MASTER'S THESIS IN LIBRARY AND INFORMATION SCIENCE
FACULTY OF LIBRARIANSHIP, INFORMATION, EDUCATION AND IT

Matters of materiality:
researchers' use of print and digital formats for academic reading

SIRI ANNE PIHLSTRØM

UNIVERSITY OF BORÅS

English title:	Matters of materiality: researchers' use of print and digital formats for academic reading
Author:	Siri Anne Pihlstrøm
Completed:	2020
Abstract:	Searching, accessing, reading, and storing academic literature is increasingly done with the help of digital devices. This master's thesis presents the results of a qualitative study on researchers' academic reading practices, including the surrounding practices of searching for and storing the literature. The aim of this thesis is to gain a deeper understanding of researchers' use of academic literature on paper and on screens. Semi-structured interviews were conducted with ten researchers within four different research areas from a university college in Norway. The theoretical framework used to discuss the results is practice theory, with the concepts materiality and affordance. Key findings are that there is not always concordance between what the researchers say they prefer and what they do, as they have a pragmatic approach. The respondents see pros and cons of both formats, and they use both, depending on the situation and what their aim is. The surrounding practices are often done digitally, while deep reading is preferred to do on paper, by the majority. The first reading of a text, which is browsing through it to see whether the text is relevant or not, is always done on screen, while most of the respondents prefer to print out articles when they are to be read thoroughly, as they value the physical properties of paper. However, the respondents of this study are more positive to screen reading than what is seen in previous research, and many of them wish to improve their skills when it comes to e-reading.
Keywords:	Academic reading, researchers, digital reading, reading practices, materiality, affordance, screen, print

Contents

1 INTRODUCTION 1

1.1 Research problem 1
1.2 Aim and research questions 2
1.2.1 Limitations 3
1.3 Outline of the thesis 3

2 PREVIOUS RESEARCH 5

2.1 Search strategy 5
2.2 Background reading 5
2.3 Core readings 7

3 THEORETICAL FRAMEWORK 10

3.1 Practice theory 10
3.2 Materiality and affordance 11
3.2.1 Tangibility 12
3.2.2 The materiality and affordances of digital devices 14
3.3 Use of theory 15

4 METHOD 16

4.1 Choice of method 16
4.2 The informants 16
4.3 Interview guide 17
4.4 Research ethics 17
4.5 The interview process 18
4.6 Coding and analysis 18
4.7 Limitations 19

5 RESULTS 20

5.1 Surrounding reading practices 20
5.1.1 How articles are found 20
5.1.2 Print it out? 21
5.1.3 Storage 24
5.2 The reading practices 24
5.2.1 Where they read 24
5.2.2 How they read 25
5.2.3 Annotations 26
5.2.4 Use of digital devices 26
5.3 Age and subject discipline 27
5.4 Preference 28

6 ANALYSIS AND DISCUSSION 30

6.1 Book Lovers, Printers, Pragmatists and Technophiles 30
6.2 Pros and cons 31
6.2.1 Orientation in the text 31
6.2.2 Distractions 32
6.2.3 Annotation 33
6.2.4 Physical properties 34
6.3 Continuous reading and reading on the prowl 35
6.4 Pragmatic, time matters 36
6.5 Document type matters 37
6.6 Skills, habit and potential 38
6.7 Age and subject discipline 39

7 CONCLUSION AND SUGGESTED FUTURE STUDIES 41

7.1 Conclusion 41
7.2 Lessons learned and suggestions for future research 42
8 SUMMARY 44
REFERENCE LIST 46
APPENDIX 1 – THE E-MAIL SENT OUT TO RECRUIT PARTICIPANTS FOR THE STUDY .....
APPENDIX 2 – INTERVIEW GUIDE .....
APPENDIX 3 – CONSENT FORM .....

1 Introduction

Reading is a big part of our lives. We do it to get information, to learn, to communicate, and to entertain ourselves. We learn to read early in life, as it is an essential skill in order to acquire knowledge, and to be able to take part in society. Reading is done for many purposes, both pleasure and utility, and various forms of reading are done in different ways (Marshall, 2010). Some of the everyday reading we do is hardly noticeable, like reading on items in the grocery store, or reading a traffic sign while driving a car. Reading also gives us the opportunity to immerse ourselves in new information or to enter another world, whether this is through a crime novel set in a foreign city, or a work of scientific literature on didactics.

Academic reading is a different type of reading than reading fiction, both mentally and physically. Reading for pleasure, also referred to as receptive reading (Foasberg, 2014), is often more relaxed and less demanding than academic reading, which tends to be a more engaged form of reading. With academic texts, you as a reader need to respond to it, by integrating it with what you already know, and it is therefore called responsive reading by Foasberg (2014). Reading is also a physical process. When we read we use our hands to leaf through pages, make notes, and skip back and forth, and the tactile feedback tells us how long a text is, and our progress in it (Mangen, 2016).

However, we read progressively more on screen as the world gets more digital. During the past few decades people's screen time has increased significantly, both for work and in their leisure time. We spend more and more time in front of computer screens, and the majority of us also own a smart phone that we always have at hand. Screens are simultaneously used for work, studying, communication, news and entertainment, including reading. With internet connected devices, a vast amount of sources are available only a few clicks away. For researchers, this means that many aspects of their work is done with the help of screens, such as searching for, accessing, reading, and storing academic literature. Despite the larger presence of digital devices in people's lives, physical books and printed pages are still preferred by many, perhaps because of their physical properties. This master's thesis will explore researchers' academic reading practices, both on screens and in print.

1.1 Research problem

I am fascinated by how reading is experienced or carried out differently on paper and on screen. I have looked into different variations of this topic during my master studies, and discovered that a large portion of the literature in this area are about studies done on e-books vs printed books when it comes to reading fiction. Additionally, the research on academic e-reading that I have come across mostly focus on students' habits and attitudes. I therefore feel that there is a knowledge gap here that needs to be filled, and this is why I have chosen to look into researchers' practices and attitudes when it comes to academic reading on

paper and on screen. There is too little up to date knowledge about researchers' academic reading practices.

As academic libraries spend a great part of their budgets on access to article databases and a considerable sum on e-books, it is important to learn more about the researchers' practices. Researchers use large portions of literature for their work, and rely on good library services. It is both interesting and valuable for academic librarians to learn more about what the researchers choose to do with the resources they find online, as this knowledge will help the library improve its services, for instance by offering instruction where that is needed. It could also give valuable guidelines for policies, for instance whether to purchase more or fewer e-books. When we know more about their practices and needs it is easier to facilitate for them.

The main reason for choosing this research area within library and information science is that I work as a senior librarian in an academic library, at a small university college in Norway. Being part of an academic environment is challenging and rewarding. Gaining more insight in how researchers work with their academic literature, as well as whether they use print and digital formats differently and for separate purposes will be of help, not only for myself in my professional role as a librarian, but hopefully for other academic librarians as well.

1.2 Aim and research questions

The aim of this thesis is to gain a deeper understanding of researchers' use of academic literature on paper and on screens. This is done by using a reading practice perspective, exploring how their reading is carried out, as well as how they search for and store academic literature in different formats. Learning more about the practices surrounding their reading will give a deeper understanding of new practices emerging and old ones changing with new material possibilities for reading. By looking at their reading practices in a broader sense, I hope to attain a better understanding of researchers' academic reading in different formats, and the reasoning behind their choices.

In order to achieve this aim, three research questions have been formulated which will be answered with the help of a qualitative interview study. The research questions are:

RQ1: What are the researchers' academic reading practices? Do the reading practices differ for print and digital formats?

RQ2: When do the researchers choose digital formats, and when do they choose print for their academic reading? How does the materiality of the format affect their choices?

RQ3: How are the practices surrounding their academic reading carried out, such as searching for literature and storing it?

As I wanted to dig deeper into researchers' reading practices and their thoughts and reasoning behind the different format choices, I decided that a qualitative

approach would be best suited. In the literature on academics' habits and perceptions when it comes to digital reading and paper reading, there is a much higher share of quantitative studies, so more qualitative studies would be of use. I decided to perform semi-structured interviews, so I could explore the topic by talking to the researchers. I have found two qualitative studies with similar methods and aim (Hillesund, 2010; Sukovic, 2011), but as those were performed nine and ten years ago there is a need for more qualitative studies of recent date.

1.2.1 Limitations

This study is a qualitative study with ten respondents. The semi-structured interviews were performed in Norway in 2019, and the respondents are ten researchers from Østfold University College, within four different research areas. Even though I wished for a more varied composition, the majority of the respondents are from the humanities and social sciences, as I did not succeed in getting any respondents from the technology or engineering departments, and only one from the natural sciences. The respondents are all professors who are experienced researchers.

As stated, the aim is to gain a deeper understanding of researchers' use of academic literature on paper and on screens. I wanted to hear about all aspects of it, and all types of academic reading, so I have not narrowed it down to a specific type of resource. However, how the researchers choose to work with literature in their writing and publishing is not dealt with. Similarly, any reading done for leisure, such as the reading of fiction, is not included in this study.

The information I got in the interviews is subjective. It is the respondents' own descriptions of their reading practices, and there is no way of verifying this. Another limitation when choosing a qualitative approach is that I get a much smaller number of respondents than I would with a quantitative approach. Thus, I cannot draw any conclusions on researchers as a whole, based on this study.

1.3 Outline of the thesis

My thesis is divided into eight chapters. The first chapter is this, the introduction, where I present my study, the aim of the research, and the outline of the thesis.

Chapter two is the literature review, where I present the literature used in the thesis, and the search strategy used for finding relevant previous research.

In chapter three I present the theory used in this thesis, which is practice theory, with the concepts materiality and affordance.

In chapter four I present the method used, and explain how the interview process and data analysis were performed.

In chapter five the results of this interview study are presented. These results are then discussed in chapter six, the analysis, where the themes the researchers brought up are seen in connection with materiality and affordance.

Chapter seven is the conclusion where I summarize the key findings and suggest future research, and the final chapter, chapter eight, is a summary of the whole thesis.

The interview guide, the consent form given out to the participants, and the e-mail I sent out to recruit participants, are included as appendices.

2 Previous research

In the following chapter I will present previous research on reading habits and preferences, when it comes to academic reading on screen and on paper. The chapter is divided into background reading and core readings. The background reading is studies done on students, and these are included to give a broader picture, whereas the core readings are studies on academic staff. The literature on practice theory, materiality, and affordance will be presented in the theory chapter.

2.1 Search strategy

I searched for peer-reviewed articles in the discovery tools of Østfold University College and University of Borås; Oria and Primo. I am affiliated to both of these universities, as an employee of the first one, and student of the second one, so I have access to the databases these university libraries have contracts with. Oria and Primo are gateways into these databases. I have also searched directly in a few relevant databases; Academic Search Premier, DOAJ, Education Research Complete, ERIC, JSTOR, Sage Premier, Taylor & Francis, and Wiley Online Library, as I feared some articles might drown in the discovery tools, as they give results from many databases.

To find relevant literature I analyzed my research questions, came up with the following keywords, and searched for a combination of these: E-reading, "digital reading", "electronic reading", screen, print, paper, university (staff), academic(s), faculty, scholar, perception, habit, behaviour. For literature on the theoretical perspective, I searched for "materiality" and "affordance" in addition to "reading", screen, print, and "digital devices". Plus, I searched for books about practice theory.

In addition, I have used snowballing, looked up interesting references from articles, and I checked Scopus to find related articles of my core readings. Also, as I mentioned in the introduction, this is a topic that have interested me for some time now, so I have included articles retrieved for earlier assignments that are relevant for this thesis as well.

2.2 Background reading

The literature search shows that there has been several studies on students' digital reading, but not as many on researchers' reading practices or perceptions. However, some of the findings from research on students' digital reading are relevant in this context too. What students see as pros and cons are similar to faculty's perceptions. Halevi, Moed, and Bar-Ilan (2015) found in their worldwide study on students, faculty members, researchers, administrators and librarians that "there are no major differences between students and faculty members or researchers in the manner by which they access, read, highlight, summarize and share scientific literature" (p. 113). Therefore, I have chosen to include studies done on students as background reading.

Findings from previous research on students' use and preference show that students choose the best of both worlds. There is a combination of e-reading and paper-based reading. When students immerse themselves in longer texts they prefer paper, but for shorter texts, or when they are skimming to find information, digital reading is a good option (Farinosi, Lim & Roll, 2016; Mizrachi, Salaz, Kurbanoglu & Boustany, 2018). Students express a preference for paper for lengthy academic reading because they experience eyestrain and distractions when reading on computers, tablets or smartphones. There are simply too many temptations, and harder to keep focus when reading on a screen (Baron, Calixte & Havewala, 2017; Johnston & Salaz, 2019; Mizrachi, 2015; Pálsdóttir, 2019; Rose, 2011). The students also express that they appreciate paper's tactile features, and find it easier to navigate in the text, highlight and make annotations on paper (Baron et al., 2017; Foasberg, 2014; Ramdarshan Bold & Wagstaff, 2017). Some studies found that students often prefer paper because of habit, and that which academic field they belong to can have an effect on attitudes towards digital reading (Pinto, Pouliot & Cordón-García, 2014; Wang & Bai, 2016; Wiberg & Myrberg, 2015).

The studies present what the students see as the pros and cons of digital reading as well. What is mentioned most often of the positive features is the accessibility, that you have access to a large number of sources within seconds. And, as long as you have an internet connection you can access them wherever and whenever you like. Another big advantage is the possibility to search for keywords and phrases in electronic documents. The ease of saving and storing information is also a huge plus. Electronic documents weigh less than books, and it is possible to keep numerous articles and books on the computer or tablet and bring along to the university or when travelling (Cumaoglu, Sacici & Torun, 2013; Farinosi et al., 2016; Pálsdóttir, 2019). The environmental and the economic aspects were also mentioned by some of the students. Some of them try to use less paper to help save the environment, and therefore used digital resources more. Others used them because it was cheaper. Generally e-books cost less than paper books (Johnston & Salaz, 2019; Wiberg & Myrberg, 2015). These advantages, especially portability, accessibility, searchability, and cost, make electronic sources more convenient in many ways, and are contributing to increased usage, even though there is an overall preference for reading on paper (Baron et al., 2017; Mizrachi, 2015).

Selwyn (2016) examined the digital downsides with an online questionnaire completed by 1658 students in Australia. He identified four groups within, what he calls, unhelpful digital technology. These were distraction, disruption, difficulty, and detriment. Digital tools bring with them many distractions, and they can easily lead to procrastination, according to Selwyn. The students said that they got distracted not only from their own screen, but also from the screens of fellow students around them. Baron et al. (2017) found that nearly 92% of the respondents in their survey of 429 university students said it was easiest to concentrate when reading print, and that they were more likely to multitask when reading onscreen. The students in Selwyn's (2016) study also mentioned difficulties such as headaches and tired eyes, and that making notes in the text was more difficult to do on screen. Disruptions like no internet connection, system breakdowns etc. were also interfering.

The literature shows that there is a strong preference for print among students when it comes to reading long academic texts. Mangen (2016) states that ”In spite of considerable technological advances in screen and display technologies, a number of empirical, qualitative studies show that many still prefer to read on paper rather than on screens — whether for study or for pleasure” (p. 474). However, screens have some advantages the students appreciate, like the accessibility, portability and searchability of digital texts, which make them convenient to use in certain situations. Let us move on to have a look at researchers’ opinions.

2.3 Core readings

The studies presented in 2.2 are studies of students’ habits and perceptions when it comes to reading on screen vs reading on paper. There is less literature on the habits of academic staff when it comes to e-reading, but there have been some studies on them as well. Some of these are done on academics as a group, including both students and faculty. It must be noted that these studies are not all of recent date, hence the situation might be a little different today.

Hillesund (2010) performed a study in Norway with, what he calls, expert readers. These were academics, specifically humanities scholars and social scientists. He conducted semi-structured interviews with 10 participants about their digital and paper-based reading, and found that concentrated reading is done on paper, while more fragmented reading, browsing and skimming, is done on computers. Even though this study was done some years ago, as we can see, his findings correspond well with more recent studies done on students.

Sukovic (2011) also did a qualitative study with researchers from the humanities and social sciences. In her study she interviewed sixteen academic researchers from Australia, and one from the United States. She came to the same conclusion: ”The majority of participants tended to make printouts for in-depth reading or for speed-reading of longer texts, because they found it tiring to read on the screen. This finding is consistent with the dominant view in the literature” (p. 142).

Another early study is that of Tenopir, Wilson, Vakkari, Talja, and King (2010). They performed surveys of academic staff of universities in Australia, Finland, and the United States from 2004-2007, asking about their reading patterns of e-articles. There were over 2000 responses, and the results show that the academic staff in all three countries read from both print and electronic sources. However, e-articles, even though found in electronic sources, were often printed out for thorough reading. Tenopir et al. (2010) also found that professors and assistant professors reported more article readings than lecturers.

In a more recent study by Late, Tenopir, Talja, and Christian (2019) it was found that the type of material and the purpose of reading influence the choice of format. They performed a survey with 528 respondents about scholarly reading among academics. They write that books are still mainly read as printed books, but there are tendencies of change for the pattern for articles. However, they are still often printed out even though obtained electronically, and as in Hillesund’s

(2010) findings, they found that when articles were to be read with great care scholars often prefer to print them out.

Lincoln (2013) presents another study on types of resources. In 2012 he carried out an online survey of 2578 library patrons of theological academic libraries, regarding academic reading habits and preferences. It showed that journal articles are used more than e-books. Half of the respondents read articles on screen, while one in five reads e-books for their academic work. This difference between reading electronic articles and e-books is something I have looked into among the researchers I interviewed.

When Hillesund writes about digital reading he means reading in a browser, but Halevi et al. (2015) found that PDF was the preferred format for reading, downloading and saving. However, many still prefer to annotate manually on paper. Halevi et al. (2015) performed an online survey completed by 416 respondents from over 20 countries, where 75 % were faculty members and/or researchers, to examine how students, faculty, librarians, and administrators access, read, and interact with scientific literature. Additionally, they found that it was not popular to access and read scientific literature on tablets, e-readers, and smartphones. However, this study had high rates of responses from Latin America and Africa, and there might be geographical differences, with different trends in western countries.

Nevertheless, Franze, Marriott, and Wybrow (2014) also found that e-readers and smartphones were not much used for academic reading. Tablets were more frequent. However, academic reading was still predominantly done on paper and desktop computers. Their study was done on academics' reading habits and preferences in Australia, where 162 academics participated in an online questionnaire. One of the main reasons many still prefer printed documents is ease of annotation.

An interesting study done on e-books and reading types is that of Revelle, Messner, Shrimplin, and Hurst (2012). First, they performed a study using q-methodology where they identified four opinion types; Book Lovers, Technophiles, Pragmatists, and Printers. These groups have different attitudes towards e-books. Book Lovers feel strongly for printed books as physical objects, whereas Technophiles have equally strong feelings for technology, and value the accessibility and search functions e-books provide. The Pragmatists are comfortable with both formats, and choose what is most convenient in that particular situation, while Printers have difficulties with reading on screen. The two first groups are more emotionally attached to the issue, than the two latter, who are more practical. After identifying the types Revelle et al. (2012) performed a big online study with 1471 respondents, where they found that 43% of faculty and staff were Book Lovers, and the rest were distributed evenly among the three remaning types.

Finally, Baron (2015) has identified two different ways of reading common today. She states that reading in hardcopy is very different from reading on a screen (p. 140). She claims that when we read on screens we do not use the body and our senses the same way as we do when reading physical pages, and this affects how we read. She sees a tendency of more and more screen reading, and she observes that "[t]he internet entices us to skew the balance away from

continuous reading, much less close reading, and toward reading on the prowl" (Baron, 2015, p. 161). Reading on the prowl is skimming or scanning through a text to see what it is about, or to find a specific piece of information, while continuous reading is reading from beginning to end. Reading fiction is, most often, continous reading. So is close reading of academic texts. This change, with more and more reading on the screen has effect on reading as a whole. "The result? The meaning of "reading" increasingly becomes "finding information"" (Baron, 2015, p. 39).

The literature I have presented here will be seen in connection to the results of my study. My study design is quite similar to that of Hillesund (2010) and Sukovic (2011), as they both performed interviews with academics within humanities and social science, and it will be interesting to see how my results are compared to studies done nearly a decade ago. Tenopir et al. (2010) found that professors and assistant professors reported more article readings than lecturers. This supports my choice of researchers as interview objects for this thesis. The studies of Franze et al. (2014), Halevi et al. (2015), and Late et al. (2019) will be used much in the discussion. I find it interesting to see my results in comparison to findings of these quantitative studies, as they, consequently, have a considerably higher number of respondents. I will also categorize the respondents using Revelle et al.'s (2012) four types.

3 Theoretical framework

I have chosen a reading practice perspective, where I look at the researchers' practices when it comes to using academic literature - that is their reading, but also surrounding practices of how they search for and store the literature. Hence, the theoretical framework of this thesis is practice theory, which seeks understanding by analyzing bodily, knowledge based practices. In *Doing qualitative research* Silverman (2013) explains theory as "a set of concepts used to define and/or explain some phenomenon" (p. 112). In order to help me explain the researchers' practices I have chosen the concepts materiality and affordance. Reading is a physical process, and the properties of books, print outs, and of digital devices affect the reader. How the literature is used differ somewhat based on the medium in which the text is presented.

I went with an inductive approach when deciding on which concepts to use. I performed the interviews first, and then, based on what the researchers told me, I established the framework. I wanted to have this freedom, to see where the conversations led me. So, for instance, as the researchers all were discussing the physical aspect of the texts, it became evident that I should explore the results with materiality in mind.

3.1 Practice theory

"Practice theory is presented as a conceptual alternative to other forms of social and cultural theory, above all to culturalist mentalism, textualism and intersubjectivism" (Reckwitz, 2002, p. 243). It has been shaped by authors such as Bourdieu, Giddens, Foucault, and Taylor, and even though there are many variations of practice theory, one of the common characteristics is "the belief that concrete human activities – with blood, sweat, tears, and all – are critical for the study of the production, reproduction and change of social phenomena" (Nicolini, 2017, p. 99). Practice theory looks at the world through real-time activity, and the bodily performances are central. It sees practices as routinized bodily activities, "routines of moving the body, of understanding and wanting, of using things" (Reckwitz, 2002, p. 255). Material resources contribute to the practice. Carrying out a practice very often means using particular things in a certain way. For instance, in order to read we need a written text. How it is to be read will differ whether it is presented in a printed book or on a computer screen, as there are different bodily operations needed to perform the reading, depending on the medium.

Reckwitz (2002) explains how we can use practice theory as a tool. It is not to be seen as 'true', in the sense of corresponding to facts. "After all, social theories are vocabularies necessarily underdetermined by empirical 'facts'." (p. 257). Nicolini (2012) states that practice theories are a broad family of theoretical approaches. He says that a unified theory of it does not exist, and he suggests that we embrace the plurality (p. 1).

For my thesis I have chosen to use a small part of the vast field of practice theory, namely Reckwitz' view on how feelings contribute in the shaping of practices. In his chapter in *The Nexus of Practices* (2017) Reckwitz explains how practice

theory and affect analysis must be set in relation to each other. He argues that the practices cannot be seen without including the emotions, feelings, and affects of actions. ”If we want to understand how practices work, we have to understand their specific affects, the affects which are built into the practices” (Reckwitz, 2017, p. 116). The way I understand this, is that our practices are shaped by the way we feel about something. The materiality of printed books and digital devices affect the readers, and these feelings, in turn, determine practices.

It was addressed in different ways, but it is clear that to all of the researchers I interviewed the physical aspect of the differences between print and digital format have effect on their reading practices. It came forth in a range of different ways, with expressions ranging from ”I’m very fond of books, text and the physical paper, and the written word on paper” (R 5), to ”I get a bit stressed if I have a pile of fifty articles on top of each other” (R 7). As we can see, the physical properties affect how the researchers feel, and in turn how they act. While physical books give R 5 a good feeling, piles of articles that are printed out can lead to stress for R 7. In order to pursuit or avoid certain feelings the researchers adjust their activities.

Nicolini (2017) writes: ”What happens here and now and why (the conditions of possibility of any scene of action) is inextricably linked to what is happening in another ’here and now’or what has happened in another ’here and now’ in the past (and sometimes in the future)” (p. 102). Even though the reading practices of the respondents in my study are habits of individuals, their activities are not unique. There are similarities and differences among the ten respondents, and these reflect practices of others as well, as practices are social.

3.2 Materiality and affordance

”Although texts have semantic meanings they are also material” (Schilhab, Balling & Kuzmičová, 2018; The spatio-temporal dimension, para. 1). There is something more to a text than the words it consists of. Materiality matters, as the physical and visual properties of a text have effect on the reader and how they can use the text.

There are different ways of understanding and defining materiality. As Leonardi (2010) writes, even ”scholars who have spent a good deal of time thinking about ”materiality” have a hard time defining it” (What is ”materiality?”, para. 7). He explores three ways of viewing materiality. The first is as a physical substance, meaning something that has matter. The second way of seeing it is the practical instantiation of a theoretical idea, and the third way is as having significance or relevance. He argues that it is useful to view materiality not only in the first way, but include these two latter ways, that is moving away from the strictly physical view on it. Faraj and Azad (2013) agree that it is beneficial to expand the materiality aspect to go beyond the physical when examining the materiality of technology. When we look at it through the affordance lens we can get a deeper understanding. The materiality of digital devices is, naturally, different from that of the printed book. Thus, they inherent different affordances.

Affordance is a term coined by Gibson which refers to ”the actionable properties between the world and an actor” (Norman, 1999, p. 39). Gibson saw affordances

as relationships that exist naturally, and they depend on the capabilities and intentions of the observer. Norman, who popularized the term in technology design, reformulated it as *perceived affordance*. "Norman suggests that affordances are intrinsic properties of artifacts and that the role of design is to make affordances easily perceptible to would–be users" (Leonardi, 2010, 1. Senses related to physical substance, para. 7). The affordances are always there, waiting to be perceived.

Therefore, to be able to explore the materiality of both print and digital reading, I choose to look at materiality as the way something is presented, that be a book or a digital device, and I include an affordance perspective which encompasses the possibilities of objects.

3.2.1 Tangibility

Hayler (2016) explains how the representation of a work has an effect on our reception of the text. He says that especially after we master the medium, and get an understanding and liking of it, it can affect us even after we have left the text. "[I]n short, textual embodiment is something" (p. 17). The materiality and affordances of text on paper and text on screen differ because of the properties of the medium in which it is presented. And there are different views on how digital text is perceived. Hou, Rashid, & Lee (2017) claim that

> Text on paper is touchable and tangible, whereas text on screens is intangible, mediated, and detached from the physical support of the reading medium. The haptic interactions with paper text afford readers richer sensorimotor engagement with the text compared to screentext, which enhances information encoding and comprehension. (p. 84)

However, there is as much reason to assert that text on screen is tangible through the digital device it is being read on, be that a computer or a tablet. Hayler (2016) calls it a misreading to call digital text intangible, and writes "That the phenomenological experience is of a potentially discomforting immateriality is born of naivety and the limitations of our senses rather than valid ontological claim" (p. 22). Mc Laughlin (2015) explains how reading digital text is a different haptic experience from reading the codex. "No less embodied, but differently embodied. There are real bodily differences between the demands of the book and the demands of the computer" (p. 171). When reading on paper we use our hands to touch, turn the pages, make notes, leaf through pages, skip back and forth, maybe let one finger remain in one part of the text, while moving along to another section. Some of these actions are done deliberately, others might happen automatically. These actions are performed when we read on digital devices as well, but in a different way. Mc Laughlin (2015) states that screen reading demands more of our bodies, as navigation in the text calls for complex eye-hand integration. He explains how we navigate the cursor on the screen by moving the mouse on its pad. The movement of the hand creates the movement on the screen. The movement is analogous, but not identical, as a tiny movement of the mouse makes a bigger one on the screen (p. 168). He emphasizes how the tolerance for inaccurate performance is low, and to be precise your eyes must work together with your hand. To access more text when reading on a computer you either use the mouse and cursor to click on an arrow on a scroll bar on the screen, or use the arrow keys on your keyboard. Actions like highlighting text, annotation etc. need to be learnt, and when you double-click to perform

commands you must be accurate. “If reading the codex requires the manual intelligence of efficient grasp and precise manipulation of pages, reading digital text increases the procedural requirements and demands increased haptic skill” (Mc Laughlin, 2015, p. 169). On digital devices with touch screens, such as iPads, you perform the actions using your fingers instead of using a mouse cursor, and you are in a way closer to the text. However, the reader must learn to master the techniques of reading on these as well, for instance turning pages by tapping or swiping etc.

Our brains construct a mental representation of the text while we read, in order to make it easier to navigate in it. This is also referred to as spatial recognition or a cognitive map (Hou et al., 2017). Several studies (Durant & Horava, 2015; Hou et al., 2017; Jabr, 2013; Mangen, 2016; Schilhab et al., 2018; Walsh, 2016) have reached the conclusion that it is easier to make this map when reading on paper, so readers remember better what is read on paper. The fixed layout of printed text, and the fact that you can both see and feel how long it is, and your position in it help the reader’s navigation. When reading on a screen more cognitive capacity is needed for this positioning. This, they claim, affects reading speed, memory and recall, and reading comprehension. As scrolling might disrupt the view for the reader, it is also easier to recall where in the text something is written when you have read it on paper. They assert that when reading on a screen, the reader has to work more to orientate him- or herself in the text, and less cognitive capacity is left for information recall and comprehension. This can also lead to more fatigue when reading on screen compared to paper. In addition to the mental challenge of reading on screen, readers may also experience eyestrain and headache when spending much time in front of a screen (Durant & Horava, 2015; Hou et al., 2017; Jabr, 2013; Mangen, 2016; Schilhab et al., 2018; Walsh, 2016).

Baron (2015) explains how reading is predominantly about content, but ”when we read, we don’t just decipher words on pages. We also sense them. Taste. Sound. Smell. Sight. Touch” (p. 140). Mangen (2016) shares her view, and describes how pages may look identical on a screen and in a printed book, but they differ in kinesthetic affordances. She writes that when we read a text on screen we only get visual information about the progress through the text, whereas with a printed book we will sense this information in different ways, as we can feel it with our hands too. We can perceive physically how much is left, and how far we have come. She argues that the haptic interaction contributes to getting closer to the text. The reader is more in touch with the text when it is read on paper, and there is a distance when it is read on a screen. She is preoccupied with that it feels different to read on a screen, and the reader can experience ’haptic dissonance’, which is the ”tension between expectations and sensual feeling when reading on e-readers” (Mangen, 2016, p. 474). This, in turn, can affect the reading and the reader’s perception of the text.

However, Mc Laughlin (2015) sees it a bit differently. He thinks Mangen “underestimates the extent to which the haptic requirements of the device can become second nature to the reader” (p. 179). Even though digital reading requires more advanced actions, with practice the processes become more and more automated and will require less and less cognitive investment, and more attention can be given to the text.

> Reading print requires an active and intelligent body, and reading in digital environments requires an even higher degree of procedural intelligence, a willingness to accept cognitive, ocular, and manual training and to master the demands of the technology. (Mc Laughlin, 2015, p. 167)

Hayler (2016) also underlines the need for ”repeated interaction” (p. 25). What we do rely on previous experience, so we need practice to change habits.

> We have a default gestalt for bound-book reading that has emerged out of a long history of experience. We are initially forced to apply that paradigm to electronic reading, but such reading is capable of and promotes interactions – such as clicking, scrolling, swift changes and communication between content, etc. – which do not fit our printed-book experience and we must therefore find a suitable model from elsewhere in order to get us through the experience. (p. 23)

The way we are used to read printed books will not exploit the potential of digital reading. Hayler (2016) makes a valid point stating that digital reading is a different way of reading, and it should not be done the same way as reading printed material. It is something new, something different. It has different potential, and should serve different functions. He examplifies it with the possibilites hyperlinks present. You can easily jump to new texts, and as he points out: ”Even if the link is not clicked and followed, hyperlinks still have implications for interpretation” (Hayler, 2016, p. 25). There are choices and potential that demand an active reader.

> [T]he technology of textuality is reformulating the procedures of the reading body and creating new somatic capacities. Digital technologies require ongoing bodily learning. There are always new procedures to perfect, new physical skills to master. Digital reading environments simultaneously promise a utopian disembodiment and require advanced physical skills, embodied by practice to the point of instinctive mastery. (Mc Laughlin, 2015, p. 168)

3.2.2 The materiality and affordances of digital devices

The affordances of screens differ somewhat between devices. A stationary computer, a laptop, a tablet, an e-reader, and a smarthphone share many of the same properties, but they also have some diverse qualities. Common to all of them is the possibility to adjust the view of a text, for instance by changing the size of the font, or zooming. You can personalize it by adjusting it to your own preferences, whereas a printed book has the layout the publisher gave it. It is also possible to search for keywords and phrases in digital texts, which can save time for the reader. To copy text or follow links are also mentioned as advantages of reading on screens. The quality of being able to store many articles and books on them is often highly appreciated, as this saves physical space (Farinosi et al., 2016).

While a stationary computer is immobile, laptops, tablets, and e-readers are portable. This portability makes it easy to bring all the books and articles you need, and the ones you did not know that you needed, with you. It is suitable to bring a tablet, for instance an iPad, when travelling. It is lighter and takes up less space than a laptop. Tablets are easy to hold, so they are convenient to read on in various reading spots, be that the sofa or on the train (Cumaoglu et al., 2013, p. 122). While paper needs external light, computers and tablets have integrated light. However, when using a digital device one must pay attention to battery life. A downside of screens is that they are expensive and more fragile. It is much

worse to drop a tablet to the ground, or spill coffee on it, than to do the same with a journal article that is printed out from a database.

With screens we must rely more on the visual, as the tangibility that helps us navigate in texts is different when reading on a screen than a printed book. With practice it will feel more natural to read on digital devices too (Mc Laughlin, 2015). Nevertheless, digital devices have properties readers appreciate, and which make them convient to use in certain situations.

3.3 Use of theory

When a text is presented in a printed book it possesses other affordances than when it is to be read in digital format on the screen of a digital device. However, they are both physical and tangible, with their respective materialities. The physical aspect does play a role, as the way something is used brings out feelings, such as comfort, stress, pleasure, or frustration. As Reckwitz (2017) underlines, the way we feel about something affects our actions and our practices. The materiality of printed books and of digital devices affect the readers, and their feelings toward the different formats can determine practices.

In the analysis I will look at the researchers' practices, and how these are shaped by their affects. I will focus on the researchers' perceptions, with materiality in mind. I will look at what the respondents say about the affordances of paper and screen, and how this make them use different formats.

Before we can move on to the results, with the following discussion and analysis, I will present the methods used to collect and analyse the data.

4 Method

In this chapter I will present the methods used for the process of collecting and analyzing the data.

4.1 Choice of method

My chosen method for exploring the topic and to get answers to my research questions, is semi-structured interviews. According to Wildemuth (2017), this is ”one of the most useful data collection methods for studying a wide range of information behaviors” (p. 256). I was interested in finding out the researchers' habits and *why* they do as they do, thus, it was suitable with a qualitative approach. It was their subjective, internal experience I wanted to explore (see for eg. Silverman, 2013, p. 6). I concluded that semi-structured interviews, where I could meet the respondents face to face and ask them to clarify whenever something was unclear, or ask for examples and more in-depth answers when needed, would be the best suited method. I wanted the freedom semi-structured interviews provided, but with a set of planned questions to make sure we covered the same areas in all ten interviews (Wildemuth, 2017, p. 248-256).

After consulting my supervisor about the number of interviews to perform, I figured ten interviews was a suitable amount for a project of this size. Interviewing, and especially the work after, with transcribing and coding the interviews, take a lot of time, so I decided ten interviews would be enough to get some variations, and see if there were common habits and perceptions among the researchers. There comes a point where you get repeated responses, and new interviews bring little new information. To reach theoretical saturation, which is ”when you’re hearing the same concepts discussed in the same way by your participants, with no additional information being added to your understanding of the theory you’re developing” (Wildemuth, 2017, p. 139), I might have needed more interviews. However, with ten interviews the respondents described different views and approaches, and still there were many shared opinions among the researchers.

4.2 The informants

I recruited participants to the interviews by sending out an e-mail explaining my study (see appendix 1) to all faculty staff at Østfold University College. These include Faculty of Health and Welfare, Faculty of Business, Languages, and Social Sciences, Faculty of Computer Science, and Faculty of Education. In the e-mail I wrote that I wanted to talk with researchers who publish articles, about their academic reading on paper and on screen. Within the next couple of days, I received 35 e-mails back from researchers who were interested in participating. To me, this felt overwhelming, as I had anticipated it would be hard to recruit enough participants. Some of them wanted to participate because they found the topic interesting, others said that the library or I, as a librarian, had helped them in their research, and wanted to give something back.

I wanted the pool of participants to be as varied as I could get. To get a random sample I chose to interview the first ten to write back to me who represented a

variety of field of study, age and gender. I wanted this variation, as I figured this might affect their habits and attitudes towards digital reading.

My respondents were equally distributed between the sexes, five men and five women. They were 39-67 years old at the time of the interviews. The average age was 50.7 and the median age 48.5. Four of them work at the Faculty of Education, and six at the Faculty of Business, Languages, and Social Sciences, with different fields of study. The respondents were researchers in the following fields:

No of participants	Research field
4	Language studies
3	Education
2	Organization/management
1	Mathematics and social science

4.3 Interview guide

Before I could perform the interviews I made an interview guide (Wildemuth, 2017, p. 249-250), and I did a pilot interview. This worked well, so I did not have to do any adjustments. When I formulated the interview guide I kept in mind Silverman's tip about keeping it simple (2013, p. 325). I had to be careful not to drown in too much data, but rather explore in depth what I wanted to find out.

My interview guide (see appendix 2) is divided into three themes. First, the researchers habits, where I ask about how they find literature, whether he or she prints out anything, and how the researcher stores the literature. I needed this part to learn about the practices surrounding the researcher's academic reading, to get an impression of how much he or she relied on paper and on digital devices in these processes, to see if this affected the reading. The second part is about the researchers reading practices; where and how they read, including making annotations in the text, and if there is any difference between their reading practices with screens and on paper. The third part is about the researchers perceptions, where I ask them to sum up the pros and cons of reading on the screen and on paper. Finally, I ask them what they prefer. I made sure that the questions were clear, understandable and open. There should be no leading questions, or sensitive ones (Dalen, 2013, p. 27).

The interview guide was used as the basis for the conversation, but I let the researchers talk freely about the different aspects. Some of them were more eager to do so than others. Nevertheless, I made sure that all ten conversations covered all the topics.

4.4 Research ethics

When conducting research it is important to keep research ethics in mind. I made sure to perform my research in line with *Good research practice* (2017), and followed the four main requirements of research ethics for humanistic and social

science research of the Swedish Resource Council, presented in *Forskningsetiska principer inom humanistisk-samhällsvetenskaplig forskning (2002).* These are the requirements of information, of consent, of confidentiality, and of usage. Before the interviews, I explained my research project to the participating researchers, and they read and signed a consent form. Here they also gave me permission to record the interview. I used the forms from Högskolan i Borås (see appendix 3). In addition to recording their voice, the only personal information I asked for was their age, and what their field of study is. This was done to see if there is a connection between age or field of study and reading habits on screen/paper. I assured the researchers that the information would be handled with confidentiality, which it have been. The researchers are anonymised in this thesis. It is not possible ”to combine a certain piece of information with a specific person’s identity” (*Good research practice*, 2017, p. 40). The gathered information is only used for this research project.

4.5 The interview process

After the study was explained to the respondent, and the consent form was read and signed, we began the interview. The interviews were performed in March and April 2019 on the university campus, either in their office, or in mine. On average, the interviews lasted twenty minutes. It varied how talkative the respondents were, so a couple of the interviews brought down the average. All the interviews were recorded using Sony Digital Dictation Machine ICD-PX370.

During the interviews I was sure to keep in mind that I should let the researchers talk freely. My own ideas and perceptions were kept to myself, as I wanted to know their thoughts. Dalen (2013, p. 32) underlines that in a research interview there should be no argumentation or moralization. It is important to let the respondent think and talk. I gave the respondents time to think things through, and did not hurry along with a new question. I was interested in what they had to say, and encouraged them to elaborate when I found it necessary.

The interviews were carried out in Norwegian. The quotes included in this thesis are translated by me. They have been lightly edited for conciseness and readability. However, I have kept the colloquial tone, as I want the quotes to be as authentic as possible.

4.6 Coding and analysis

After I had performed the interviews I transcribed them. I did this manually, by playing the recording, stopping it, and typing what was said. After each interview was transcribed, I listened to the whole interview again, while reading the interview transcript, to make sure it was correct. This process allowed me to get to know the content well, and was a good point of departure for the coding and analysis.

Wildemuth (2017, p. 319) explains how analysis of qualitative data involves condensing data into categories and themes. The analysis turns data into results. What is central in the process is to go through the data systematically in order to see what it is about, find categories and gather data together where it belong.

This examination and interpretation lead to an understanding of what the findings of the study are.

I began my analysis by making a table in Excel, using the themes from my interview guide, that is, themes found in previous literature. For the surrounding reading practices these were how they found literature for their research, habits concerning printing, and storage of the literature. When it comes to the reading practices the themes were where they read, device(s) used for e-reading, how the reading was carried out, and annotation. In addition, I had the themes advantages and disadvantages of paper, and the same for e-reading. This deductive framework helped me organize the respondents' answers. From the respondents' utterances I extracted the condensed meaning, and put it in the table, where it belonged. Colors, representing codes, were added to help the visualization. While analysing the transcripts of the interviews I was open for more themes to emerge in the process. I did not add any additional themes than the ones I started with, but during the analysis themes were divided into categories, for instance accessibility, availability, searchability, and portability as advantages of e-reading. After this process the data was reconceptualized, that is put back together to form descriptions (Dalen, 2013, p. 62; Kvale & Brinkmann, 2015, p. 226-233).

The results will be presented in the next chapter.

4.7 Limitations

Ten interviews were performed for this study. Even though that number was found to be sufficient to shed light on this topic, a larger pool of answers could have given more variations, or made the findings stronger. Another aspect is that it was random who I interviewed. As previously mentioned, I made sure to get respondents from both sexes, at various ages and subject fields, but with ten different researchers the answers could possibly be a bit different. Additionally, the informants are only from Faculty of Education and Faculty of Business, Languages, and Social Sciences. If they were from more types of research areas, there could perhaps be more variations. I was curious about how the researchers at the Faculty of Computer Science dealt with texts on paper and on screen, but, unfortunately, I did not get any respondents from that department. Another selection might have given some other answers.

5 Results

In this chapter I will present the results from the interview study with the ten Norwegian researchers. The chapter will follow the thematic outline of the interview guide, covering first the surrounding reading practices, then their reading practices. The last part of the interview was about their perceptions of texts in print and on screens. Their views regarding the pros and cons of the different material types are presented within the other themes. At the end of the chapter, before some concluding remarks about preference, I look into whether age and subject discipline have effect on the researchers' practices when it comes to choosing paper or digital format.

Using text is more than reading. I have looked into the researchers' practices surrounding academic reading as well as the actual reading, as this adds interesting insight. The researchers' use of texts in their research process includes searching for information, browsing through large portions of texts, thorough reading of relevant articles, and storing literature. Therefore, I asked the respondents about their reading practices in a broad sense. It also includes how they find and handle the literature they use. I asked them how they search for and access literature, how they read, make annotations, and how they choose to keep the reading material. To see this as a whole gives a picture of how the researchers work with academic literature on screen and on paper. I wanted to see if format preference is solely related to how it is to actually read the text, or if it is also affected by surrounding practices, for instance finding literature or storing it. When the researchers talked about the pros and cons of reading on paper and on screen they looked at reading in a broad sense, including these surrounding practices. For instance, the fact that articles are retrieved digitally, or the portability of digital texts can contribute to more digital reading. We will look more into this.

5.1 Surrounding reading practices

In the first part of the interview, I asked the researchers about their practices when it comes to surrounding reading practices, to get an understanding of how they work with academic literature. By asking them this, I also got an impression of what they were familiar with when it came to online resources. It was important for me to gain an insight into their practices to be able to ask the right follow-up-questions and dig deeper into the different aspects later on in the interview.

5.1.1 How articles are found

The first question I asked the respondents was how they find the literature they use for their research. By opening with this question, I got information about how they begin, and how familiar they are with electronic databases, and, to some extent, their search processes. All of them answered that they use online resources. They said they perform searches in Google Scholar and in Oria, which is the discovery tool of Norwegian academic libraries, and the gateway into the research databases the library subscribes to. One researcher even occasionally

uses a simple Google search to find resources. Other methods mentioned were looking at references in articles and books, screening through new issues of periodicals as well as alerts. Half of them mentioned input from colleagues, and inspiration from conferences they attended. Four researchers mentioned social academic networks, such as ResearchGate and Academia. One also said peer reviewing could work as an inspiration, as it gave suggestions of literature to check out.

5.1.2 Print it out?

All of the researchers I interviewed said they still print out journal articles they find online, from time to time. There were different reasons for doing so. For one of the respondents it was just out of old habit, as the practice now is to read on screen, especially on a Kindle e-reader. Three of the others also said they mostly read on the computer screen, so it is very rare that they print something out. When they choose to do so it was not to forget to read articles they considered very important.

One of the researchers explained how the journal articles she has as physical copies has gone through a quality check. She told me that when she has an article on paper she has judged it interesting, and thus will read all of it. Two others said they print out articles to be able to bring them with them to other reading locations, for instance on travels where there may not be an internet connection. Yet two other respondents said that they printed out articles to keep a paper copy in a storage. One of them had a well-organized storage with physical folders, while the other one kept them in a pile of papers in the office. Another researcher explained that articles that will be used a lot are printed out, while the others are added to the Dropbox-folder, and will be read on the iPad. The materiality of paper leads to it being used differently than how a digital text is used.

Six of the ten respondents print out articles when they want to read them more thoroughly, because they prefer paper for a closer reading of the text. Some of the researchers expressed how they read articles on the computer to get an overview, but when the articles are to be read more in depth, or properly, as one of them put it, they need them in print. Reasons given for preferring paper for deeper reading was that the respondents found it easier to orientate themselves on paper, they found it easier to make annotations on paper, and they felt that they remember better what they read on paper. The materiality and affordances affect how the respondents feel, and, in turn, shape their practices.

To have articles physically can be efficient and help save time. One of the respondents explains:

> I'm not like the ones who say "no, it's not the same experience with screen reading compared to paper reading". I don't think so, and that goes for both fiction and academic literature, for me. The experience, or understanding, or how I will use it doesn't change if I move it from paper to screen. But it's a bit quicker, especially when you're in the office, if you have five articles physically in front of you, then you can just flip a page like that. It's simply quicker than to look it up and search for it on the screen. So I think much of the reason is that, when I need it, I need it to happen quickly. (R 8)

Additionally, two of the researchers emphasized how paper creates a feeling of serenity. ”The tactile aspect, to hold, physically hold a book or an article, that’s important to me. And I feel it creates a sense of calmness” (R 5), one of them said. The other elaborated on how this feeling of tranquillity improves focus. Having something solid on the desk in front of him, with physical boundaries, helped him concentrate. The researcher expressed how reading on the screen could feel stressful and overwhelming, because there was so much content available at the same time.

Some of the respondents expressed how the opportunities hyperlinks create sometimes were distracting, as they led away from the original text, before they were done with it. They said that they can find it hard to get an overview of the field, and to know where things are.

> A disadvantage can be that you get almost stressed and feel “oh, I have to read this, and this, and this, and this”, and you just keep on clicking further, and don’t get the depth. You don’t get the peace to sit down and really take part in what a researcher has done, for instance. (R 2)

Another one also admits that this is distracting, but, in a way, appreciates it:

> It’s easier for me to think “wow, that looks interesting”, and two clicks later it’s here, and then that’s interesting, and somewhat relevant. But then I didn’t finish, well enough, the text I was originally occupied with. So it’s easier for me to get distracted that way. However, it’s productive time, and it leads me to getting knowledge and control of a field, but I might not get to immerse myself as much as I should. (R 1)

Additionally, as computers are multifunctional devices, the researchers said they were often interrupted while reading, by notifications from other programs popping up.

The majority of the researchers I interviewed prefer paper for longer texts, whereas shorter texts, or parts of them, can be read on screen. The respondents explained how they think the physical properties of paper make it better for longer texts. To be able to physically hold it, and use their hands to move in the text help them orientate themselves in it.

> Because I hold and look, and move like that, back again. Well, that’s the way you read student texts, but I also do that when reading articles, to see the connections and how it’s built up, the argumentation and so on, and I find that easier to do on paper. (R 3)

Some of the respondents expressed that they had difficulties with obtaining an overview of digital texts. When they start to go deeper into a text, and move back and forth, it was harder to know where they were in a digital text, than a text on paper. They explained how they found it easier to navigate in the article, and between articles, when they had physical copies, than when they had them on the screen. Their practices are shaped by what they feel is simplest to do. One of the researchers explained how she sometimes prints out and makes piles of articles to get an overview, as this physical organization of the texts help her organize her thoughts. The materiality of the text and the storage of it affect how it is used. Another respondent elaborates on how it is easier to use several articles at the same time when they are in print rather than on screen:

> The advantage of paper is that I can have ten articles, or fifty, spread out at the same time. If I were to read everything on screen I would have to switch between

> tabs all the time. If I have read an article thoroughly it's enough to just look at the page and I know what's written where on that page. If I have to change tabs all the time, I don't know this. I can have books spread out, open on the right pages, and get better overview of more texts at the same time on paper, than if I have to switch between tabs. And it wouldn't help if I had fourteen computer screens and all of it up at the same time. It's something else to have it on paper, for me. So that's definitely an advantage with paper, compared to reading digital versions of the texts. (R 6)

The researcher finds it easier to handle multiple articles at the same time when they are physical, as switching tabs disrupts the workflow. Some of the respondents explain how it is easier to remember which page something is written on, and even where on the page, when it was read in print.

There are also other more practical reasons. Some of the respondents mentioned screen fatigue and tired eyes when reading on the computer screen. One of them expressed how it can be tiring to spend much time in front of a screen, especially when the screen is small. The researcher said that the eyes are not getting any better as you get older, so screen time was notable. Nevertheless, the researcher reads a lot on screen, and like that it is possible to enlarge text on the screen. Another respondent, who is also generally positive to digital reading, said that the eyes can run dry, and the muscles get tighter, when reading on screen for some time. And sometimes it can cause trouble falling asleep at night.

As we can see, the respondents have several reasons for wanting to make a paper copy of articles found online, and they all have to do with materiality. Many respondents express how physical properties and affordances of paper facilitate reading. When it comes to e-books compared to physical books this is even clearer. Some of the respondents said that they need to have core readings as physical books in their bookshelves. Even some of the ones who do most of their reading on screen, and prefer the digital format in general, emphasized that it was necessary to have key publications available as printed books, as they return to these texts often. Additionally, having a physical bookshelf with important works in the office gives them a good feeling. The respondents value the properties a physical book has, and this goes beyond the experience of reading on paper.

When it comes to digital sources the respondents appreciate the accessibility; that it is easy to search and find literature in online databases, that they get easy and immediate access, and that it is easy to retrieve the content again, if needed. They also like that it is easy to store many files and easy to bring them with them wherever they go. One of the respondents brought up the fact that paper and printed books are heavy to carry. The researcher explained how they brought important books and articles back and forth between the university office and the home office, and how their bag got quite heavy at times. Additionally, there is the risk of forgetting or misplacing books or articles when you have them as physical copies. When the literature is on your digital device you have everything in the same place. Some said it was easier to organize and share digital articles, and easier to navigate in the documents, by searching for keywords. The search function makes it easier for the researchers to read through the main elements and most interesting parts of the text quickly, and easily retrieve passages. These advantages, one of the researchers emphasized, are very important because they save time and effort. The respondent who does, more or

less, everything digitally appreciates the possibility to have the same workflow everywhere; in the office, at home, when travelling, and in their leisure time. It is the same wherever and whenever. Being efficient is important to the researchers, and their practices are shaped by this. The affordances of digital text make the use flexible.

5.1.3 Storage

How the researchers store and organize their literature was my last question in the section on their surrounding reading practices. I included this to gain more insight in how they prefer to work with screen and paper. The respondents had different ways of doing this, and some of them admitted that they could improve their system, as there was some lack of structure of the files. Almost all of them store the articles, or references to them, in folders on their computer. Three of them use EndNote to help organize them. Some prefer to keep the articles in full, while a couple of them found it as easy to keep the references in EndNote and search for the article again when they needed it. However, two of them commented on the risk of losing access to articles due to termination of library deals with providers.

Most of them rely on electronic storage, and the main reason given for this was that it was harder to keep paper copies in a systematic way, and some found it messy and stressful having huge piles of paper. In addition, it was mentioned that paper is perishable. Nevertheless, some keep articles on paper for a while. Three of the researchers choose to store in both formats, and one of them expressed that it felt safer to store articles in paper, to have them physically, in case of a computer crash. One has a systematic double archive, which consists of folders on his computer and physical folders in the office, in order to have a back up if something happens. The researcher explained that articles received digitally are printed, and articles received on paper are digitized. Another researcher kept in paper what was received on paper, and stored on the computer when it was found digitally. A third one keeps articles in piles of paper, and saves favorites as bookmarks in the browser. The different researchers appreciate different ways of storing the literature.

5.2 The reading practices

The second part of the interview was about the researchers' reading. Where, but mainly how they read was the focus of this part, including if there were any differences on how they read on paper and on screen. I wished to explore how the materiality of the text affect their reading practice.

5.2.1 Where they read

When I asked the researchers where they usually read academic literature, all but one answered that they read in their offices. The last one said she needed to be somewhere else than her office in order to concentrate. Another one also acknowledged that it was often hard to concentrate in the office because of interruptions, while two others said that their office was where they found peace

and quiet. Most of them also read a lot at home, some specified that it was in their home office. Four of the respondents answered that they read everywhere. This included while travelling, in the garden, at the playground, and in bed.

In their office, either at work or at home, both formats are used. When they are not in their university office or home office they usually read on paper. However, there are a few exceptions. One of the researchers I interviewed has more or less turned completely digital in their reading practices. The researcher owns a Kindle, which is used a lot, but also reads on the computer, on the iPad, and the smartphone. Two of the other researchers also occasionally read academic literature on their iPads.

5.2.2 How they read

I asked the researchers how they read, in the sense of how they approach the text and move around in it. I was curious to find out when they read a text from beginning to end, and when they jump in the text. And, most importantly, if there is a difference between what they do on screen and on paper. I was curious to find out if the affordances invite to a certain approach and use.

The respondents all answered that they jump in the text first, to get an overview. They skim the article, and read pieces of the text, like the abstract, have a look at the references, find the problem statement, read the introduction, headlines, method, and conclusion, or search for keywords, and read around them. One of the respondents explained how, after some time as a researcher, the common way to read is to enter the text with a meta-look. First, browse through it, and pick something here and there. Then, if it is interesting and relevant, it is read from beginning to end. This first reading, the browsing through to judge whether an article is interesting or not, is fragmented, and often done on screen, as the articles are usually found online in article databases.

When the researchers find the article interesting, they read all of it. Four of them are comfortable with reading whole articles on screen. A couple of these think that it is more convenient, and explain that they like to turn the pages and go back and forth in the text on screen. One of them said that this works equally well, even better, on screen than on paper. However, as we have seen, sometimes three of these four also choose to print out important articles. The remaining six answered that they print out articles to read them thoroughly. Reasons given by the respondents for printing out articles were, as we have mentioned already, that they find it easier to navigate in the text when it is on paper, they find it easier to make notes by hand, and some said it was quicker to turn the pages back and forth in a physical document, and a couple mentioned that they felt calmer and liked the feeling of holding it physically in their hands. In addition, they remember better what they read on paper.

> Things I only need to have a fairly good overview of might as well be read on screen, but if I shall really immerse myself in something, I do that on paper, to get... well, it sticks much better. I believe in learning through the hands. I believe hand writing has certain advantages. It might be a placebo effect, why I print it out, I don't know, but it works (R 6).

This brings us over to the process of taking notes while reading.

5.2.3 Annotations

Nine of the ten respondents make annotations when they read academic literature. The one who does not take notes is the one who reads everything on screen, and the reason given for seldom making notes was the use of many different platforms. Besides, the researcher explained, Kindle is not good for writing and making notes on. The researcher said that it was hard to remember what was read where and thus where the notes were. The researcher admitted that it would have been better to decide to go with one platform, and stick to it, but had not done so yet. However, the researcher rarely returns to notes, and sees the academic writing as the way of notetaking at the moment.

One of the respondents prefers to make notes in PDF's, and explains that it is done by highlighting important parts with yellow, and writing comments on the page margins. The researcher finds this superior to doing so on paper, as long as there is a big screen to work on. Six of the researchers make notes on paper, and two are comfortable with both – sometimes on paper, and sometimes on the screen. When doing it on the screen one of these makes notes in PDF's and the other one on the iPad with a pen, using the app iAnnotate.

Whether the researchers choose to make notes digitally or by hand is connected to whether they prefer to read articles thoroughly on screen or on paper. The reasons the researchers give for preference for print when making annotations are that it is easier, and they are taking better notes. They remember better the text, their notes, and where important paragraphs are, when the notes have been made by hand. By using the hands there has been a physical process that aids the memory.

Making notes by hand is a study technique used for many years by several of them, and they are accustomed and content with it. However, a couple of the respondents admitted that they did not have enough knowledge on how to make notes efficiently on screen, so they rather continued to do so on paper. We will look more at what they say about technical equipment and skills in the next part.

5.2.4 Use of digital devices

Some of the respondents underlined that technical equipment and competence matter. For instance, the one who prefers to make annotations in PDF's and one of the two who prefers e-books emphasized that they need a big computer screen, like the ones the university college has placed in all the offices. When it comes to digital reading, nine out of ten prefer to read on a computer screen, rather than on an e-reading device or on their smartphones. The exception is the respondent who reads everything on screen. This researcher prefers to read books on the Kindle, and thinks it is fantastic as a reading device. The researcher likes to read on screen, and their way of reading suits the digital format, as articles are rarely read from beginning to end. To be able to search in the text is important, and the main reason for the researcher's preference for digital texts. The affordance of searching in the text is important in different stages of the reading. First, it can be important to search for keywords in order to get an overview of the text, and at a later stage it is useful in order to check something. In addition to reading on

the Kindle, the computer screen and the iPad, the researcher is even able to read academic articles on the smartphone, a much smaller screen.

”I’m not a Kindle-fan. I wish I had been, though” (R 3), one of the other respondents said. Despite this, the researcher occasionally reads academic articles on the iPad, whereas one of the others said that the iPad is only used for leisure activities. Yet another of the respondents reads academic literature on her iPad quite a lot. This researcher finds the iPad more convenient and portable compared to a computer or laptop, and always brings the iPad when travelling. The researcher likes the advantage of bringing many articles along, and is happy with making notes on it. This respondent had recently done research abroad for some months, and then only read articles on screen, mostly on the iPad. The researcher has no difficulties with only using digital articles. Nevertheless, back in the office articles are being printed out again. However, the researcher adds that much more paper would have been used, if it were not for the iPad. A couple of the researchers brought up the environmental aspect, but using less paper was not their main reason for reading more on screen.

When it comes to preferred format when reading on a screen seven of the respondents answered that they prefer PDF, because the layout of the PDF makes it better to read, as it resembles printed pages. Three read articles directly in the browser, however one of them admitted not really knowing about the different formats, so would just read the text as it appeared on the screen. The respondents’ reading practices are influenced by the surrounding practices, but we see that paper’s physical properties are highly valued by the majority when it comes to deep reading.

Even though the researchers read many other texts on screens, only two of the ten respondents said they prefer e-books to printed books. One of them is the one who reads on a Kindle, while the other one reads e-books on the computer screen. The main reason given by them as to why they prefer the digital version is the possibility to search in the text. Another point, made by the first one, is portability. The other eight respondents found it easier to use printed books, and they would rather use a book published in print, than to print out chapters of an e-book. Their practice is continuing to use printed books because they find it more convenient. One of them explained how she feels it is more efficient to read a printed book. She thinks it takes more time to turn the pages and navigate in an e-book than it does to flip back and forth in a paper book. However, she admits that she might not have learnt how to use all the tools available for e-reading.

5.3 Age and subject discipline

The researchers are, naturally, more used to reading on paper. They have read on paper their whole lives, while digital tools are newer and they need to learn to use this technology as adults. One of them put it this way: ”I think it’s habit. I’m used to one thing, well, I’m used to the other as well, but I’m more used to the paper edition, and to handle that” (R 4). Another one reflects about how it would have been if she had begun to read on screen earlier in life. Then she thinks she would have found it much easier, but she considers it too late for her to change her practices now, even though she is only in her forties. Others

express a wish to develop the abilities to read better on screen. One of them calls himself a development project when it comes to digital reading, and two others express that they move more towards screen reading, because they see many advantages with it, and that it is the way of the future. They acknowledge that it will require some practice, though.

I asked my respondents their age and subject discipline, as I was curious to find out if these influence their reading practice when it comes to reading on paper and on screen. One of my respondents expressed that he thinks it does. However, of the four researchers who prefer digital reading two were among the oldest respondents. The other two were among the youngest.

How positive the researchers are towards screen reading is connected to their personal reading practices over time, but not directly to their age. Subject discipline, on the other hand, might have an effect. A couple of the researchers I interviewed pointed to the fact that there is less to be found digital in German or French than in English, so they still need to rely somewhat on printed sources. This is of practical reasons, not preference. However, this might contribute to forming the practice.

Two of the respondents who are highly in favor of print come from language studies. One of them reflected on the preferences based on the background:

> There are possibly many things that I should have learnt with this, that might have improved the efficiency of my work. So it might be that I should think about it in a different way. I might be a bit conservative. Perhaps. But I'm probably influenced by my background as a literary scholar, in that I'm very fond of books and text, and the physical paper and the written word. (R 5)

However, two other participants who came from language studies prefer screen reading, so in my findings subject discipline is actually not as decisive when it comes to attitudes towards screen reading either.

5.4 Preference

In this chapter we have seen that the respondents' reading practices, including the surrounding practices, when it comes to reading printed and digital text, have to do with materiality. The respondents find many advantages, and some disadvantages, with both formats, and they use both, depending on the situation. However, one of the researchers underlined a couple of times in the interview that digital reading and working on a screen was such a big part of the work, and tried not to think about possible downsides. This researcher and three of the others said they preferred digital format, and the remaining six answered paper. However, some found it difficult to say which format they preferred. One respondent first had this to say about the digital format:

> I miss being able to make better notes in the text. So that's the advantage of paper. But you get these high piles and mountains of books and paper, so it's actually really convenient with e-books. So, in total, I prefer digital format, absolutely. (R 9)

However, later in the interview the same researcher acknowledges: "I think that the printed book and paper, that is unsurpassed technology. It is! So if the aim is to go deeper, paper is definitely best" (R 9). The respondent values paper's

properties, but finds more advantages with the digital format, and in total, prefers that.

Sometimes the researchers need to make time and delve deeper into articles or books, and then the preferred format for most of them is paper. Other times they need to browse through a lot of content quickly, and then they do this on screen. One of them explains how she finds it quicker to skim through an article on the computer, than on paper, but she feels more confident that she gets the overview on paper, and thus choose that for deeper reading. Another respondent explains that she has tried to test deep reading on screen and on paper, and found that she remembers better what is read on paper. She said it might be considered old-fashioned to still prefer paper, but that works best for her. So even though the researchers are fairly comfortable with screen reading, sometimes paper is preferred.

We will investigate this further in the next chapter.

6 Analysis and discussion

The aim of this thesis is to gain a deeper understanding of researchers' use of academic literature on paper and on screens. In the interviews I got information about the respondents' thoughts on how their reading is carried out, as well as how they search for and store academic literature in different formats. By exploring their reading practices and the surrounding practices, I sought to find out when and why they choose digital format, and when and why they use print.

I found it very interesting to hear what the researchers had to say about reading and handling their literature on paper and on digital devices, as it is not either/or for them. What they prefer often depends on the situation and what their aim is.

What fascinated me most was the researchers' views of how they found it to be a different experience to read on paper and on screens. They talked about how it feels, and how it affects their ability to work with the text. The material properties and affordances of books and digital devices affect the researchers' feelings towards them, and this, in turn, shape their actions and habits. Their practices are set in motion by emotions. They do as they do because it feels easier, better, and more effective. In general, the researchers do a lot of screen reading, but most of them prefer paper for deeper reading, and they all occasionally print out texts. This is also seen in previous studies (Franze et al., 2014; Hillesund, 2010; Late et al., 2019; Sukovic, 2011; Tenopir et al., 2010).

In this chapter the materiality and affordances of paper and of digital devices will be explored by investigating what the respondents see as pros and cons of the different formats, and how this have effect on the way they read and handle the literature. By looking into the reasons the respondents gave for choosing paper and screen in different situations we see that the material properties and affordances affect the choices they make.

Before I move on to that, I want to classify the ten respondents in my study using the four types identified in Revelle et al.'s (2012) study. Even though the types are based on attitudes towards e-books, I think they are applicable to digital reading in general.

6.1 Book Lovers, Printers, Pragmatists and Technophiles

I would say that we have one Book Lover (R 5), who feels strongly for printed books, and highly appreciates the properties of paper. We have one Technophile (R 1), who values technology and the possibilities given by it. The rest could be seen as Pragmatists, comfortable with both formats, and choose whatever is most convenient, whereas at least one of these have tendencies of being a Printer (R 4). The Book Lovers and Technophiles are considered to be more emotionally attached to format, but they also choose what suit them best.

In Revelle et al.'s (2012) study, the highest percentage of Book Lovers could be found among humanities scholars. They concluded that there is a difference between academic disciplines, where academics from Humanities, Education,

and Fine Arts in particular prefer print books, whereas academics from Engineering and Business were more interested in online materials (p. 426). Even though the one Book Lover of the ten researchers I interviewed is from the humanities, no strong correspondence between research field and preference for paper or screen could be seen among my respondents. The researchers in my study have, for the most part, a pragmatic approach.

6.2 Pros and cons

The researchers I interviewed see advantages and disadvantages both with use of paper and with digital devices, and there is not a total consensus among them about what these are. They feel differently on some aspects. For instance, one of the respondents feels stressed when there is a lot of paper in the office, while a couple of the others expressed that paper offered them a sense of calmness. Especially the Book Lover emphasized that printed books provided a peacefulness.

In the following, I will explore these pros and cons, divided into different areas the respondents emphasized were important to them when it came to choosing reading format. These are orientation in the text, distractions, annotation, and physical properties.

6.2.1 Orientation in the text

Most of the respondents expressed that they find it easier to know where they are in the text when they read on paper. They also remember better what is written where. Hou et al. (2017) explain this with the cognitive map a reader creates in their mind while reading. They state that screens make it more difficult to construct this map, or spatial representation, of the text. "If short term memory resources have to be directed to the work of the eye and the hand – how to steer the cursor, how to move the eyes efficiently – comprehension skills will be diminished" (Mc Laughlin, 2015 p. 190). When text is read on a screen it is not as fixed as it is on paper, as screen size can differ, and scrolling may disrupt the view for the inexperienced screen reader. However, there is a difference between reading in HTML and reading PDF's. The latter resembles the layout of a printed page, whereas the first is more fluent. Texts on the web also lack the boundaries physical texts have, and the reader might get tempted to follow links that lead away from the original text.

Mc Laughlin (2015, p. 190) underlines that with training reading on digital devices can be performed equally automatically as reading on paper. This transformation to reading on screen, to make it an embodied practice, requires exactly that; practice. Readers who do not master this yet use more energy on locating themselves in the text. This leaves less capacity to remember the content of what is being read. A reader often remembers better where in a printed text, a specific quote is (say, at the top corner of page 3), whereas these linkages are not available when reading on the screen (Schilhab et al., 2018, The spatio-temporal dimension, para. 6). As one of the researchers I interviewed explained, she only needs a quick look at a printed page to remember what is written on it, but she does not get the same recollection from a text on screen. It is argued that the

reader does not get the same connection to a text read on screen, as they lack the physical boundaries. “With screens, there isn’t a sense of the wholeness of the work, since we only encounter its parts piecemeal” (Baron, 2015, p. 151). As the way people feel about something shape their practice, the connection the respondents feel to printed texts can contribute to their continued use of these. If they feel closer to text on paper than on screens, the feeling of comfort and control provide a good feeling, and encourages continued use.

However, orientation in the text is more important when articles are to be read thoroughly than just skimmed through. Researchers often browse through articles, and read only parts of them, as we saw in the previous chapter, in the section on how the researchers read. One of the affordances of digital texts, which is highly appreciated, is the possibility to search for keywords and elements. This makes screen reading suited for this first reading where the aim is to evaluate the relevance of an article and get an overview of it. We saw that all of the respondents do this first, quick reading on the screen. However, since the articles usually are found digitally it is natural to do this first reading and assessment on the screen. Nevertheless, most of the respondents prefer paper and print out the text when they need to delve deeper in it. The printed book or paper is suitable for concentration and deep reading. There are no internal disturbances, so it is easier to keep focus when reading on paper (Johnston & Salaz, 2019, p. 132-133). This brings us over to the next topic.

6.2.2 Distractions

In previous research (Baron et al. 2017; Johnston & Salaz, 2019; Mizrachi, 2015; Pálsdóttir, 2019; Rose, 2011; Selwyn, 2016) distractions are often mentioned as one of the major disadvantages of screen reading. Of course, distractions may occur when reading printed sources as well, however, a big difference is that the distractions are located outside the material text in print, while they are inherent to the medium in digital texts (Mc Laughlin, 2015, p. 176). Because computers, tablets and smartphones are used for communication and entertainment as well, it can be appealing to check something on the web or one can get disturbed by notifications while reading. An e-mail can pop up in the corner, for example. When reading on a multifunctional device there are more challenges with keeping focus. The affordances of digital devices, that is, all the possibilities they present, lead to tempting options to reading.

As we have seen, reading behaviour is usually different on screen and on paper, as screen reading is often more fragmented than paper reading (Pálsdóttir, 2019; Schilhab et al., 2018). Additionally, when working on a computer multitasking is common. The user move between different tasks or activities, and interruptions can often occur. There is often a higher speed on the screen. As Baron (2015) puts it: “Screens hasten us along. Print invites us to linger” (p. 152).

Some of the previous research referred to is done on students, and I would think that students might get distracted more easily than researchers do, as researchers usually have more experience with reading academic texts, and, possibly, a different motivation. From my own time as a student I know the feeling of getting an urge to check social media or watch an episode of a TV-series while

reading an academic article. The researchers I interviewed emphasized how they need to be focused and efficient, but they experience distractions as well. In addition to interfering e-mail-notifications, the respondents in my study expressed that they experience a different type of distraction. They feel distracted by all the possibilities. There is always something more to look into.

Text in a web environment does not have boundaries in the same way as printed text has. ”[T]he experience of reading a book seems reassuringly secure and coherent. Books can be *completed*, as opposed to the open virtuality of digital environments” (Mc Laughlin, 2015, p. 174). Text online is more fluid and lacks closure. There is a vast amount of available content just a click away when working on a computer, so it might feel difficult to contain the project within its boundaries. Hyperlinks present possibilities, and the reader must constantly choose whether to follow these links or remain where they are (Hayler, 2016). This accessibility is generally an advantage, but all the possibilities can feel like a threat, be overwhelming and might lead to stress, as well. This was addressed by a couple of the researchers. The price to pay for having so much available is that there are also many irrelevant documents, which might steal time from you (Hillesund, 2010; Sukovic, 2011). And it can be hard to tell what is relevant and not. As Mc Laughlin (2015) puts it: “[The reader] must ignore all irrelevant text, even when the definition of relevance is unclear” (p. 181). Feeling stressed is not pleasant, so in order to avoid this feeling researchers who experience stress when reading texts on screen would rather print out texts, in order to immerse themselves in them in peace and quiet.

6.2.3 Annotation

Deeper reading of academic literature usually includes making notes in the text. Navigation in the text and recalling its content is made easier by marking relevant passages and writing keywords in the margins. This is still mostly done manually on printed pages, as this is often found easier than doing so on screen. Digital annotation is still, by many, seen as inflexible, difficult, and time-consuming. This also contributes to why people still prefer to work with printed text (Franze et al, 2014; Halevi et al., 2015). This is another clear example of how feelings shape the practice, as making digital annotations would cause frustration for the ones who finds it difficult to do, the feeling of ease make them continue making annotations on paper.

Additionally, research has shown that to make notes by hand seems to have cognitive advantages, and makes the reader remember better. When we use our senses this affects the feelings as well, and the tactile experience makes us feel closer to paper (Baron, 2015; Mangen, 2016; Sukovic, 2011). The researchers I interviewed expressed this too. The respondents who prefer to deep read and make annotations on paper do it because they think that this study technique works best. While this applies for the majority of them, one of the respondents prefers to make notes in PDF’s. Two others are also comfortable with that. This is a higher share than seen in previous studies (Halevi et al., 2015; Ramdarshan Bold & Wagstaff, 2017). However, as I only have ten respondents it is not possible to draw any conclusions regarding this. Nevertheless, a few years have passed since those studies so it is natural to think that increased use of screens leads to more digital annotation. However, to become confident with making

annotations on a screen requires practice, but first, a determination to try. When it feels natural and easy it is more likely to become a new practice.

6.2.4 Physical properties

To have a physical copy of the text may serve as a physical reminder. There is a saying that goes “out of sight, out of mind”, and that can surely be true for digital articles. To be ”reminded of their existence by their tangible presence” (Baron, 2015, p. 137) was a point brought up by some of the respondents in the interviews. They print out articles to make sure they remember to read them.

Ease of annotation, physical comfort, portability, tangibility, easier navigation, and better comprehension were the reasons given for choosing paper in Franze et al.’s study (2014, Reasons for reading on paper, para. 3). Tangibility, easier navigation, annotation, and better comprehension are connected, and we have already discussed some of this. When it comes to physical comfort some of the researchers I interviewed commented that it feels good to hold a piece of text in their hands. As it gives them a good feeling they wish to continue this practice.

One can argue that if the digital text is read on a tablet or an e-reader it can be held in the hands as well, and it shares many of the same functions as a physical book. However, on digital devices all texts appear the same. On the positive side, this physical homogeneity make oversized books easier to handle and bring with you, no book is too heavy or unwieldy. On the downside, it means that they are physically indistinguishable, as they have no physical distinctiveness. As all texts “arrive in the same material device, they all become part of the same experiential flow, with fewer markers to remind us of their real difference” (Mc Laughlin, 2015, p. 187). They will give the reader the same physical experience. As the physical book is only that specific text the reader might feel closer to it.

> Our study shows there are some aspects of the physical reading experience that cannot be achieved in digital form due to the difference of the mediums. These are things such as the feeling of paper, the physical experience when page flipping, having less distractions, positioning or storing paper in a particular place, as well as being away from digital screens. (Franze et al., 2014, Conclusions, para. 7)

It is common to experience eyestrain after long days in front of a screen, so switching to another medium to get a break from the computer was welcomed. Besides, in her review of literature on the subject, Clinton (2019) concludes that reading on paper was more efficient than reading on screen, in terms of performance.

Still, despite all the advantages the respondents find with paper, they read a lot on screen as well. As Johnston and Salaz (2019) points out in their study, there is sometimes a difference between what is convenient and what is preferred. As my respondents, for the most part, are Pragmatists, the affordances of screen make researchers often choose that, even though the majority still prefer to read on paper when concentration is needed. Some of the researchers I interviewed explained that when an article is printed out it has gone through a quality check. First, they have skimmed through it on screen, and decided to print it out in order to read it more thoroughly. There is a different use of the mediums.

6.3 Continuous reading and reading on the prowl

Baron (2015) states that ”one of the major effects of digital screens is to shift the balance from continuous reading to reading on the prowl” (p. 39). As already discussed, print creates a sense of the whole, while screen reading often is more fluid. The affordances of digital devices encourage this kind of discontinuity, with the advantage of searching for elements or keywords, and moving quickly through the text, jumping from one section to another. The focus switches rapidly (Baron, 2015, p. 152; Schilhab et al., 2018, Deep reading, para. 4). Much academic reading is skimming through, and screen reading is suitable for this. As we have seen, the researchers I have interviewed read both on screen and on paper, some prefer one to the other, while the rest explain how they read differently on screen and on paper. This is in line with how Hayler (2016) sees digital reading. As it presents different possibilities it should serve different functions. A quote often referred to is this by Liu (2005), which sums it up well:

> The screen-based reading behaviour is characterized by more time spent on browsing and scanning, keyword spotting, one-time reading, non-linear reading, and reading more selectively, while less time is spent on in-depth reading, and concentrated reading. (p. 700)

It was written some years ago, but it is still valid.

Hillesund (2010) explains how concentrated studying often is a combination of continuous and discontinuous reading. Both previous research (Franze et al., 2014; Halevi et al., 2015; Sukovic, 2011) and my study found that academics prefer to browse through an academic article first, and read it as a whole later. In Franze et al.’s study (2014, Reading habits, para. 2) they found that readers tend to begin reading the abstract, the introduction or conclusion, and rated the conclusion, results, abstract and methods sections as the most important ones. All of the researchers I interviewed do this fragmented reading first, where they see what the article is about, and judge whether it is interesting or not, on the screen. However, had the article first appeared to them on paper, instead of being found digitally in an online database this first reading would, most likely, have happened on paper. The surrounding reading practices affect the reading practice. Four of the ten respondents continue to read the article on screen, most of the time, but the majority prefer to do the deeper reading on paper.

Even though this fragmented reading is suitable to do on screen, it happens on paper as well. Scanning and searching was not invented with the computer. Jumping in the text and re-reading parts of it also happen in print. Hillesund (2010) says that, based on his study, “[a]cademics seldom read a scholarly article or book from beginning to end, but rather in parts and certainly out of order, using hands and fingers flicking back and forth, underlining and annotating, often relating the reading to their own writing” (Introduction, para. 2). He underlines how this discontinuous reading involves very active use of the hands. Some of the researchers I interviewed reflected on how reading is a physical process, and emphasized how they use their hands to leaf through the printed pages and make notes.

To read something thoroughly requires more concentration, and then a majority of the researchers I interviewed need the text in print to get the peace and quiet required. This is also seen in previous research (Franze et al., 2014; Halevi et al., 2015; Singer & Alexander, 2017; Tenopir et al., 2010). The reading practice is

shaped by the researchers' need to feel focused and calm, in order to be able to concentrate on the reading. As we have discussed earlier in this chapter the feeling of for instance stress or frustration make the researchers avoid certain practices.

The physical settings required for focused reading vary. Some prefer the desk at their office, while others prefer to go somewhere else, and perhaps sit more comfortably in an armchair. With paper there are more options for where you can read, as it is easy to hold and handle. You can even bring the article with you to read outside in the garden, which is not as easy to do with a laptop, because of the need for electricity and that sunlight impairs the view of the screen. One can argue that this only applies when comparing paper to a computer screen, and you could do this with an e-reader or tablet as well. In fact, these are perhaps better to bring along on holiday or work trips, as they can contain numerous articles, and e-readers can be more pleasant to read on than paper in some settings. However, of the ten researchers I interviewed there were only a couple of them, the Technophile and one Pragmatist, who used their iPad or Kindle to read academic articles. It might be because the others are not experienced enough with tablets, or perhaps they still find it challenging to do this deeper reading on a screen. These reasons are intertwined.

6.4 Pragmatic, time matters

> I think it's a big advantage to be able to use both, and to use whatever is suitable. I would have found it very restraining if someone had told me that screen is the only option, you cannot use paper, and the other way around. (R 3)

This was said by one of the researchers when I asked if they preferred reading on paper or screen. Most of the respondents of my study are classified as Pragmatists, and share this view.

The researchers are busy and have tight schedules. In the interviews they emphasized that they need to be efficient, and their practices are formed from what they find to be most convenient and what they feel is most productive. They are happy to have options, because sometimes digital reading is quicker, and other times paper is preferred.

Ross, Pechenkina, and Chase (2017) make an important point: "most studies tended to juxtapose e-texts with paper-based texts in their research design, hence creating and perpetuating a 'print versus digital' dichotomy" (Conclusion, para. 1). One should be careful to enforce either/or. Farinosi et al. (2016) also underline that it is important not to set paper and screen up against each other, as they are not competitors, but play complementary roles. The current situation, where old and new technologies exist side-by-side, is complex. There are benefits of both formats, and they are used when suited (Hayler, 2016). Mizrachi (2015) mentions Zipf's principle of least effort. We generally do what requires least effort from us, and the researchers do whatever is most efficient and feels best. That is, different format preferences for different reading tasks.

Sometimes there is a discrepancy between preference for print, and use of screen reading. Tracy (2018) found that reasons given for choosing to read on screen despite preferring to read on paper were saving time and effort, saving money,

and saving the environment (p. 44-45). Even though respondents in my study preferred to read on paper, practical reasons, like the fact that they accessed the article digitally contributes to more screen reading. Another example is the choice of using an e-book, which is available immediately, instead of waiting for the library to receive a printed copy of it from another library, even though they prefer to use the printed version.

In their work the researchers use online resources, because, as they all told me in the interviews, what they see as the greatest advantages with digital texts is the accessibility and availability. This saves time, and the research process benefits from quick retrieval of information and effective organization and storing of literature.

6.5 Document type matters

There is a difference between different types of sources. When it comes to the researchers' use of e-books I was curious to find out how much they use them, as my experience from working in an academic library for ten years is that most, both staff and students, prefer printed books. While academic articles increasingly are read on screen, there is often a more reluctant attitude towards reading e-books. With the interviews I got this confirmed. The respondents are more positive towards reading articles digitally than e-books. Previous research also show that books are still mainly read as print, while journal articles, conference proceedings and newspapers more often are read in electronic format (Late et al., 2019, p. 493). There seems to be an easier transition to reading articles on screen than reading e-books. While the use of electronic articles now is a natural part of an academic's life, the adoption of academic e-books has been slower (Miller, 2014, p. 96). There might be several reasons for this. Articles are shorter, and they are pieces of another whole, namely a journal. Hou et al. (2017) argue that "a paperbook is a physically and functionally unitary object. The interaction with paper books is so natural, intuitive, and immediate that readers cease to cognitively process it; therefore, it has lower cognitive demands" (p. 85). The physical properties of a book help us in the reading process:

> A book's tangibility also lets you use it in particular ways. You can stick three fingers into different parts of the volume to easily shuttle back and forth in the text. You can find your way back to a passage by remembering it's about a quarter way through, on the upper left-hand side, just before the end of a chapter. (Baron, 2015, p. 131)

The book is a unit with set properties. The content is the same, but a book has a cover you can hold, and a physical size and weight you can sense. Whereas with an e-book all texts appear the same. The researchers appreciate the physical features of books, and this, in turn, make them continue the practice of using paper books. To become equally comfortable with reading digital books require practice (Mc Laughlin, 2015). When something works well it is harder to find motivation to learn to use a new medium. However, the advantage of being able to search for keywords or phrases in e-books is highly valued by some researchers.

6.6 Skills, habit and potential

When something works well, we tend to stick with it. Habit provides a feeling of safety, and new practices requires time and effort to establish, and frustration might occur. In the interviews it became clear that equipment matter. For instance, some emphasized that they need a big computer screen to read on. The affordances of a big screen make it easier to use. However, technical skills are even more important. To fully exploit the potential of e-texts researchers need to develop new skills through training and repetition. ”Learning to read in digital environments demands high cognitive investment” (Mc Laughlin, 2015, p. 190).

Screen reading is another way of reading than reading on paper, and readers must adjust accordingly. It tends to be more fragmented, and there are more distractions when reading on a screen than on paper. It is important to learn to focus on the reading, and to avoid temptations (Schilhab et al., 2018, How to deep-read on screen). Many of the researchers I interviewed have the practice of printing out texts when they need to concentrate. However, some of them expressed that they want to become better at screen reading.

To be efficient when using digital texts, and make it feel as easy to use as paper, especially when taking notes on screen, requires a certain set of skills, and techniques need to be learnt. Ramdarshan Bold and Wagstaff (2017) found in their study that 24% think it is too difficult or time-consuming to write in the margins and highlight important passages in the text digitally, and 16% actually did not know how to do it on their e-device (p. 20). While a few of the researchers I interviewed feel comfortable with highlighting in PDF’s and making notes on the screen, others admitted that there was a lack of knowledge when it comes to making digital annotations. Some acknowledged that they could do an effort to learn how to do it. However, a couple of them feel that they have more possibilities on paper. Furthermore, their experience was that making annotations by hand made it easier for them to learn and remember. Therefore, those researchers were not too eager to switch reading formats for deep reading.

Even though many of the respondents still use paper for continuous reading, they have all managed to develop the skills needed for searching for information on the screen. The most common ways to find electronic articles are searching in the library’s discovery tool, searching directly in article databases and using Google Scholar. Other important ways are browsing, following citations, Web of Science and Scopus, and consulting colleagues. This is seen both in my study, and in previous research (Halevi et al., 2015, Late et al., 2019; Sukovic, 2011; Tenopir et al., 2010).

Articles accessed electronically are increasingly read on screen (Tenopir, King, Christian & Volentine, 2015, p. 103). Improvements in screen technology and the development of more intuitive interfaces contribute to more digital reading. There is constantly development and progress that facilitate reading on screens.

The Technophile in my study, who reads everything on screen, made a choice a few years ago to change practices and read only digitally. I believe a transition like that requires deliberate action and an active choice. It does not just happen overnight. It takes some time to master it and gain the confidence needed. There must be a wish to do so, as it might feel like a step backwards at first. Before you

can master it properly actions will probably take more time, and not go as smooth and automatically as what you are used to. Other times, we are forced to follow the technological development, for instance when it comes to searching for information in online databases. As we master this, and experience how effective it is, it is awkward to go back to the manual library catalogue. As we get more accustomed to something we get increased confidence, it feels more natural to us, and new practices develop. Nevertheless, sometimes we need to use historical practices, so all old knowledge should not be forgotten.

Dinkins, Kirkland, & Wald (2014) noted that there were mainly two reasons for not using e-books among university faculty: ”lack of awareness of e-book collections and lack of know-how of procedures for accessing and downloading e-books” (p. 21). I also saw this lack of knowledge in my interviews. An example of this is when I asked the researchers if they sometimes printed out chapters of e-books, and one of them admitted that he did not know that it was possible. After the interview, I showed him how to do so. Admitting what you do not know is important in order to learn something new.

E-readers, tablets, and smartphones are not much used to access and read scientific literature (Franze et al., 2014; Halevi et al., 2015; Late et al., 2019). My findings correspond with this, as most of the respondents' screen reading is done on computers. However, use of iPad and Kindle is very important to the researchers who read a lot digitally. For the Technophile they are essential. Based on my findings it seems that if the researchers started to use tablets more, they might read more on screen. The fragmented reading is suitable to do on handheld reading devices, and these resembles the codex more than computers do (Mc Laughlin, 2015, p. 184-186). Besides, with a handheld device you can bring many books and articles with you wherever you go. It is a threshold to overcome to learn to use these, and generally, it is easier to keep doing what you do than to change your practice. When something works well there is no desire to change. New approaches and practices require an effort. Reading on a tablet or an e-reader requires another type of interaction and attention than a printed book (Schilhab et al., 2018, Deep reading, para. 5).

6.7 Age and subject discipline

Some of my respondents are happy with their current practices, while others wish to improve their skills when it comes to digital reading and annotation. Others again might think the ship has sailed, and that they are too old for learning something new. I wanted to find out if age and subject discipline play a role when it comes to attitudes towards digital reading.

Tenopir et al. (2010) found in their survey that age was not statistically significantly associated with the number of electronic readings. This corresponds to my findings, as some of the younger researchers were more in favor of paper than some of the older ones are. In fact, the oldest respondent reads mostly on screen, and is comfortable with making annotations in PDF's.

However, the researchers I interviewed were 39 years old and older, so neither of them can be considered “digital natives”, and they were brought up with reading and studying on paper rather than on screens. Nevertheless, studies done

on students, who are considerably younger, also show a preference for print (Baron et al., 2017; Mizrachi et al., 2018; Pálsdóttir, 2019; Wiberg & Myrberg, 2015).

When it comes to research field, Tenopir et al. (2010) found that humanities faculty members reported reading fewer e-articles compared to faculty members in other disciplines. This is also common among students. Pinto et al. (2014) detected that it was more frequent that students studying technical disciplines used e-books, while students of humanities, education, law, and health less so. However, in my findings there was no clear connection between research field and how positive they were towards screen reading. Two of the researchers who are most in favor of print, the Book Lover and a Pragmatist, are from the humanities, but so are a couple of the researchers who prefer digital format. One might argue that these other studies were quantitative and had a higher number of respondents. Variations occur within research fields, and ten respondents is probably not enough to see the tendencies seen in earlier studies.

7 Conclusion and suggested future studies

7.1 Conclusion

"We live at a time when the materiality of text is changing." (Mc Laughlin, 2015, p. 172). The respondents in my study find many advantages, and some disadvantages, with both paper and digital format, and they all use both, depending on the situation and what their purpose is. As I have used Reckwitz' (2017) view of how affects affect practices, that is, how people are motivated by obtaining pleasant feelings or by avoiding negative ones, I have looked at how the researchers' reading practices are explained by that they do what they find most comfortable, efficient, and convenient.

When the respondents were asked what they prefer, six of them answered that they prefer paper, and four e-reading. However, they all do a lot of screen reading. One of the researchers put it like this: "I prefer to read on paper. When it comes to just reading. But I read as much on screen. I would say both. They fill different functions, I'd say. To me" (R 3). This sums it up for the majority of them. There is not always concordance between what they say they prefer and what they do, as they have a pragmatic approach. By looking at reading practices in a broad sense, including the surrounding practices of finding, accessing, and storing the literature, I saw that it is, for the most part, the surrounding practices that lead to increase of digital reading. Even though many of the respondents prefer to do the thorough reading on paper, and making notes by hand, they read a lot on screen as well, because they mostly retrieve the literature digitally. As the article is accessed electronically, the first reading is done on the screen, and many of the researchers find digital storing of the literature to be the most effective organization of it.

The researchers recognize many advantages with using digital text, such as the possibility to search in the text, easy access, and the ease of saving, storing and bringing along vast amounts of literature. However, the physical properties of paper are still highly appreciated by many of them. For the researchers time is an issue, and they do what is most effective, and what requires less effort. Sometimes this entails reading on the screen, other times on paper. There is a duality, and they choose the best of both worlds. Digital reading has different properties and potential, and serve different functions.

Academic reading is often fragmented. The first reading of an article, which is browsing through it, reading pieces here and there, like the abstract, introduction, method and conclusion, to see if it is relevant or not, is done on screen by all of my respondents. This type of reading fits the screen well. Six of the researchers prefer paper for thorough reading of articles, mainly because they think it is easier to make notes by hand, and they remember better what they read when they read on paper. They also said they find it easier to orientate themselves in the text, and remember what was written where when it is read on paper. Some also mentioned that they needed paper to avoid distractions and to get a sense of calm required to concentrate on their reading. Two of the respondents do this continuous reading on the screen as well, whereas another two are comfortable with both.

Reading on screen and, perhaps even more so, making digital annotations, require skills and practice on how to do it efficiently. Four of the researchers I interviewed are comfortable with this, while the possibility to leaf through pages and scribble on physical paper is still very important to the rest of them. For the ones who read much on screens, a tablet such as an iPad or Kindle is essential, as they facilitate e-reading. It seems that if researchers started to use tablets more, they might read more on screen. Another respondent emphasized the need to have a large computer screen to read on.

In my study age and subject discipline is not connected to how positive or negative the respondents are towards screen reading. Material type, on the other hand, is significant. While four of the respondents said they are comfortable with reading most on screen, only two of the ten answered that they prefer e-books to printed books. Important publications are preferably kept on paper, as some of the researchers underlined that they need to have them physically in their bookshelves.

I cannot draw any conclusions on researchers as a whole based on the ten interviews I have performed for this thesis, but I gained a deeper understanding of these researchers' reading practices. Naturally, there were variations among them, but they also shared many of the same opinions on the topic.

The respondents in my study are more open to reading on screen than what is seen in the findings of earlier studies I have read. Most of those studies are done some years ago, so it implies that people get more used to and more positive towards reading on screen. Nevertheless, there are still the same tendencies, with a preference for paper when it comes to longer texts that require concentration. I believe reading in print and on digital devices will co-exist for a long time. As we have seen, even though surrounding reading practices increasingly are done digitally, the physical properties of paper are still highly valued by the majority when it comes to deep reading. The materiality and affordances of paper and of digital devices encourage different use of the different formats.

I wish that the results of this thesis could be used for improving library services. We get statistics on searches and downloads, but these interviews shed light on how the documents are used. For instance, the way the respondents feel about printed books, and in turn e-books, is valuable information. By knowing how the majority of these researchers still value printed books it would be a better service to them to continue to offer printed books, not only purchasing e-books. As there is a wish among several of the respondents to become better at digital reading, it could be a possibility to give more instruction when it comes to exploiting the potential of e-reading. The results also provide many interesting options for further studies.

7.2 Lessons learned and suggestions for future research

Writing this master's thesis has been a valuable learning process for me. I did not have a clear path to follow from day one, but found my way as I went along. If I were to start over again today, I would have gone with the same choice of

method, as I think the semi-structured interviews worked well. As stated earlier, I wish I got more respondents from the natural sciences or technology. In retrospect, I could have taken the time to try harder to recruit researchers from those departments. When analysing the interviews I found it natural to work with pre-selected themes, but perhaps it would have been easier to structure the findings if I had went with an inductive approach, and worked from the specific to broader generalization. Nevertheless, the analysis provided very interesting results, and I enjoyed working with this. I am happy with my choice of theory, however, it took time, and required valuable help from my supervisor, to arrive at it. As the respondents all discussed the materiality of paper and of digital devices, it soon became clear that I should look at the results using that as a concept, aided by the affordance concept, but I had difficulties establishing the rest of the theoretical framework. However, when it was in place, I am very content with it, as I think it proved to be a useful way of looking at the results.

This master's thesis can be the point of departure for some interesting future research, as there is more to explore regarding this topic. The results of my study could preferably be seen in connection with a survey with a larger pool of respondents. With the interviews I have performed, there is valuable information which could be a good starting point for developing questions and answers for a multiple-choice questionnaire, for instance. A survey could be broad, or preferably focus on certain aspects. It would also be interesting to perform interviews with researchers where we could dig even deeper into some elements, for instance precisely how they move in the text.

I would like to know the results if the interviews I have performed were repeated in some years. It will be interesting to see if the preference for paper will last, as several of the researchers I interviewed expressed a wish to become better at screen reading. I am looking forward to reading more research in this area in the future, to see if this trend continues. I am especially curious of studies done after spring 2020. In this period of lockdown due to covid-19, people work from home, and are forced to rely more on digital solutions than ever before, myself included. During this time many have lost the opportunity to print out articles or go to the library to borrow a physical copy of a book. By using screens more, people get more accustomed to it, and, who knows, maybe this lockdown will lead to more digital reading and improved skills. It will be very interesting to see if that has an effect.

8 Summary

The world gets more and more digital, and searching for, accessing, reading, and storing academic literature is increasingly done on digital devices. Still, the majority of my respondents prefer to print out articles found online, from time to time, because of paper's physical properties.

The aim of this thesis was to gain a deeper understanding of researchers' use of academic literature on paper and on screens. When we know more about their reading practices we can improve the library services for them. My research questions were "What are the researchers' academic reading practices? Do the reading practices differ for print and digital formats?" (RQ1), "When do the researchers choose digital formats, and when do they choose print for their academic reading? How does the materiality of the format affect their choices?" (RQ2), and "How are the practices surrounding their academic reading carried out, such as searching for literature and storing it?" (RQ3). The chosen method to answer these questions was semi-structured interviews.

A large portion of the literature on academic e-reading are quantitative studies, so there is a need for more qualitative studies of more recent date. By talking to the researchers it was possible to delve deeper into their reading practices, exploring the whys and hows, by hearing their thoughts and reasoning behind their format choices. There is also a scarcity of studies on researchers' reading in print and on screen, as most of the previous research focus on students' reading. The respondents of my study are ten researchers from different research areas from a university college in Norway, and the interviews were performed in March and April 2019. The theoretical framework used to discuss the results is practice theory, more precisely Reckwitz' (2017) view on how feelings contribute in the shaping of practices. As the respondents all talked about how the materiality and affordances of paper and digital devices affected their preferences and actions, it was natural to use these concepts.

My key findings are that the respondents of my study are more positive to screen reading than what is seen in previous research. Four of the ten prefer digital reading. However, the resource type matters, because only two of ten prefer e-books to printed books. It is not a black and white picture, as the researchers see pros and cons of both formats, and they use both, depending on the situation and what their aim is. Time is an issue for them. They need to be pragmatic and they choose to do what is most efficient to them. The first reading, which is a quick browsing through the text, is always done on screen, because articles are retrieved digitally, but the majority prefer to print out articles when they are to be read thoroughly. This is mainly because they find it easier to make notes on paper, easier to navigate in the text, there are less distractions, it is easier to remember the content, and more convenient to use multiple articles at the same time. The respondents who read much on screens value the accessibility, searchability, and portability. Tablets like iPads and Kindles were important to the ones who read much on screen, so if researchers had used tablets more they would presumably read more on screen.

The surrounding reading practices are often done digitally, while deep reading is preferred to do on paper, by the majority. As the materiality and affordances

of paper and of digital devices encourage different use, use of both formats will most likely co-exist in the years to come. Nevertheless, the respondents in my study were more positive to e-reading than what has been seen in previous studies, and several of the ones who prefer paper expressed a wish to become better at e-reading. This implies that the reading practices of researchers will continue to evolve as screens and digital texts become even more established.

Reference list

Baron, N. S., Calixte, R. M., & Havewala, M. (2017). The persistence of print among university students: An exploratory study. *Telematics and Informatics, 34*(5), 590-604. doi:10.1016/j.tele.2016.11.008

Baron, N. S. (2015). *Words Onscreen : The Fate of Reading in a Digital World*, Oxford University Press, Incorporated, 2015. ProQuest Ebook Central.

Clinton, V. (2019). Reading from paper compared to screens: A systematic review and meta-analysis. *Journal of Research in Reading, 42*(2), 288-325.

Cumaoglu, G., Sacici, E., & Torun, K. (2013). E-Book versus Printed Materials: Preferences of University Students. *Contemporary Educational Technology, 4*(2), 121-135.

Dalen, M. (2013). *Intervju som forskningsmetode – en kvalitativ tilnærming.* (2nd ed.) Oslo: Universitetsforlaget.

Dinkins, D., Kirkland, L. N., Wald, J. P. (2014). An Uneasy but Powerful Alliance: Faculty Use of E-books. *The International Journal of the Book, 11*(3), 11-25. doi:10.18848/1447-9516/CGP/v11i03/37022

Durant, D. M., & Horava, T. (2015). The Future of Reading and Academic Libraries. *portal: Libraries and the Academy, 15*(1), 5-27. doi:10.1353/pla.2015.0013

Faraj, S. & Azad, B. (2013). The Materiality of Technology: An Affordance Perspective. In Paul Leonardi, Bonnie Nardi, Jannis Kallinikos (Eds.), *Materiality and Organizing: Social Interaction in a Technological World* (p. 237-258). Oxford: Oxford University Press.

Farinosi, M., Lim, C., & Roll, J. (2016). Book or screen, pen or keyboard? A cross-cultural sociological analysis of writing and reading habits basing on Germany, Italy and the UK. *Telematics and Informatics, 33*(2), 410–421.

Foasberg, N. M. (2014). Student Reading Practices in Print and Electronic Media. *College & Research Libraries, 75*(5), 705-723. doi:10.5860/crl.75.5.705

Forskningsetiska principer inom humanistisk-samhällsvetenskaplig forskning. (2002). Stockholm: Vetenskapsrådet.

Franze, J., Marriott, K. G., & Wybrow, M. J. (2014). What academics want when reading digitally. In S. Simske, & S. Ronnau (Eds.), *Proceedings of the 2014 ACM Symposium on Document Engineering (DocEng'14)* (pp. 199 - 202). New York NY USA: Association for Computing Machinery (ACM). doi:10.1145/2644866.2644894

Good Research Practice. (2017). Stockholm: Swedish Resource Council.

Halevi, G., Moed, H., & Bar-Ilan, J. (2015). Accessing, Reading and Interacting with Scientific Literature as a Factor of Academic Role. *Publishing Research Quarterly, 31(*2). 102-121. doi:10.1007/s12109-015-9404-9

Hayler, M. (2016). Matter Matters: The Effects of Materiality and the Move from Page to Screen. In G. Griffin, & M. Hayler (Eds.), *Research Methods for Reading Digital Data in the Digital Humanities* (pp. 14-35). Edinburgh: Edinburgh University Press.

Hillesund, T. (2010). Digital reading spaces: How expert readers handle books, the Web and electronic paper. *First Monday*, *15*(4). doi:10.5210/fm.v15i4.2762

Hou, J., Rashid, J., & Lee, K. M. (2017). Cognitive map or medium materiality? Reading on paper and screen. *Computers in Human Behavior, 67,* 84-94. doi:10.1016/j.chb.2016.10.014

Jabr, F. (2013). Why the Brain Prefers Paper. *Scientific American*, *309*(5), 48. doi:10.1038/scientificamerican1113-48

Johnston, N., & Salaz, A. M. (2019). Exploring the Reasons Why University Students Prefer Print over Digital Texts: An Australian Perspective. *Journal of the Australian Library & Information Association, 68*(2), 126-145. doi:10.1080/24750158.2019.1587858

Kvale, S., Brinkmann, S., Anderssen, T., & Rygge, J. (2015). *Det kvalitative forskningsintervju* (3rd ed.). Oslo: Gyldendal akademisk.

Late, E., Tenopir, C., Talja, S., & Christian, L. (2019). Reading practices in scholarly work: from articles and books to blogs. *Journal of Documentation, 75*(3), 478-499. doi:10.1108/JD-11-2018-0178

Leonardi, P. M. (2010). Digital materiality? How artifacts without matter, matter. *First Monday, 15*(6-7). doi:10.5210/fm.v15i6.3036

Lincoln, T. D. (2013). Reading and E-reading for Academic work: Patterns and Preferences in Theological Studies and Religion. *Theological Librarianship, 6*(2), 34-52.

Liu, Z. (2005). Reading behavior in the digital environment: Changes in reading behavior over the past ten years. *Journal of Documentation*, *61*(6), 700-712. doi:10.1108/00220410510632040

Mangen, A. (2016). What hands may tell us about reading and writing. *Educational Theory*, *66*(4), 457-477. doi:10.1111/edth.12183

Marshall, C. C. (2010). *Reading and writing the electronic book.* San Rafael, Cali: Morgan & Claypool.

Mc Laughlin, T. (2015). *Reading and the body; The physical practice of reading.* New York: Palgrave Macmillan.

Miller, L. N. (2014). Preference for Print or Electronic Book Depends on User's Purpose for Consulting. *Evidence Based Library and Information Practice*, *9*(3), 95–97. doi:10.18438/B8B891

Mizrachi, D., Salaz, A. M., Kurbanoglu, S., & Boustany, J. (2018). Academic reading format preferences and behaviors among university students worldwide: A comparative survey analysis. *PLoS ONE, 13*(5), 1-32. doi:10.1371/journal.pone.0197444

Mizrachi, D. (2015). Undergraduates' Academic Reading Format Preferences and Behaviors. *Journal of Academic Librarianship, 41*(3), 301-311. doi:10.1016/j.acalib.2015.03.009

Nicolini, D. (2012). *Practice theory, work, and organization: An introduction*. Oxford: Oxford University Press.

Nicolini, D. (2017). Is small the only beautiful? Making sense of 'large phenomena' from a practice-based perspective. In A. Hui, T. Schatzki, & E. Shove (Eds.), *The nexus of practices: Connections, constellations, practitioners* (pp. 98-113). London: Routledge.

Norman, D. A. (1999). Affordance, conventions, and design. *Interactions, 6*(3), 38-43. doi:10.1145/301153.301168

Pinto, M., Pouliot, C., & Antonio Cordón-García, J. (2014). E-book reading among Spanish university students. *The Electronic Library, 32*(4), 473-492. doi:10.1108/EL-05-2012-0048

Pálsdóttir, Á. (2019). Advantages and disadvantages of printed and electronic study material: Perspectives of university students. *Information Research, 24*(2).

Ramdarshan Bold, M., & Wagstaff, K. L. (2017). Marginalia in the digital age: Are digital reading devices meeting the needs of today's readers? *Library and Information Science Research, 39*(1), 16-22. doi:10.1016/j.lisr.2017.01.004

Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European Journal of Social Theory, 5*(2), 243–263. doi:10.1177/13684310222225432

Reckwitz, A. (2017). Practices and their affects. In A. Hui, T. Schatzki, & E. Shove (Eds.), *The nexus of practices: Connections, constellations, practitioners* (pp. 114–125). London: Routledge.

Revelle, A., Messner, K., Shrimplin, A., & Hurst, S. (2012). Book Lovers, Technophiles, Pragmatists, and Printers: The Social and Demographic Structure of User Attitudes toward e-Books. *College & Research Libraries, 73*(5), 420-429.

Rose, E. (2011). The Phenomenology of On-Screen Reading: University Students' Lived Experience of Digitised Text. *British Journal of Educational Technology, 42*(3), 515-526. doi:10.1111/j.1467-8535.2009.01043.x

Ross, B., Pechenkina, E., Aeschliman, C., & Chase, A. (2017). Print versus digital texts: Understanding the experimental research and challenging the dichotomies. *Research in Learning Technology, 25*. doi:10.25304/rlt.v25.1976

Schilhab, T. S. S., Balling, G., & Kuzmičová, A. (2018). Decreasing materiality from print to screen reading. *First Monday, 23*(10). doi:10.5210/fm.v23i10.9435

Selwyn, N. (2016). Digital Downsides: Exploring University Students' Negative Engagements with Digital Technology. *Teaching in Higher Education, 21*(8), 1006-1021. doi:10.1080/13562517.2016.1213229

Silverman, D. (2013). *Doing qualitative research*. Los Angeles: Sage.

Singer, L., & Alexander, P. (2017). Reading on Paper and Digitally: What the Past Decades of Empirical Research Reveal. *Review of Educational Research, 87*(6), 1007-1041.

Sukovic, S. (2011), E-Texts in Research Projects in the Humanities. In Woodsworth, A. (Ed.), *Advances in Librarianship*, *vol. 33* (p. 131-202). Bingley: Emerald Group. doi:10.1108/S0065-2830(2011)0000033009

Tenopir, C., Wilson, C. S., Vakkari, P., Talja, S., & King, D. W. (2010). Cross Country Comparison of Scholarly E-Reading Patterns in Australia, Finland, and the United States. *Australian Academic & Research Libraries, 41*(1). 26-41.

Tenopir, C., King, D., Christian, L., & Volentine, R. (2015). Scholarly article seeking, reading, and use: A continuing evolution from print to electronic in the sciences and social sciences. *Learned Publishing, 28*(2), 93-105.

Tracy, D. (2018). Format Shift: Information Behavior and User Experience in the Academic E-book Environment. *Reference & User Services Quarterly, 58*(1), 40-51.

Walsh, G. (2016). Screen and Paper Reading Research – A Literature Review. *Australian Academic & Research Libraries, 47*(3), 160-173. doi:10.1080/00048623.2016.1227661

Wang, S., & Bai, X. (2016). University Students Awareness, Usage and Attitude Towards E-books: Experience from China. *The Journal of Academic Librarianship, 42*(3), 247-258. doi:10.1016/j.acalib.2016.01.001

Wiberg, N., & Myrberg, C. (2015). Screen vs. paper: what is the difference for reading and learning? *Insights, 28*(2), 49-54. doi:10.1629/uksg.236

Wildemuth, B. M. (2017). *Applications of Social Research Methods to Questions in Information and Library Science* (2nd ed.) Santa Barbara, Cali: Libraries Unlimited.

Appendix 1 – The e-mail sent out to recruit participants for the study

Hi!
I wish to talk with researchers who publish articles, about your academic reading on screen and on paper. I'm studying for a master's degree in digital library and information services at Högskolan i Borås, in addition to working here as a senior librarian at HiØ. My master's thesis has the working title "Researchers' use of print and digital format in academic reading", and my research questions are:

RQ1: How do researchers describe their habits of reading in print and digital format for academic purposes?
RQ2: When do researchers choose digital formats, and when do they choose print? What is the reasoning behind their choices?

I'm interested in finding out how those of you who write research articles, book chapters, and dissertations read on screen and on paper. My method is semi-structured interviews, and the interview can be performed either in Norwegian or in English. Based on the pilot interview I will assume that the conversation will take about half an hour, and the information will, of course, be treated confidentially.

If you want to participate it will make me very happy and grateful. Contact me for more information, or to suggest a time for the interview.

All the best,
Siri Anne Pihlstrøm

Senior Librarian
The Library – Halden
Østfold University College

[My contact information]

Appendix 2 – Interview guide

Present myself and my research questions. Working title: ”Researchers' use of print and digital format in academic reading”. Underline that the focus is on academic reading. Explain that this is used for a master thesis at the University of Borås. The respondent reads through and signs the consent form, where it is also stated that he or she may choose to withdraw from participating at any time. Inform the respondent that I will record the interview, but all the information will be stored properly and treated with confidentiality.

Introduction – presentation

What is your field of study?	
How old are you?	

The researcher’s habits

	Supplementary questions
How do you find literature for your research?	Do you use the library resources?
What do you do when you find an interesting journal article or e-book?	
Do you print out journal articles?	When do you choose to do so?
Do you print out chapters of e-books?	
Have you ever tried to locate a physical copy of an e-book you found interesting?	Why?
How do you store the literature you are using for your research?	

The researcher’s reading

Where do you read?	
When you read on a screen, do you read on a computer or do you have an e-reading device?	If computer: Do you download journal articles/e-books, or do you read them in the browser?

How do you read? From beginning to end, or do you jump in the text? When do you do what?	
Is there a difference between how you read on paper compared to on a screen?	Please give examples.
How do you make notes while you read?	

The researcher's opinions

What are, in your opinion, the pros and cons of e-reading?	
And the pros and cons of reading on paper?	
What do you prefer?	Why? Different use of different formats?

Thank you for your participation.

Appendix 3 – Consent form

HÖGSKOLAN I BORÅS
The Swedish School of Library and information Science

2019-03-08

Consent for the collection and processing of personal data

For my master thesis at the University of Borås I am conducting a study with the purpose of investigating researchers' use of print and digital format in academic reading.

I who am conducting the study would like you to tell me about your experiences of reading in print and digital format for academic purposes, and what affects your choice when choosing between reading/working with printed and digital format. The only personal information I will be asking for is which department you belong to, thus your field of study, and your age. I will record the interview using a digital voice recorder.

The personal data will be used to see if there is a correlation between field of study or age and use of electronic documents, and the interviews will be transcribed.

The University of Borås is the controller of the processing, and the legal basis for the processing is article 6.1 (a) in the General Data Protection Regulation, GDPR, (consent).

The personal data will be used by me and may be made available to the teachers of the current course and central administrators at the university. The data may also be public documents, which means that anyone as a general rule may access it in accordance with the principle of free access to public records.

The personal data will be stored in the EU/EEA, or countries outside the EU/EEA that the EU Commission has determined to have an adequate level of protection, i.e. sufficiently high according to the GDPR. The data will be erased when it is no longer necessary.

The results of the study will be presented in anonymised form, so that no data can be traced to you.

Your participation in this study is completely voluntary. If you consent to the processing of your personal data as described above, you may withdraw your consent at any time whereby we will stop using your personal data. Because of legal requirements we may however be prevented from immediately erasing your personal data.

I hereby consent that University of Borås may collect and process my personal data as described above.

_____
Signature

_____
Name in block letters

_____
Place and date

Legal guardians' signature (if the participant in the study is under 18 years old)

_____	_____
Signature	Signature
_____	_____
Name in block letters	Name in block letters
_____	_____
Place and date	Place and date

To be filled in by the responsible teacher or supervisor

Student's name

Course and semester

Course responsible (name, department)

Privacy Notice

Your privacy is important to us at the University of Borås. We are committed to protect your personal data and only process it according to applicable laws and regulations, including the General Data Protection Regulation (GDPR).

The University of Borås is the controller of the university's processing of personal data. If you have any questions about how we process your personal data, you are welcome to read more about this on our website, http://www.hb.se/privacy, or contact the course responsible.

Your rights

- The university is transparent with how we process your personal data. If you want to know what personal data we process about you, you can request a copy of the personal data and information about the processing free of charge once per year. To order a copy of your personal data and information about the processing, you can use the form for this that is available on our website, http://www.hb.se/dataskydd.

- If you have consented to a certain processing of your personal data, you may withdraw your consent at any time. We will then not continue to process your personal data. This does not however usually affect information that has already been made public. Because of legal requirements we may also be prevented from immediately erasing your personal data.

- You are entitled not to be subject to automated decision making, including profiling, i.e. decisions taken technically without human intervention. The university does not make such decisions.

- You have a right, under certain circumstances, to receive your personal data in a structured, commonly used and machine-readable format to transmit those data to another controller.

- You are entitled to have your personal data changed or supplemented if they prove to be incorrect or incomplete.

- You have a right, under certain circumstances, to have the processing of your personal data restricted or terminated.

- You have a right, under certain circumstances, to have your personal data erased.

- You have a right to lodge a complaint with the supervisory authority, the Swedish Data Inspection Authority (Datainspektionen)

Contact us

Controller
Högskolan i Borås/University of Borås
501 90 BORÅS
Sweden
Tel. +46 33-435 40 00
Email: registrator@hb.se
Org.nr: 202100-3138

Data Protection Officer

Åsa Dryselius
Email: asa.dryselius@hb.se