences and thoughts from students. The study has with the best interest utilised the expressed thoughts and attitudes of the participating parts – most of the data is based on a random sample, where prerequisites and background of the individuals are not known to the researcher. Due to a low response rate, see section (3.8 and 6.3) and Dörnyei's (2009) notion of the potential disadvantages of the questionnaire, see section (3.8), I find this data insufficient for generalising.

By employing multiple research question, the study attempted to narrow down the scope of the thesis and to limit the focal points, however, a possible limitation of the study will always be a lack of sufficient in-depth analysis of the matter addressed. On this background, I suggest that the aspects touched upon in this investigation are given further and more elaborate attention in future research.

Throughout this project, other possible approaches for such a project presented itself, in search of literature and research material for this study – several other platforms and exciting innovations were discovered. Exploratory and comparative further research on the potential of digital language learning platforms based on algorithmic scripts and AI-engines would be highly interesting and valuable for future English language learning education. I,

therefore, suggest that the field of advanced computer power taken into the classroom is given considerable attention – with regards to multiple points of view such as virtual learning, distance learning and personalised and individual curricular content. Such matter has potential in terms of general language acquisition, as well as specific practice on single elements in language learning, such as vocabulary, reading, grammar and pronunciation.

In general, digital technology has many affordances and will be a substantial part of everyday life in the future. The relationship between curricular development in tandem with technological advancements can, under watchful eyes of the competence, contribute to many interesting and progressive aspects regarding pedagogy and didactics.

Little attention has been given to the investigated topic of future-orientated DTAs and their place in English language learning. This thesis aims to shed light upon this corner of the importance of digital competence and 21st-century reading skills, digital language teaching – and attempts to contribute to the field of English language learning didactics by bringing this topic to the surface. The discipline is influenced by external development in our society which is, for instance, reflected through the implementation of the new curriculum (LK20)– and with this, one may anticipate new ways to approach English language learning will arise and develop. On this background, one may assume that the various aspects of this thesis may contribute to a discussion of future English language reading instruction and the importance of sufficient competencies to go along with digital technology in the classroom.

7. REFERENCES

Alexander, Patricia A. 2012. "Reading into the future: Competence for the 21st century." *Educational Psychologist* 47 (4): 259-280.

Atkinson, Paul, and Amanda Coffey. 2004. "Analysing documentary realities." *Qualitative research* 3: 77-92.

Bian, Lian, and Yueguang Xie. 2010. "Research on the adaptive strategy of adaptive learning system." International Conference on Technologies for E-Learning and Digital Entertainment.

Borg, Simon. 2008. *Teacher Cognition and Language Education : Research and Practice*. London: Continuum International Publishing.

Bowen, Glenn A. 2009. "Document analysis as a qualitative research method." *Qualitative research journal* 9 (2): 27.

Buckingham, David. 2003. *Media education : literacy, learning and contemporary culture*. Cambridge: Polity Press.

Breivik, Lisbeth M. 2019 "PhD revisited: How teachers teach and readers read Developing reading comprehension in English in Norwegian upper secondary school" in Rindal, Ulrikke Elisabeth, Lisbeth M Brevik. 2019. *English didactics in Norway-30 years of doctoral research*. 207-227 Oslo: Universitetsforlaget.

Carrell, Patricia L, Joanne Devine, and David E Eskey. 1988. *Interactive approaches to second language reading*. Cambridge University Press.

Chun, Dorothy, Richard Kern, and Bryan Smith. 2016. "Technology in language use, language teaching, and language learning." *The Modern Language Journal* 100 (S1): 64-80.

Common Core State Standards Initiative. 2020. "Read The Standards" 27.04.2020
http://www.corestandards.org/read-the-standards/

Creemers, Bert P. M. 2010. *Methodological advances in educational effectiveness research*, ed Leōnidas Kyriakidēs and Pam Sammons. Abingdon, Oxon, England New York: Routledge.

Creswell, John W. 2012. *Educational research : planning, conducting, and evaluating quantitative and qualitative research*. 4th ed. ed. Boston, Mass: Pearson.

Creswell, John W. 2014. *Research design : qualitative, quantitative, and mixed methods approaches*. 4th ed. International student ed. ed.*Research design*. Los Angeles, Calif: SAGE.

Danielsen, Anne G. 2013. "Kunnskapsbygging i skolen via kvantitative verktøy-statistikk og spørreskjema. I M." *Læreren som forsker. Innføring i forskningsarbeid i skolen.* Oslo: Gyldendal Norsk Forlag.

Dodigovic, Prof Marina. 2005. *Artificial Intelligence in Second Language Learning* : Raising Error Awareness. Vol. artificial intelligence

Dörnyei, Zoltán, and Tatsuya Taguchi. 2009. *Questionnaires in second language research: Construction, administration, and processing*. Routledge.

Edwards, Anne. 2015. "Designing tasks which engage learners with knowledge." *Designing tasks in secondary education. Enhancing subject understanding and student engagement*: 13-27.

Erstad, Ola. 2010. *Digital kompetanse i skolen*. 2. utg. ed. Oslo: Universitetsforl.

Erstad, Ola. 2015. "Educating the digital generation exploring media literacy for the 21st century." *Nordic journal of digital literacy [elektronisk ressurs]* 10: 85-102.

Fink, A. 1995. *How To Ask Survey Questions*, United States of America: Sage Publications.

Gilje, Øystein. 2017. *Læremidler og arbeidsformer i den digitale skolen*. Bergen: Fagbokforl.

Haug, Peder. 2012. "Tilpassa opplæring : kvar står vi i dag, og kva er hovudutfordringane?", S.[45]-60. Oslo: Abstrakt, [2012].

Hayles, N Katherine. 2010. "How we read: Close, hyper, machine." *ADE bulletin* 150 (18): 62-79.

Heift, Trude, and Carol A Chapelle. 2013. "Language learning through technology." In *The Routledge handbook of second language acquisition*, 573-588. Routledge.

Hellekjær, Glenn Ole. 2005. "The acid test : does upper secondary EFL instruction effectivily prepare Norwegian students for the reading of English textbooks at colleges and universities?" nr 240, Faculty of Humanities, University of Oslo Unipub.

Information age. From: https://dictionary.cambridge.org/dictionary/english/information-age
Cambridge Dictionary 30.04.2020

Kelentrić, Marijana, Karianne Helland, and Ann-Therese Arstorp. 2017. "Professional Digital Competence Framework for Teachers in Norway."

Kern, Richard. 2015. *Language, literacy, and technology*. Cambridge University Press.

Kerr, P. 2016. "Adaptive learning." *ELT J.* 70 (1): 88-93. https://doi.org/10.1093/elt/ccv055.

Krumsvik, Rune Johan. 2011. "Digital competence in the Norwegian teacher education and schools." *Högre Utbildning* 1 (1): 39-51.

Krumsvik, Rune Johan. 2013 "IKT i skolen" in *Praktisk pedagogisk utdanning: en antologi.* Edit: Krumsvik, Rune Johan, and Roger Säljö, eds. 2013. Praktisk-pedagogisk utdanning : en antologi. 521-548 Bergen: Fagbokforl.

Lexile 2020. "The Lexile Framework for Reading" Updated: 2020
https://lexile.com/educators/understanding-lexile-measures/

Mackey, Alison. 2005. *Second language research : methodology and design*. Edited by Susan M. Gass. Mahwah, N.J: Lawrence Erlbaum.

Mangen, Anne, Bente R. Walgermo, and Kolbjorn Bronnick. 2013. "Reading Linear Texts on Paper versus Computer Screen: Effects on Reading Comprehension." *International Journal of Educational Research* 58: 61. https://doi.org/10.1016/j.ijer.2012.12.002.

Mary, Macken-Horarik, and Morgan Wendy. 2008. "Getting "meta": Reflexivity and literariness in a secondary English literature course." *English teaching : practice and critique* 7 (1): 22.

Medietilsynet. 2020. "Barn og medier-2020 -delrapport 1" 11.02.2020
https://medietilsynet.no/globalassets/publikasjoner/barn-og-medier-undersokelser/2020/200211-barn-
og-medier-2020-delrapport-1_-februar.pdf

Moravcsik, Andrew. 2014. "Transparency: The revolution in qualitative research." *PS: Political
Science & Politics* 47 (1): 48-53.

Murray, Denise E. 2005. "10. TECHNOLOGIES FOR SECOND LANGUAGE LITERACY." Annual
Review of Applied Linguistics 25: 188-201

Ng, Clarence, and Brendan Bartlett. 2017. *Improving reading and reading engagement in the 21st
Century: International research and innovation.*

NOU 2014: 7 *Elevenes læring i fremtidens skole.* Oslo: Kunnskapsdepartementet.
https://www.regjeringen.no/no/dokumenter/NOU-2014-7/id766593/?ch=1

Lund, Anders. 2019 "PhD revisited: The teacher as interface" in Rindal, Ulrikke Elisabeth & Lisbeth
M Brevik. 2019. *English didactics in Norway-30 years of doctoral research.* 140-161 Oslo:
Universitetsforlaget.

Palfrey, John. 2008. *Born digital : understanding the first generation of digital natives*. Edited by Urs
Gasser. [Revised]. ed. New York: Basic Books.

Paramythis, Alexandros, and Susanne Loidl-Reisinger. 2003. "Adaptive learning environments and e-
learning standards." Second European Conference on e-learning.

Patton, Michael Quinn. 1990. *Qualitative evaluation and research methods*. SAGE Publications, inc.

Prensky, Marc. 2001. "Digital natives, digital immigrants." *On the horizon* 9 (5).

Punch, Keith F. and Alis Oancea. 2014. *Introduction to research methods in education*. Sage.

Rongved, Elisabeth. 2018 "Hva snakker vi om når vi snakker om digitalisering i skolen?"
Utdanningsforsking: https://utdanningsforskning.no/artikler/hva-snakker-vi-om-nar-vi-
snakker-om-digitalisering-i-skolen/

Røkenes, Fredrik Mørk. 2019 "PhD revisited: Preparing future teachers to teach with ICT" in Rindal,
Ulrikke Elisabeth, Lisbeth M Brevik. 2019. *English didactics in Norway-30 years of doctoral
research.* 162 -182 Oslo: Universitetsforlaget.

Rønning-Arnesen, Lene.,Kristiansen, Katrine., and Thulin, Merethe B., 2019 "Fremtiden er digital –
også i skolen" Aftenposten, 31.05.2019
https://www.aftenposten.no/meninger/debatt/i/3JPypM/kort-sagt-fredag-31-mai

Roness, Dag. 2016 "Aksjonsforskning og kvantitativ metode." *In Å forske på egen praksis:
Aksjonsforskning og andre tilnærminger til profesjonell utvikling i utdanningsfeltet.* Edit:
Ulvik, M., Riese, H., Roness, D. 59-77 Bergen: Fagbokforlaget

Skulstad, Aud Solbjørg. 2019 "PhD revisited: Established and emerging business genres" in Rindal,
Ulrikke Elisabeth, Lisbeth M Brevik. 2019. *English didactics in Norway-30 years of doctoral
research.* 35-56 Oslo: Universitetsforlaget.

Smith, Paul. 2016. "Personalized Education Using Adaptive Learning Technology: One Size." *Learning* 12 (1): 101-118.

Stake, Robert E. 1995. The art of case study research. Thousand Oaks. Calif: sage.

The Norwegian Directorate for Education and Training. 2013 *English subject curriculum (ENG1-03)* From: https://www.udir.no/kl06/ENG1-03/Hele/Grunnleggende_ferdigheter?lplang=http://data.udir.no/kl06/eng

The Norwegian Directorate for Education and Training. 2013 *Professional Digital Competence Framework for Teachers* From: https://www.udir.no/contentassets/081d3aef2e4747b096387aba163691e4/pfdk-framework.pdf

Thompson, J. 2013 *Types of self-led e-Learning, micro-Adaptive systems and algorithm-based systems*. 04.05.2020 http://pub.cogbooks.com/~cogbooks/white-papers/

UIS. 2020 "Hefte: Lesing på skjerm". Updated 14.08.2020 https://www.uis.no/nb/hefte-lesing-pa-skjerm

UNESCO. 2019 "Digital skills critical jobs and social inclusion" 24.05.2020 https://en.unesco.org/news/digital-skills-critical-jobs-and-social-inclusion

Yin, Robert K. 1994. "Discovering the future of the case study. Method in evaluation research." Evaluation practice 15 (3): 283-290

Ørevik, Sigrid 2018a. "Reading and literacy " in. *Teaching English in the 21st century : central issues in English didactics.* Edit: Fenner, Anne-Brit, and Aud Solbjørg Skulstad. 2018. 93-116 Bergen: Fagbokforl.

Ørevik, Sigrid 2018b. "Digital Technology in the English classroom" in *Teaching English in the 21st century : central issues in English didactics*. Edit: Fenner, Anne-Brit, and Aud Solbjørg Skulstad. 2018. 237-256 Bergen: Fagbokforl.

8. APPENDICES

Appendix A: NSD Approval

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Masterprosjekt ENG350 - UiB våren 2020

Referansenummer

490935

Registrert

29.01.2020 av Rune Mo-Bjørkelund - Rune.Mo-Bjorkelund@student.uib.no

Behandlingsansvarlig institusjon

Universitetet i Bergen / Det humanistiske fakultet / Institutt for fremmedspråk

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Sigrid Ørevik, Sigrid.Orevik@uib.no, tlf: 4755582362

Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Rune Mo-Bjørkelund, rune.mo-bjorkelund@student.uib.no, tlf: 91354018

Prosjektperiode

01.01.2020 - 15.05.2020

Status

28.02.2020 - Vurdert anonym

Vurdering (1)

28.02.2020 - Vurdert anonym

Det er vår vurdering at det ikke skal behandles direkte eller indirekte opplysninger som kan identifisere enkeltpersoner i dette prosjektet, så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 28.02.2020 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Prosjektet trenger derfor ikke en vurdering fra NSD.

Vi minner om at deltakerne bør uansett få forskningsetisk informasjon om prosjektet og hva deltakelse innebærer, og det bør komme frem at besvarelsene ikke vil kunne kobles til enkeltdeltakere (med mindre deltakeren aktivt identifiserer seg selv). Du kan derfor be deltakerne om å ikke oppgi navn eller andre personidentifiserende opplysninger i tekstfeltene.

HVA MÅ DU GJØRE DERSOM DU LIKEVEL SKAL BEHANDLE PERSONOPPLYSNINGER?

Dersom prosjektopplegget endres og det likevel blir aktuelt å behandle personopplysninger må du melde dette til NSD ved å oppdatere meldeskjemaet. Vent på svar før du setter i gang med behandlingen av personopplysninger.

VI AVSLUTTER OPPFØLGING AV PROSJEKTET

Siden prosjektet ikke behandler personopplysninger avslutter vi all videre oppfølging.

Lykke til med prosjektet!

Kontaktperson hos NSD: Eva J B Payne

Tlf. Personverntjenester: 55 58 21 17 (tast 1)
https://meldeskjema.nsd.no/vurdering/5e2eca44-b0cb-461b-a11f-450377a13757

Appendix B: Questionnaire

Denne spørjeundersøkjinga er knytt til masterprosjektet mitt på Humanistisk Fakultet ved Universitet i Bergen. I prosjektet mitt undersøkjer eg primert korleis bruken av 'Read Theory' som er eit adaptivt leseprogram kan fremje lesedugleikar hjå elevane, og fremje engelskdugleikane generelt. Samstundes ynskjer eg å innhente informasjon om lærarar sitt forhald til bruk av digitale - hjelpemiddel og platformar i undervisninga.

Personvern: Prosjektet er godkjent og vurdert som anonymt av NSD - Norsk senter for forskningsdata. Legg difor ikkje inn svar som kan knyttast til enkeltpersonar.
På førehand takk.

Underviser du eller har du undervist i engelskfaget dei siste 5 åra?
- (1) ❑ Ja
- (2) ❑ Nei

Underviser du eller har du undervist i engelskfaget på fylgjande trinn?
- (1) ❑ Ungdomstrinnet
- (2) ❑ Vidaregåande skule
- (3) ❑ Ungdomstrinnet og vidaregåande skule

Føler du deg kompetent i det digitale klasserommet? Dvs: Tykkjer du at du har kompetanse nok til å utnytte dei digitale hjelpemiddela du har til rådigheit, og kan oppfylle elevens kompetansemål i digitale ferdigheiter?
- (2) ❑ Veldig kompetent
- (3) ❑ Nokså kompetent
- (4) ❑ Verken eller
- (5) ❑ Mindre kompetent
- (6) ❑ Svært lite kompetent

Omgrepet digital kompetanse står sentralt i læreplanen og får til dels endå større fokus i fagfornyelsen: Korleis tolkar du omgrepet digital kompetanse?

_____

_____

_____

_____

_____

Skulle du ynskje det vart satt større fokus på å utvikle betre digital kompetanse blant lærararne på skulen?

(1) ❑ Ja

(2) ❑ Nei

(3) ❑ Verken eller

Har du spesifikk utdanning eller kursing innan digital bruk i skulen og klasserommet?

(1) ❑ Ja, høgare utdanning

(2) ❑ Ja, kurs el. liknande

(3) ❑ Nei

(4) ❑ Nei, men skulle ynskje eg hadde

Kor ofte nyttar du digitale eller web-baserte hjelpemiddel aktivt i undervisninga di?

(1) ❑ Kvar time

(2) ❑ I fleirparten av timane

(3) ❑ I ca halvparten av timane

(4) ❑ I eit fåtal av timane

(5) ❑ Aldri

Kvifor nyttar du digitale hjelpemiddel i undervisninga?

(1) ❑ For å variere undervisninga

(2) ❑ Fordi det er effektivt.

(3) ❑ Fordi elevane likar å jobbe gjennom digitale verktøy eller platformar.

(4) ❑ Fordi du som lærar likar å jobbe gjennom digitale verktøy eller platformar.

(5) ❑ Fordi du vert pålagt å nytte digitale hjelpemiddel av leiinga på skulen eller kollegiet.

(6) ❑ Fordi det gjer eit større læringsutbyte enn alternativet.

Kva digitale hjelpemiddel har du tilgang til i engelskundervisninga di?

(1) ❑ Elevane har eigen laptop (mac/PC/chromebook)

(2) ❑ Elevane har eigen tablet (iPad el. liknande)

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(3) ❑ PC-rom

(4) ❑ Smarttelefonar

(5) ❑ Har ikkje tilgang til digitale hjelpemiddel

Kva digitale platformar eller programvare nyttar du i engelskundervisninga?

(1) ❑ E-bøker

(2) ❑ Encyclopedia

(3) ❑ Sosiale media

(4) ❑ YouTube

(5) ❑ Netflix eller andre strømmetjenestar

(6) ❑ Videospel

(7) ❑ Ulike applikasjonar på smarttelefon

(8) ❑ Tekstbehandlingsprogram

(9) ❑ Retteprogram (Grammarly el. liknande)

(10) ❑ Translatør-programvare

(11) ❑ Andre

Er det enkelte platformar eller programvare som vert nytta i større grad enn andre i engelskundervisninga di? Forklar gjerne kvifor du nyttar nettopp denne platformen.

_____

_____

_____

_____

Om læreaktiviteten i timen skal være lesing, nyttar du anna lesemateriale enn læreboka?

(1) ❑ Nei, nyttar stort sett læreboka til lesing

(2) ❑ Brukar læreboka i tillegg til anna læremateriell i fysisk form; dvs. Bøker, aviser, magasin, el. liknande.

(3) ❑ Nyttar ulike nettstader eller læreressursar på nett.

(4) ❑ Nyttar andre leseplatformar i form av appar, video-spel eller andre digitale leseplatformar.

Har du kjenskap til smarte og adaptive læreplatformar/program som Read Theory og DuoLingo?

(1) ❑ Har kjennskap til ReadTheory

(2) ❑ Har kjennskap til ReadTheory og nyttar/har nytta det i undervisninga

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(3)   ☐ Har kjennskap til DuoLingo

(4)   ☐ Har kjennskap til DuoLingo og nyttar/har nytta det i undervisninga

(5)   ☐ Nei, har ikkje kjennskap til verken ReadTheory eller DuoLingo

(6)   ☐ Har kjennskap til og nyttar andre liknande platformar.

Om du nyttar eller har nytta deg av Read Theory eller DuoLingo, forklar korleis dei vert nytta, både i og utanfor klasserommet: kva tykkjer elevane og kva tykkjer du sjølv om bruk av slik 'smart' programvare i engelskundervisninga?

_____

_____

_____

_____

_____

Om du fekk velje: ville du ha nytta digitale hjelpemiddel og ny teknologi i klasserommet:

(1)   ☐ Meir

(2)   ☐ Mindre

(3)   ☐ Like mykje som eg gjer no

I kva grad tykkje du den adaptive funksjonen i ReadTheory fungerar?

(1)   ☐ I stor grad - fungerar veld bra.

(2)   ☐ I nokså stor grad - fungerar bra.

(3)   ☐ Verken eller - fungerar til ein viss grad.

(4)   ☐ I liten grad - fungerar dårleg.

Kva legg du i omgrepet 21st century skills?

_____

_____

_____

_____

Kva legg du i omgrepet 21st century reading skills?

_____

_____

_____

I kva grad tykkjer du ReadTheory fremjar 21ˢᵗ-century skills og reading skills?

_____

_____

_____

_____

Kva meiner du er dei viktigaste fordelane ved bruken av ReadTheory? Svar gjerne i stikkordsform:

_____

_____

_____

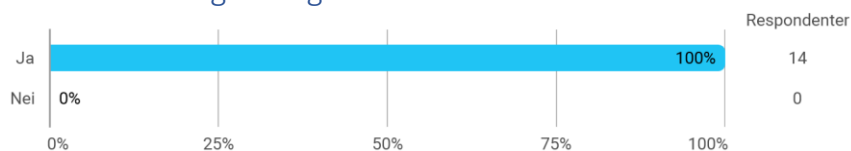**Kva meiner du er dei mest største ulempene ved bruken av ReadTheory? Svar gjerne i stikkordsform:**

_____

_____

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Appendix C: Questionnaire data

Denne spørjeundersøkjinga er knytta til masterprosjektet mitt på Humanistisk Fakultet ved Universitet i Bergen. I prosjektet mitt undersøkjer eg primert korleis bruken av 'Read Theory' som er eit adaptivt leseprogram kan fremje lesedugleikar hjå elevane, og fremje engelskdugleikane generelt. Samstundes ynskjer eg å innhente informasjon om lærarar sitt forhald til bruk av digitale - hjelpemiddel og platformar i undervisninga.
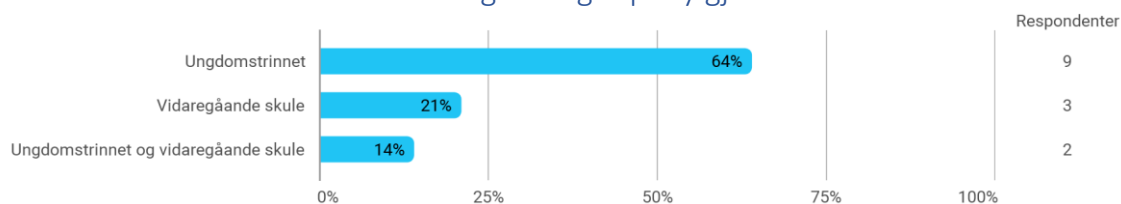
Personvern: Prosjektet er godkjent og vurdert som anonymt av NSD - Norsk senter for forskningsdata. Legg difor ikkje inn svar som kan knyttast til enkeltpersonar.
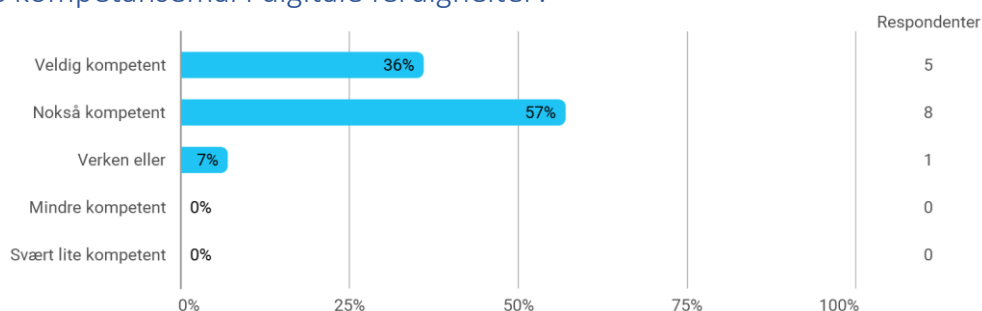På førehand takk.

Underviser du eller har du undervist i engelskfaget dei siste 5 åra?

	Respondenter
Ja — 100%	14
Nei — 0%	0

Underviser du eller har du undervist i engelskfaget på fylgjande trinn?

	Respondenter
Ungdomstrinnet — 64%	9
Vidaregåande skule — 21%	3
Ungdomstrinnet og vidaregåande skule — 14%	2

Føler du deg kompetent i det digitale klasserommet? Dvs: Tykkjer du at du har kompetanse nok til å utnytte dei digitale hjelpemiddela du har til rådigheit, og kan oppfylle elevens kompetansemål i digitale ferdigheiter?

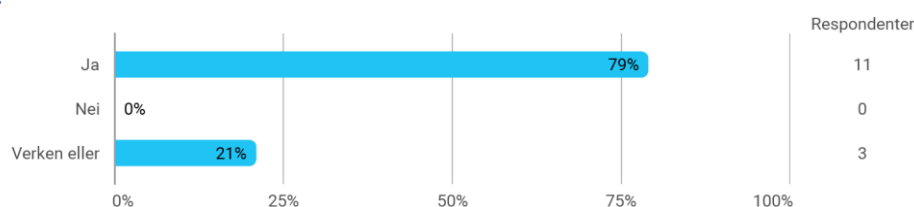|	Respondenter
Veldig kompetent — 36%	5
Nokså kompetent — 57%	8
Verken eller — 7%	1
Mindre kompetent — 0%	0
Svært lite kompetent — 0%	0

Omgrepet digital kompetanse står sentralt i læreplanen og får til dels endå større fokus i fagfornyelsen: Korleis tolkar du omgrepet digital kompetanse?
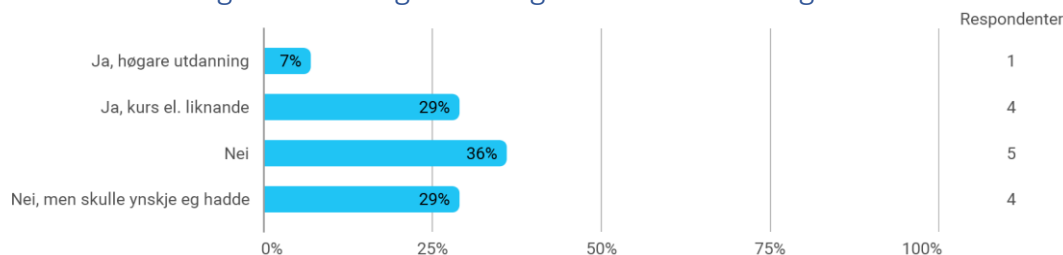
- Elever skal kunne bruke digitale hjelpemidler på en funksjonell måte. Mange elever er kanskje flinke til å navigere rundt på kjente plattformer, men jeg opplever ofte at elever for eksempel ikke har kompetanse i enklere oppgaver som lagring, mappeindeling osv. De mangler ofte også grunnleggende innføring i enkle kommandoer i Word noe som gjør at de bruker unødvendig tid på å følge opp formelle krav til oppgaver som skal leveres.
  Elever trenger også å lære mer om kildekritikk på internett og det er vanskelig for dem å navigere fordi det er så mye informasjon tilgjengelig hele tiden.

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- At man har kompetanse til å bruke digitale hjelpemidler for å fremme elevers læring, samt at man har kompetanse om digitale hjelpemidler elever kan bruke for å fremme læring.
- Å kunne benytte seg av digitale hjelpemidler og ressurser, samt være kildekritisk.
- Vidt: Tekniske ferdigheter + kunnskap om muligheter, nytte, risiko...
- Kort sagt: jeg sammenlikner den med lesekompetanse. Kompetanse til å bruke digitale ressurser for å finne informasjon, bruke den og skape den.
- At eleven skal kunne bruke digitale hjelpemiddel.
- Være i stand til å håndtere en digital hverdag. Kunnskap, evne til kritisk tenkning og bevisst bruk av digitale produkter. Og sikkert noe annet jeg har glemt.
- Å ha kompetanse til å bruke digitale verktøy og kunne orientere seg i et digitalt samfunn
- Programmer, nettsider, skriveverktøy o.l på pc. Bruke de tingene for å kunne fremme egen læring.
- At eleven kan nytte seg av digitale appar, nettstader, og sjølv produsere bøker, filmar, m.m for å lære engelsk.
- Ferdigheter, kunnskaper, kreativitet og holdninger som alle trenger for å kunne bruke digitale medier for læring
- Å kunne bruke digitale hjelpemidler på en hensiktsmessig måte og være positivt innstilt til og aktivt oppsøke ny kunnskap innen bruk av PC og tablet, nettressurser, koding etc.
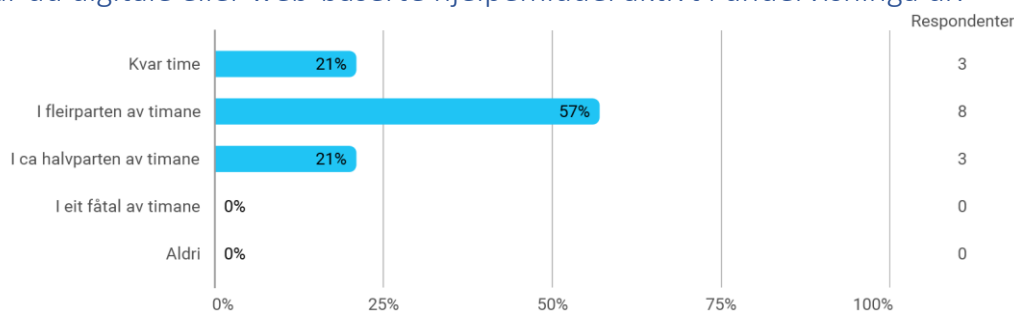
Skulle du ynskje det vart satt større fokus på å utvikle betre digital kompetanse blant lærararne på skulen?

	Respondenter
Ja — 79%	11
Nei — 0%	0
Verken eller — 21%	3

Har du spesifikk utdanning eller kursing innan digital bruk i skulen og klasserommet?

	Respondenter
Ja, høgare utdanning — 7%	1
Ja, kurs el. liknande — 29%	4
Nei — 36%	5
Nei, men skulle ynskje eg hadde — 29%	4

Kor ofte nyttar du digitale eller web-baserte hjelpemiddel aktivt i undervisninga di?

	Respondenter
Kvar time — 21%	3
I fleirparten av timane — 57%	8
I ca halvparten av timane — 21%	3
I eit fåtal av timane — 0%	0
Aldri — 0%	0

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Kvifor nyttar du digitale hjelpemiddel i undervisninga?

	Respondenter
For å variere undervisninga	86% — 12
Fordi det er effektivt.	79% — 11
Fordi elevane likar å jobbe gjennom digitale verktøy eller platformar.	71% — 10
Fordi du som lærar likar å jobbe gjennom digitale verktøy eller platformar.	64% — 9
Fordi du vert pålagt å nytte digitale hjelpemiddel av leiinga på skulen eller kollegiet.	7% — 1
Fordi det gjer eit større læringsutbyte enn alternativet.	29% — 4

Kva digitale hjelpemiddel har du tilgang til i engelskundervisninga di?

	Respondenter
Elevane har eigen laptop (mac/PC/chromebook)	71% — 10
Elevane har eigen tablet (iPad el. liknande)	29% — 4
PC-rom	14% — 2
Smarttelefonar	43% — 6
Har ikkje tilgang til digitale hjelpemiddel	0% — 0

Kva digitale platformar eller programvare nyttar du i engelskundervisninga?

	Respondenter
E-bøker	43% — 6
Encyclopedia	36% — 5
Sosiale media	14% — 2
YouTube	86% — 12
Netflix eller andre strømmetjenestar	64% — 9
Videospel	29% — 4
Ulike applikasjonar på smarttelefon	29% — 4
Tekstbehandlingsprogram	86% — 12
Retteprogram (Grammarly el. liknande)	71% — 10
Translatør-programvare	36% — 5
Andre	43% — 6

Er det enkelte platformar eller programvare som vert nytta i større grad enn andre i engelskundervisninga di? Forklar gjerne kvifor du nyttar nettopp denne platformen.

- Vi bruker også CdORD og Quizlet.
  CDORD leser tekst høyt for elevene og hjelper dem med alt fra ordfeil til å se sammenheng avsnitt.
  Quizlet brukes gjerne til å øve på ordforråd knyttet til tema.
- Readtheory - kan tilpasses den enkelte elev
  Quill - grammatikk, enkel å forstå, kan tilpasses elevene
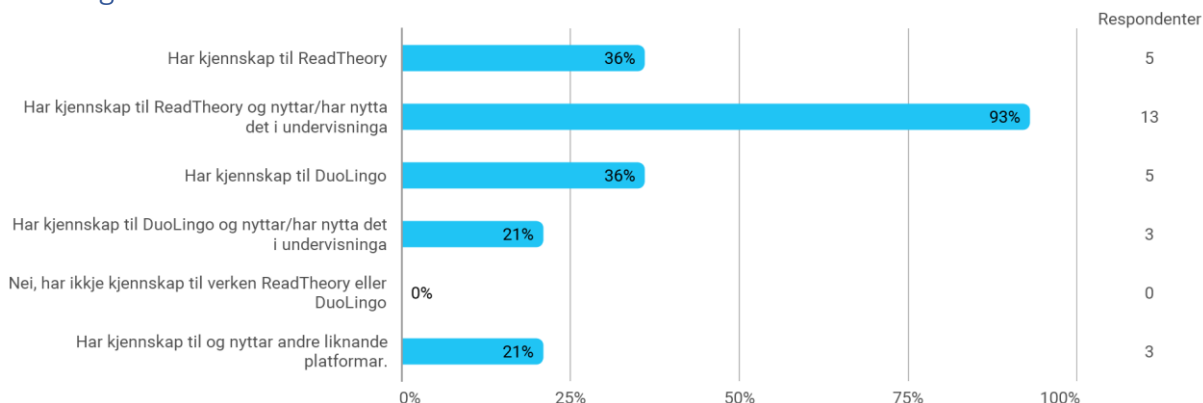- ReadTheory
  Quill

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Fordi det er lett å følge med på elevenes nivå og fremgang.
- Word, Teams og smartboka er daglege arbeidsverktøy. Ordnett, Encyclopedia Britannica, kamera, iThoughts etc. er fremme til spesifikke oppgaver og f. eks. The Sims kun til ett enkelt prosjekt.
- Quizlet- bruker til ordinnlæring og testing.
- Quill og read theory.
- Readtheory pga kartlegging tilpasset lesetekster.
- Stairs online elev og lærerressurser. Vi har stairs papirbok, og finn det hensiktsmessig å bruke dei andre ressursane som støtte i ulike tema.
- x
- Showbie
- Jeg bruker youtube og campus inkrement i egen omvendt undervisning. Spill som gir opplysninger gjennom tekst og tale er både lærerikt og gøy.

Om læreaktiviteten i timen skal være lesing, nyttar du anna lesemateriale enn læreboka?
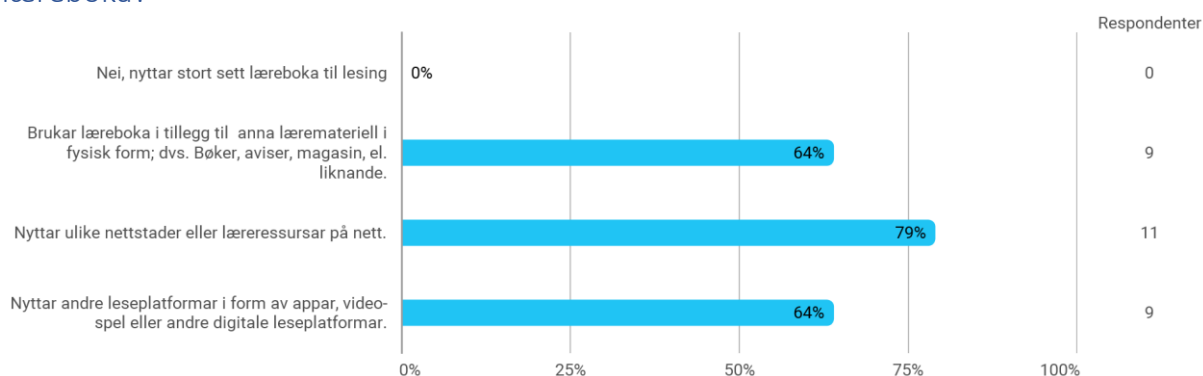
Respondenter

Nei, nyttar stort sett læreboka til lesing	0%	0
Brukar læreboka i tillegg til anna læremateriell i fysisk form; dvs. Bøker, aviser, magasin, el. liknande.	64%	9
Nyttar ulike nettstader eller læreressursar på nett.	79%	11
Nyttar andre leseplattformar i form av appar, video-spel eller andre digitale leseplattformar.	64%	9

Har du kjenskap til smarte og adaptive læreplattformar/program som Read Theory og DuoLingo?

Respondenter

Har kjennskap til ReadTheory	36%	5
Har kjennskap til ReadTheory og nyttar/har nytta det i undervisninga	93%	13
Har kjennskap til DuoLingo	36%	5
Har kjennskap til DuoLingo og nyttar/har nytta det i undervisninga	21%	3
Nei, har ikkje kjennskap til verken ReadTheory eller DuoLingo	0%	0
Har kjennskap til og nyttar andre liknande plattformar.	21%	3

Om du nyttar eller har nytta deg av Read Theory eller DuoLingo, forklar korleis dei vert nytta, både i og utanfor klasserommet: kva tykkjer elevane og kva tykkjer du sjølv om bruk av slik 'smart' programvare i engelskundervisninga?

- Jeg har brukt begge plattformene i undervisning, men i ulike klasser og grupper med forskjellige mål. For eksempel opplever jeg at noen elever som har lite engelskerfaring oftere tar i bruk disse plattformene også på fritiden for å øke sine kunnskaper. Likevel opplever jeg at lesing på digitale plattformer ikke har like god læringseffekt sammenlignet med lesing på papir. Fordelen med lesing på papir er at jeg kan modellere lesestrategier og elevene kan markere i teksten i mens de leser. Ulempen er at utvalget kanskje blir mindre og likt for alle. Fordelen med Readtheory er helt klart at elevene kan lese tekster som er bedre tilpasset deres eget nivå og proksimale utviklingssone. Ulempen er at de må lese på skjerm og at det ikke er mulig å forberede tilpassede strategier fordi det er ny tekst hele tiden.
Jeg opplever at det er veldig stor forskjell på hvordan elever liker å bruke slike plattformer. Noen liker godt at oppgavene er konkrete og korte, mens andre synes det blir kjedelig. Det er
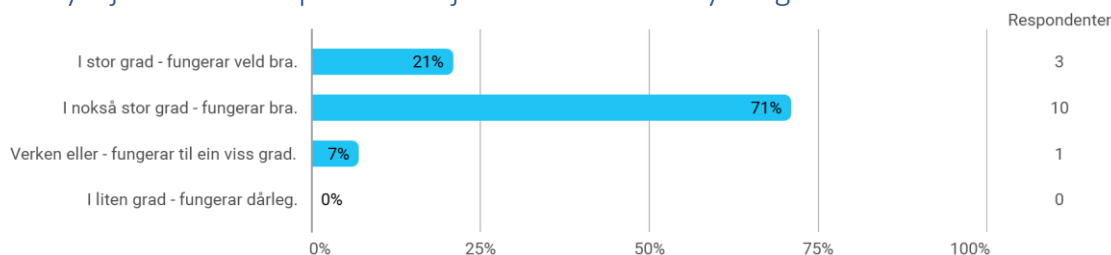
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også vanskelig med dybdelæring gjennom slike plattformer og annen lesing og språklæring er selvfølgelig helt nødvendig.
- Elevene liker at tekstene er tilpasset deres nivå, og de føler mestring når de når et høyere nivå. Jeg bruker 15min i starten av en dobbelt time til å fokusere på lesing.
- Til hjemmearbeid.
- ReadTheory brukar eg til ekstra-oppgåver og ekstra (frivillig) lekse. For dei elevane som opplever mestring med ReadTheory, er det eit godt alternativ til å vente på tur.
- Read Theory- har nettopp begynt i en klasse som ekstra opplegg
DuoLingo- har brukt i NOA undervisning
- At det er tilpasse eleven sitt nivå er avgjerande. Elevane likar det også.
- Bruker det som hjelpemiddel f.eks når elever skal ha individuell samtale.
- Jeg syns ideen er hod, men jeg syns ille ReadTheory passer godt nok for mine elever.
Duolingo er en god app, men da jeg brukte den fantes den bare for engelskspråklige som ville lære norsk, ikke omvendt
- Bra med nivålesing.
Kan følge eleven og se evt fremgang.
Kan også legge til svaroppgaver slik at det skriftlige kommer inn.
Kan jobbe på egenhånd.
- Har brukt det mest for p gi elevane lesetrening i timane. Litt som heimearbeid.
Dei fleste elevane har likt å jobba på readtheory. Underviser nå på 5-7 trinn. For-testen måtte mange bare klikke seg gjennom, blei altfor avansert. Men dei fekk greie tekstar å jobba med etterpå. Elevane likar generelt å jobba i 15 minutt om gongen. Har opplevd at ein elev brukte translate på heile teksten for å kunne svare rett på spørsmål. Då er det norskkunnskapene som vert vurderte. Elles har eg vore ute for at ein elev bare klikka seg gjennom utan å vurdere svara. Desse er unntak. Eit anna unntak er ein flink 6. Klassing som hadde jobba godt i sommerferien.
- Jeg har kun brukt det i klasserommet og elevene liker det godt. Jeg synes det funker veldig bra fordi programmet selv tilpasser for elevene og gir både meg og elevene et veldig godt bilde på deres nivå.
- Nettopp tatt i bruk, for tidlig å si.
- Readtheory blir litt kjedel7g når man ikke kan velge tema selv.

Om du fekk velje: ville du ha nytta digitale hjelpemiddel og ny teknologi i klasserommet:
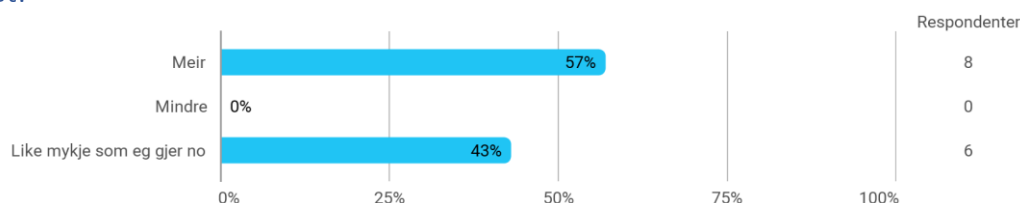
		Respondenter
Meir	57%	8
Mindre	0%	0
Like mykje som eg gjer no	43%	6

I kva grad tykkje du den adaptive funksjonen i ReadTheory fungerar?

		Respondenter
I stor grad - fungerar veld bra.	21%	3
I nokså stor grad - fungerar bra.	71%	10
Verken eller - fungerar til ein viss grad.	7%	1
I liten grad - fungerar dårleg.	0%	0

Kva legg du i omgrepet 21st century skills?

- Jeg tenker at det handler veldig mye om fleksibilitet innenfor flere ulike ferdigheter. Det holder f.eks. ikke å å kunne lese noveller, lesing er mer omfattende og inkluderer andre ferdigheter. Elevene skal ikke bare lese og godta (sammenlignet med å slå opp i et leksikon for 20 år siden), de skal vurdere og tolke.
- Lese- og skriveferdigheter, ferdigheter om læring og ferdigheter om livet.
- Kunnskap om teknologi, fleksibilitet.
- steAm ;-) Kreativ og sjølvstendig bruk og tilpasning av kompetanse.
- Bli kritisk til informasjon og kunne skille mellom sannheten og "fake news"
- Å kunne orientere seg i den digitale verda, vere kritisk, kunne ta i bruk ulike hjelpemiddel osb

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- Dagens ferdigheter.
- Elevane skal bli best muleg budde på å møta livet i verda vi lever i nå, og vil koma til å møta i framtida.
- Problemløsning, kommunikasjon, informasjon og livsmestring
- Lite
- Teknologiske ferdigheter, ikke-fysisk kommunikasjon.

Kva legg du i omgrepet 21st century reading skills?

- Se over
- Ferdigheter innenfor lesing, å forstå innhold og kunne sette det i sammenhenger.
- Kunne navigere i ulike typer tekster, kunne benytte seg av hjelpemidler
- Blant anna kildekritikk, intertekstualitet og det at lese-utholdenhet må trenes på nye måter.
- Finne riktig og kvalitetsikret informasjon.
- Har aldri høyrt omgrepet..
- Å kunne orientere seg i tekster som er mer enn bare ren tekst, herme på skjerm med lenker, bilder, filmer og animasjoner som gir tilleggsinformasjon
- Nåtidens leseferdigheter
- Kompetanse som gjer elevane i stand til å forstå skriftleg engelsk, i samband med fritid-ferie, skule-høgare utdanning og framtidig jobb.
- Informasjon, media og digitale ferdigheter
- ?
- Sammensatt tekst, må kunne lese seg til hvor man skal trykke og dekode digitale tekster.

I kva grad tykkjer du ReadTheory fremjar 21st century skills og reading skills?

- På en god måte. De mer avanserte tekstene krever jo at elevene bruker strategier for å finne svarene på oppgavene, ikke bare går tilbake til teksten og ser etter "riktig" ord eller setning. Det som kanskje ikke er like lett å trene på gjennom Readtheory er kildekritikken fordi avsender ikke har en agenda som de kan avsløre. Et eksempel som jeg opplever er at elever leser "forskning" og ikke tenker på hvem forskeren jobber for. Når de da skal finne ut av det kreves det andre ferdigheter enn det som skal til for å vurdere troverdighet til en kilde som er falsk (les: falske facebook artikler som egentlig er virus, eller scam-mail).
  Slike ferdigheter er svært nødvendige i fremtiden, og det er krevende å undervise.
- Ettersom at tekstene har veldig ulikt innhold, føler jeg at Readtheory er mest med på å fremme leseferdighetene, men også skriveferdigheter. De leser en tekst og skal prøve å svare på spm. til teksten. De vil se hvordan ord er skrevet, setningsoppbygning, tegnsetting, samt hvordan formulere påstander/spørsmål - som kan fremme skriveferdigheter.
- Fleksibelt
- Liten, men det trener tradisjonelle ferdigheter som er en viktig del av grunnlaget for «the 4C».
- Håper at den fremmer leseferdigheter og det å tenke kritisk. Ellers har jeg brukt den for lite for å kunne svare mer.
- ?
- I mindre grad.
- God grad.
- Tekstar med varierte tema, varierande vanskegrad lettar tilgjenge for den enkelte.
- I stor grad
- Til en viss grad. Det er først og fremst et adaptivt leseverktøy, ikke "a miracle maker".

Kva meiner du er dei viktigaste fordelane ved bruken av ReadTheory? Svar gjerne i stikkordsform:
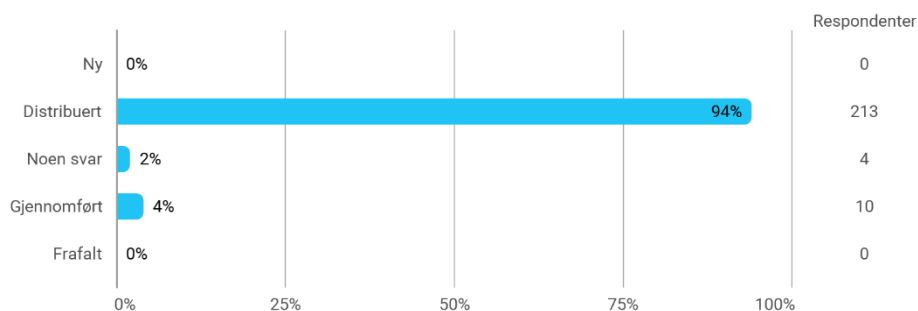
- tilpasset til hver elev
  enkelt å følge opp
  bra med "klasserom" på nettsiden
  kan ha skriveoppgaver som vurderes av læreren
  lett å engasjere elever
  lett å holde konkurranser (den med flest poeng ila en periode vinner)
  Relativt korte tekster.
- Tilpasset eleven
  Lærer ser utvikling
  Mestringsfølelse hos eleven
- Lett å holde oversikt, adaptivt
- Effektivt.

- -tilpasset opplæring
  -rapport om progresjon
  -varierte tekster
- Tilpassa kvar elev sitt nivå
  Enkelt å bruke
- At den tilpasser seg brukeren
- Alle får tekster på sitt nivå.
  Lærer følger hele prosessen.
- Alle elevar får tilpassa tekstar. Enkelt å administrerer for lærar som blir frigjort til å kunne observere/ veilede. Tek lite tid å logge seg på. Mange ulike tema. Fint med kontrollspørsmål til teksten.
- Nivådeling
- Tilgang
  Variasjon
- Tilpasset nivå.

Kva meiner du er dei mest største ulempene ved bruken av ReadTheory? Svar gjerne i stikkordsform:

- vanskelig å lære bort lesestrategier
  elever får bedre leseferdigheter av å lese på papir (ref PISA undersøkelser)
  Alle leser ulike tekster så lesingen må skje utenfor kontekst av andre temaer vi holder på med i undervisningen.
- Savner forklaring på norsk når det kommer til grafene om hvordan elevene ligger an i lesing.
- Ingen
- Rigid, må suppleres med skjønnsvurdering og mer fleksible undervisningsformer.
- Vi kan ikke ha felles samtaler eller oppgaver.
- Tekstene har ein tendens til å vere litt kjedelege.
- Vanskelig tekster, litenknteressante tekster
- Kan gjette svar...men sånn er det jo overalt
- For- test som er lik for alle. Kunne kanskje vore 2-3 nivå.
- Spørsmålene kan være vanskelig formulert
- Erstatter ikke bok-og den gode leseopplevelsen
- Ikke nødvebdigvis tema elevene interesserer seg for.

Samlet status

		Respondenter
Ny	0%	0
Distribuert	94%	213
Noen svar	2%	4
Gjennomført	4%	10
Frafalt	0%	0

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Appendix D: D1 – www.readtheory.org

ReadTheory.org Data Collection Study 2.0

A Preliminary Study Concerning the Effectiveness of an Online

Reading Comprehension and Writing Program

March 2016

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Abstract

ReadTheory.org is an interactive website designed to serve as a computer-based supplemental reading program for students in grades 1 through 12. The website provides a wide variety of reading comprehension exercises and follow-up essay options for writing practice. ReadTheory's unique features are its rejection of a paid licensing or fee-for-use model, its incorporation of game mechanics, and its responsive leveling algorithm, which allows students to be presented with best-fit material based on prior performance.

The purpose of this research was to investigate ReadTheory.org's impact on student grades, standardized test scores, and overall reading confidence and ability. Over 1100 professional educators were surveyed. Their responses provide strong evidence to suggest ReadTheory has had a positive effect on these three measures. Additionally, both student and teacher satisfaction with ReadTheory were found to be high.

Introduction

In the United States, tens of millions of unique users access online learning platforms every month, with continued exponential growth expected (Murphy et al., 2014). However, this technological revolution has not reached all students equally, with platform licensing costs providing a high entry barrier to under-resourced schools. Providing low- and no-cost online learning platforms are an effective way to overcome this barrier. Furthermore, these platforms must be made lively and engaging. Instructional technology professor Karl M. Kapp writes, "Elements such as assigning points to activities, presenting corrective feedback, and encouraging collaboration have been the staples of many educational practitioners. The difference is that gamification provides another layer of interest and a new way of weaving

together those elements into an engaging game space that both motivates and educates learners" (Kapp, 2012:12).

ReadTheory.org combines a no-cost, personalized online learning environment with increasing degrees of motivational gamified content. More importantly, all content on ReadTheory is in line with grade-specific Common Core State Standards on English Language Arts, ensuring that in-program progress translates to offline success on state standardized tests (Common Core, 2010). In keeping with the Common Core, ReadTheory activities are designed to foster critical thinking skills, enrich vocabulary, and prepare students for college- and career-relevant literacy.

Methods

ReadTheory collected data from 1100 professional educators who have used the program in their classrooms for a duration of 1-12 months since the program's inception in 2014. Data was collected via a standardized questionnaire and in some cases validated via interpersonal communication. Data was collected during the month of February 2016. Responses to the questionnaire were submitted on a voluntary basis. This data has been used to draw conclusions regarding the effectiveness of the program.

Results

Respondents were distributed randomly across 15 categories with regard to the education level of the students with whom ReadTheory is being used. With respect to questionnaire respondents, the program is being used primary by teachers and students in grades 3 through 8. A significant number of responses pertaining to the "Other" category reflect data collected from school administrators, instructional facilitators, and auxiliary support staff.
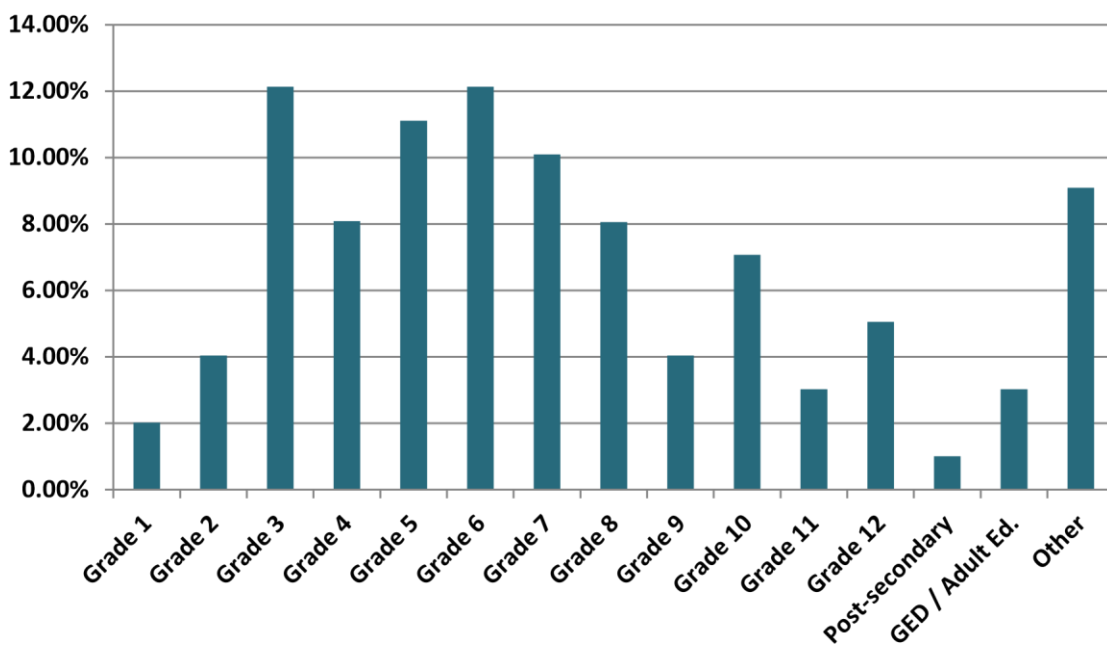
Of teachers who have used the program long enough to note a sustained change in student standardized test scores, over 80% of respondents reported that ReadTheory has contributed to an increase in scores.* Students whose scores have remained the same comprised 11.34%. Students whose scores have increased slightly comprised 23.71%. Students whose scores have greatly increased comprised 4.12%.

Student Standardized Test Score Outcomes After Using ReadTheory

Weight	1	2	3	4	5		
Outcome	Student scores have greatly decreased	Student scores have slightly decreased	Student scores have remained the same	Student scores have slightly increased	Student scores have greatly increased	N/A	Weighted Average
Percentage	1.03%	0.00%	11.34%	23.71%	4.12%	59.79%	3.74

*Results based on survey respondents who reported being able to determine the effect ReadTheory had on their students' grades.

Similarly, over 70% of educators who noticed an effect of ReadTheory on student grades reported that ReadTheory had contributed to an increase in student grades.* Students whose grades have remained the same comprised 16.67%. Students whose grades have increased slightly comprised

42.71%. Students whose grades have greatly increased comprised 3.13%.

Student Grade Score Outcomes After Using ReadTheory

Weight	1	2	3	4	5		
Outcome	Student grades have greatly decreased	Student grades have slightly decreased	Student grades have remained the same	Student grades have slightly increased	Student grades have greatly increased	N/A	Weighted Average
Percentage	1.04%	1.04%	16.67%	42.71%	3.13%	35.42%	**3.71**

* Results based on survey respondents who reported being able to determine the effect ReadTheory had on their students' grades.

Nearly 70% of respondents reported that ReadTheory has increased their students' confidence in taking reading comprehension tests.* Students whose confidence levels have remained the same comprised 19.39%. Students whose confidence levels have increased slightly comprised 65.31%.

Students whose confidence levels have greatly increased comprised 15.31%.

Student Confidence Level Outcomes After Using ReadTheory

Weight	1	2	3	4	5		
Outcome	Student confidence levels have greatly decreased	Student confidence levels have slightly decreased	Student confidence levels have remained the same	Student confidence levels have slightly increased	Student confidence levels have greatly increased	N/A	Weighted Average
Percentage	0.00%	0.00%	19.39%	65.31%	15.31%	35.42%	**3.96**

* Results based on survey respondents who reported being able to determine the effect ReadTheory had on their students' reading confidence.

All respondents were asked to rate how interesting their students find the reading comprehension passages on a scale of 1 (no interest) to 10 (very high interest). 88.72% of respondents rated reader interest at 6 or above. The most common score, reflecting 27.80% of all respondents, was as an interest level of 8 out of 10.

Student Interest Levels In ReadTheory Assessment Passages

Interest Level (1=No Interest, 10=Extremely Interesting)	1	2	3	4	5	6	7	8	9	10	Weighted Average
Percentage	0.00%	0.10%	1.97%	2.06%	7.15%	13.46%	26.84%	27.80%	11.31%	9.31%	7.33

*Results based on teacher opinion of student interest levels.

All respondents were asked to rate their overall satisfaction with ReadTheory on a scale of 1 (not

at all satisfied) to 10 (extremely satisfied). Nearly 80% of respondents rated satisfaction at 8 or above. The most common score, representing almost 30% of all respondents, was a satisfaction level of 10 out of 10.

Overall Satisfaction With ReadTheory

Interest	1	2	3	4	5	6	7	8	9	10	Weighted Average
Level (1=No Interest, 10=Extremely Interesting)											
Percentage	0.00%	0.00%	0.92%	1.14%	6.21%	8.23%	14.43%	16.49%	22.68%	29.90%	8.23

Optional Respondent Commentary

Respondents were asked to submit optional comments regarding the program. Comments were selected based on their ability to further document the effectiveness of ReadTheory as well as their ability to provide additional information about the program that could not adequately be captured via questionnaire. Their comments are as follows.

"I love it. I think it is a valuable tool for helping kids grow as readers. I am requiring it for all of my students this year."

- Karen Conner, 10th Grade Teacher

"This program is new to me and my classes, but I am extremely excited to have found it. I love the way students can "track" their progress as they go, know a challenge question takes extra work (and they work at them so they can get the bonus points), and I can easily see many different reports as to their progress. I look forward to using it for years to come."

- Dawn Varner, 3rd Grade Reading Teacher, Farmersburg, IN

"Thank you for providing this wonderful website. I use it for IEP progress monitoring--thanks to the awesome data it provides--and recommend to parents for students to use at home. I have changed districts and introduced a whole new group of teachers to ReadTheory. A powerful, powerful tool, especially since Common Core was added!"

- Rochelle Spicer, 9th grade Resource Teacher, Olathe, KS

"Thank you for giving teachers a free alternative to helping students become better readers. As you are aware, teachers spend a great deal of money out of our own pockets to enhance our programs. It is wonderful to have such a quality program that is offered to educators at no cost. Thank you!!"

- W. Bilinsky, Middle School Teacher, Thorold, Ontario, Canada

"ReadTheory is an outstanding tool in my classroom. I do not know what I would be using if I had not discovered it. Thank you."

- C.H., 4th Grade Teacher, Lewiston, ID

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"I LOVE ReadTheory for several reasons. First, I consistently see very high-quality passages that

are varied in style, format, and genre, [and are] interesting to read. Second, I love the questions. They are spot on to the type of academic reading my students will have to do in high school. They are learning new words, new contexts for those words, and enjoying the reading that goes with it. In addition, the writing assignments are varied and thought-provoking. My students get a lot out of crafting their responses. Finally, I love how manageable the program is. I can assign students a certain number of readings a week, require a couple of writing assignments, and go from there."

- J.D., Middle School ESOL Teacher, VA

"I teach special education students who are several grade levels behind. I find that this program is

quite beneficial for them. It allows them to look back at the passage to verify their answers and has other beneficial features too …. I recently instituted a competition between my students to see how many 100%s they can get when they are on Read Theory. They love it and it is paying off! The data provided by the website shows that their Lexiles are rising!"

- Ms. P, High School Specialized Support Teacher, San Antonio, TX

"I think that ReadTheory is a great program, and it has been a great benefit to my students, enabling me to provide differentiated reading to my students who have struggled to pass our state exam and are largely English Language Learners."

- Gabriel Cerda, ELA Teacher, Pharr, TX

References

Murphy, R., Gallagher, L., Krumm, A., Mislevy, J., & Hafter, A. (2014). Brief on "Research on the Use of

  Khan Academy in Schools." Menlo Park, CA: SRI International.

Common Core State Standards for English Language Arts & Literacy in History/Social
  Studies, Science, and Technical Subjects. (2010). Common Core State Standards
  Initiative. Accessed from http://www.corestandards.org/ELA-Literacy/

Kapp, K. (2012). The Gamification of Learning and Instruction: Game-Based Methods and Strategies for

  Training and Education. San Francisco, CA: Pfeiffer.

Appendix F: D3

ReadTheory Support <support@readtheory.org>   tor. 20. feb., 17:04
til meg

engelsk > norsk Oversett e-posten   Slå av for: engelsk ×

Greetings,

I'll do my best to answer your questions and you can definitely use this message in your work.

When we began creating ReadTheory nine years ago, we saw that there was a real need for an adaptive reading comprehension resource that did not require a $60/student membership from a school district to access. Our company was founded in North Carolina and there are many schools in this state without the resources to purchase subscriptions for each of their students. We knew we wanted to create something that was accessible to everyone, regardless of their means. We are proud to be used by school districts and students around the world - Brunai just recently incorporated our program into every classroom in the country because we have no barrier to entry. Our users have taken over 100 million quizzes to date.

Our program was developed in consultation with education psychologists at the University of North Carolina. All texts are aligned using the Lexile framework and the subject matter and questions are all based on the Common Core State Standards. We designed it to be adaptive in order to make differentiation easier for teachers. While using our program, students are only ever faced with texts that are just at the edge of their abilities. This puts them in the "stretch zone" which is the ideal amount of difficulty in order to push readers to improve their abilities.

Please contact us again if you have additional questions.

Sincerely,

Sean M.
ReadTheory Support

Appendix G: D4

ReadTheory Support   tor. 16. apr., 13:06
til meg

engelsk > norsk Oversett e-posten   Slå av for: engelsk ×

Greetings again!

1. We developed ReadTheory with lack-of-access forefront in our mind. Teachers and students from lower-income areas did not have access to high quality adaptive reading programs offered at more privileged schools. These programs can have a subscription cost of $60/per student and that is just out of reach for many districts. We wanted to create something that was usable by all. To that end, we now have users all over the world and the entire nation of Brunei has adopted ReadTheory in their classrooms. All that said, ReadTheory functions best (and was designed for) when a teacher follows up with students and uses the data to guide classroom instruction.

2. Our focus is primarily reading comprehension. While we know many thousands of users utilize the site as part of an ELL curriculum, we can't say the site was explicitly designed for this purpose. That said, our writers include idioms and colloquialisms that are vital for full language fluency.

3. As a digital platform the site fosters basic 21st century reading skills. We are working to add additional more interactive features to the site but our current focus is more of a "substitution" of traditional reading comprehension practices done in class on paper, rather than something uniquely additive.

4. ReadTheory currently begins at the 1st grade, which assumes that all users have a complete understanding of word composition and phonics. We are looking into adding additional support for lower-level readers. Additionally, we tend to be a pretty serious program, without a lot of the shiny and colorful add-ons seen in many other reading programs. We're looking into adding games/gamification to our system to further encourage students, but we also know that a large number of our users are adult education students, so we need to walk a fine line.

Please let me know if you have additional questions. There may be a delay in my response as we are currently experiencing a surge in interest in our site.

- Sean M.
ReadTheory Support

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Appendix H: D5

ReadTheory Support   2. mai 2020, 03:38 (for 10 døgn siden)
til meg

engelsk > norsk Oversett e-posten   Slå av for: engelsk ×

Greetings,

Thank you for reaching out again. I'll do my best to answer your three main questions.

1. Many of ReadTheory's articles are based around non-fiction mass-information texts. We actually have a partnership with the North Carolina Department of Natural and Cultural Resources wherein we adapt their encyclopedia entries into comprehension passages for younger students.

2. ReadTheory does not emphasize digital multimodal reading.

3. Our passages range in ability level from 1st to 12th grade. Many of our higher level passages present strong viewpoints and the questions then challenge those viewpoints. While our focus is largely in comprehension, at the higher levels we strive to ensure that critical analysis is part of the work a student is doing while utilizing the site.

Please let us know if you have any further questions.

- Sean M.
ReadTheory Support

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