’IT MAKES THINGS UP LIKE CRAZY’

Swedish school librarians’ perceptions on ChatGPT

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Title

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Abstract

The aim of my thesis is to provide research-based insight into AI technologies for information seeking’s place in future school library operations. To achieve this aim, I am looking at Swedish school librarians’ perceptions and views on AI technologies for information seeking, especially in connection with their work on media and information literacy. My research questions are as follows: (Q1) How do school librarians perceive AI technologies for information seeking in relation to their perception of current search technologies? (Q2) What AI specific literacies do school librarians see need to be developed and fitted into future media and information literacy education? I used the qualitative method of semi-structured interviews to gather the empirical material for this study. The theoretical concepts applied to the analysis were Haider’s and Sundin’s *infrastructural meaning-making* and Taina Bucher’s *algorithmic imaginary*. Some of the interviewees saw the possibility to search in a conversation-like way as something positive in comparison to current search technologies. In contrast, knowing how to formulate one or a set of questions was identified as a future skill in order to effectively converse with an AI chatbot. Most participants also saw ChatGPT as an unreliable source for information, and current search technologies where links and sources are presented to the user are seen as the superior. The participants largely agree that the introduction of AI technology will not have any serious impact on the way they instruct on media and information literacy. Different strategies which align with the concept of infrastructural meaning-making, such as comparing search results, discussing the technical side to search, and making search visible, will be equally applicable to instruction on AI. Some participants see that AI technologies for information seeking could worsen already existing issues with current search technologies, such as an increase in the spread of misinformation and increasingly complex technologies being hidden behind a façade of an easy-to-use search service, making instruction on media and information literacy even more important.

Keywords

School library; school librarians; ChatGPT; AI technologies for information seeking; natural language AI; media and information literacy; infrastructural meaning-making; algorithmic imaginary

Table of contents

1. Introduction 4
1.1 Research aims and questions 5
1.2 Limitations of the study 6
1.3 Key concepts 6
1.3.1 Media and information literacy 7
1.3.2 School libraries in a Swedish context 8
1.3.3 Artificial Intelligence 9
1.4 Disposition 11
2. Literature Review 12
2.1 Search engines 12
2.2 Artificial intelligence and librarians 14
2.3 ChatGPT 17
3. Theoretical perspective 20
3.1 Infrastructural meaning-making 20
3.2 Algorithmic imaginary 23
4. Method 25
4.1 Choice of method 25
4.2 Selection of interviewees 26
4.3 Implementation 27
4.3.1 Analysis 28
4.4 Ethical considerations 30
5. Analysis and discussion 32
5.1 Views on media and information literacy 32
5.1.1 Search infrastructure 32
5.1.2 Making the invisible visible 34
5.1.3 Trust 36
5.2 Perceptions on ChatGPT and AI 37
5.2.1 ChatGPT and cheating 38
5.2.2 ChatGPT, your friendly neighbourhood robot 41
5.2.3 ChatGPT and searching for information 43
5.2.4 ChatGPT, ethics and the law 48
5.3 Future of media and information literacy 53
6. Conclusion 56
7. Bibliography 61
8. Appendices 69
Appendix 1. Interview guide 69
Appendix 2. Informed Consent 71

1. Introduction

In November 2022 the company OpenAI released their chatbot ChatGPT to be tried out by the public. ChatGPT marvelled its users by its fast respond rate, its capacity to answer complex questions, and how it gave long form and complex answers to simple prompts. Within the first two months 100 million users had signed up (Skopeliti and Milmo 2023). In addition to this, ChatGPT's seeming ability to take on and produce creative work is seen as revolutionary by many. It can write college-level essays, provide a plan for your curriculum, write articles, mimic poetry styles, write computer code and much more. Immediately two camps formed of those who see ChatGPT as a great tool which can help you with routine tasks so that you can focus on more creative outputs, whilst others see it as a great disrupter, especially within the world of academia and journalism. A lesser discussed area in the media is how the development of AI chatbots, like ChatGPT, will affect the way we search for information. This thesis will focus on the potential impact ChatGPT, and other AI technologies like it, can have on search and search infrastructure.

In the last 20 years, how we search for and how we access information has gone through a massive change. First with the development of the internet, but more importantly, with the development of search engines, which aimed to organise the unindexed chaos which was the early internet and make it universally accessible (Google Search 2023). The winner of the search engines arms races of course being Alphabet's Google Search. Google Search has become so intricately connected to our lives that 'just google it' has become common parlance. For many using the internet today means using Google. Plenty of research has been devoted to every aspect of Google Search over the years and how its monopoly on search affects our search behaviour (Haider and Sundin 2019; Halavais 2013; Noble 2018; Vaidhyanathan 2011). With the advent of AI technologies like ChatGPT, how we search for information may change yet again. Microsoft has already launched a new version of their search engine Bing which incorporates ChatGPT. Google has released a promotion video of its own AI chatbot, called Bard, which it also means to incorporate into its search-empire in the near future. It is therefore pertinent to ask now how will the development of AI technologies for information seeking affect the way we search for and evaluate information?

Searching for and evaluation of information and information sources is a central activity in school. ChatGPT's potential effect on education has been much

discussed in the media, but the focus has mainly been directed towards the possibility of pupils using the tool for cheating (Bengtsson 2022; Johnson 2023; Klein 2023). How ChatGPT, and other services like it, will affect pupils' information seeking behaviour and what effects this will have on media and information literacy (MIL) instruction are two issues which have been largely ignored by the media. Swedish school librarians are already actively working with instruction on how to search for and evaluate sources. They have great knowledge of current information infrastructure, before the advent of AI, and as a professional group has had to handle technological developments in this field before. AI technologies for information seeking could potentially have huge effects on media and information literacy instruction, I therefore argue that it is important to gain an understanding on what school librarians' perceptions of AI technologies for information seeking are and what effects they think this could have on their work, especially as it pertains to media and information literacy.

1.1 Research aims and questions

The aim of my thesis is to provide research-based insight into AI technologies for information seeking's place in future school library operations. To achieve this aim, I am looking at Swedish school librarians' perceptions and views on AI technologies for information seeking, especially in connection with their work on media and information literacy. My objective is to explore how Swedish school librarians see this new technology fitting into current instruction on media and information literacy and whether they see any specific literacies connected to AI which will have to be included in the future. Media and information literacy already include several types of literacies connected to "digital tools, information, libraries, and human rights" (Limberg 2021b, author's translation). The question is whether there is any specific knowledge about AI technologies for information seeking that could be considered a specific AI literacy under the umbrella of media and information literacy?

My research questions are as follows:

1. How do school librarians perceive AI technologies for information seeking in relation to their perception of current search technologies?
2. What AI specific literacies, if any, do Swedish school librarians see need to be developed and worked into future media and information literacy instruction?

I will take this more explorative approach as AI development within the field of information seeking is a new phenomenon in terms of the societal impact that is happening now with ChatGPT. There is still much we do not know or understand about AI technologies for information seeking and their potential impact on society. More descriptive research questions can be seen as a first step towards developing further areas of enquiry for future research (Swedberg 2020).

1.2 Limitations of the study

This thesis focuses solely on AI in relation to information seeking, and even more specifically ChatGPT. AI can be and is used for a great number of things and it would be impossible to formulate a study which discusses all the possible ways AI technology could affect the work of school librarians. Limiting the focus to a single type of AI is, therefore, more of an advantage than a limitation. Swedish school librarians' two main focuses are promotion of reading and media and information literacy (Limberg 2021a). I believe that current AI developments, especially ChatGPT, will have the greatest effect on school librarians' work with media and information literacy, and this thesis will therefore focus on this area of their work.

What also needs to be mentioned is the temporality of this project. The phenomenon I am studying is constantly changing. The development of ChatGPT is happening exponentially fast, and a limitation of this study is therefore that it is very much a product of this specific time and place. What is true for ChatGPT today, might not be true tomorrow. We have already seen further development of ChatGPT during the six months period which I have worked on this thesis. Therefore, for this study, I have decided to focus on the version of ChatGPT which was released in November 2022 with the GPT-3 system. At the time of writing GPT-4 has already been released but had not been tried by my informants, bar one who had gained access to Microsoft's updated Bing service which is run on the GPT-4 system.

1.3 Key concepts

In the following section a few key concepts are presented. First, a description and brief history of media and information literacy is presented, including its place in the library sector. Following, the school library's position in a Swedish context is introduced, after which follows a discussion on the definition of AI. Finally, ChatGPT is introduced, including its enter onto the market, what sets ChatGPT apart from previous chatbots, and how ChatGPT itself see its potential effects on search infrastructure.

1.3.1 Media and information literacy

The concept of media and information literacy (MIL) was first introduced in 2011 by UNESCO as an initiative to promote media education in schools, with a focus on developing critical thinking skills and ethical values related to media use and creation (Limberg 2021b). In recent years, media and information literacy has become an increasingly important topic in the international development community, with organisations such as UNESCO, the World Bank, and the European Union investing in media and information literacy programs to promote access to information, critical thinking, and digital literacy in developing countries (European Commission 2022; UNESCO 2023; the World Bank 2023). In Sweden, as well, we can see a greater focus put on media and information literacy education. In 2019, the Swedish Media Council was commissioned by the government to work towards strengthening media and information literacy in the country. Their work is focused on acting as a coordinator for different actors working with media and information literacy on different levels in society (Ku2018/01726/MF).

Media and information literacy includes many different types of literacies, which are all connected to "media, digital tools, information, libraries and human rights" (Limberg 2021b, p. 122). Media and information literacy can be summarised as "the ability to find, analyse, critically review and create information across various media and contexts" (Olsson 2019, p. 177). There are a number of other terms which deal with similar literacies, for example information literacy, media literacy or digital competence. Digital competence is the term used in the Swedish school curriculum (Läroplan för grundskolan, förskoleklassen och fritidshemmet [Lgr 2022], 2022). Limberg points out that many of the literacies which are included in media and information literacy like "the ability to search, find and critically review, and interpret information including analysing and compile facts have for a long time constituted essential features in education" (author's translation Limberg 2021b, p. 124). What has been added are specific literacies that are relevant to current societal and technological developments (Limberg 2021b).

Within the library sector media and information literacy is seen as an essential part of the profession. The International Federation of Library Associations and Institutions, IFLA, published in 2011 a number of recommendations for governments and organisation to support the research of and education on media and information literacy (IFLA 2011). What is more, the Swedish Library Act states that public libraries should work towards an increased understanding of information technologies and how these can be used for knowledge creation and cultural

participation (SFS 2013:801). All of the above-mentioned actors see media and information literacy education as essential for a functioning democratic society. The assumption is that a media and information literate public will inevitably lead to democratic development (Haider and Sundin 2022). It should be noted that this view of media and information literacy education as the upholder of democratic societies has been criticised. Haider and Sundin (2022) suggest a level of scepticism towards the connection between citizens' literacy and democratic progress. They do, however, concede that this reasoning also is strategic as "it justifies spending resources on further education, which is of course a legitimate goal" (Haider and Sundin 2022, p. 54).

1.3.2 School libraries in a Swedish context

The situation for school libraries in Sweden is complex. On one hand, Swedish school libraries are governed by the Swedish Education Act, which stipulates that all pupils should have access to a school library (SFS 2010:800, 2 kap. 36§). At the same time, school libraries are also part of the general library sector, together with public and academic libraries, and are governed by the Swedish Library Act (SFS 2013:801). Limberg (2021a) writes that this duality, belonging to both the educational and cultural sector, has permeated the history of school libraries in Sweden and has led to uncertainties surrounding their governance. Limberg (2021a) states that even though school libraries often have had an elevated status in society this has not been translated into law and the definition of what a school library is and what access looks like remains vague. This has led to huge differences in what type of library service pupils have access to, especially whether the school library is run by educated staff or not. Where a school library does have educated staff, their two focus areas, beyond taking care of the physical library, are reading promotion and media and information literacy (Limberg 2021a).

In recent years, public debate has become increasingly concerned with school libraries. In the current digital landscape where everyone has access to insurmountable amounts of information and a growing fear that children and young people read less, school libraries are seen as part of the solution. A governmental investigation was launched in 2019 which aimed to address these differences in access to school libraries and strengthen the position of school libraries in Swedish schools (SOU 2021:3). The results of the investigation, which were published in January 2021, suggest a more precise legal definition of a school library. It was

suggested that the school library should be placed at the school[1] and that school libraries should be staffed primarily by educated librarians (SOU 2021:3, pp. 29-30). However, due to political turmoil following the fall of the Swedish government after a vote of no confidence the year that the results of the investigation were presented, the investigation and its suggestions for strengthened school libraries have subsequently been put on hold, and the definition of school libraries and their role within Swedish education remains vague.

1.3.3 Artificial Intelligence

The field of modern-day artificial intelligence was founded by American researchers John McCarthy, Marvin Minsky, Herbert Simon and Allen Newell in the 1950s. In 1956 they organised a legendary conference at Dartmouth College which kicked off AI as a field of study (Luger 2021). Since its inception as a field of study, a general agreement on the definition of AI remains to be disputed. Luger, writing on the history of the field, writes that the issue with defining AI lies in the issue of defining intelligence (Luger 2021). Luger also points out that artificial intelligence as a field is still very young and it is therefore entirely appropriate to have difficulties arriving at a general definition (Luger 2021).

Today, the term AI is generally used to describe a range of digital technologies and tools "that enable automated information processing and decision-making that previously required human mental activity" (Vinnova 2018, p. 26). The European Commission defines AI as such:

> Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advance robots, autonomous cars, drones or Internet of Things applications).
>
> *Communication from the commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions (2018). COM 2018/237*

It is also usual to differentiate between general and narrow AI. General AI is "aspiring to match the general intelligence of a human being" (Cox et al. 2019, p. 419). It is the type of AI which would perhaps conjure up images of HAL in Kubrick's *2001: A Space Odyssey* (1968) or the dystopian future in *The Terminator* (1984) where, in both movies, a security or computer program has become sentient

[1] Currently, the law allows for collaboration between schools and the public library. Some schools therefore do not have a school library at the school, rather the public library acts as the school library.

and turns on its human creators. Narrow AI, on the other hand, is an application or program which is ascribed to work on one or a few specific problems (Cox et al. 2019). This is the type of AI which exists today and which this thesis concerns itself with. Narrow AI, as can be discerned in the European Commission's definition, is already incorporated into a range of virtual and physical applications. Open AI's ChatGPT is a type of narrow AI which focuses on natural language processing.

ChatGPT

In November 2022 the non-profit company OpenAI launched its chatbot ChatGPT to be tried out by the public. The success was immediate with over 100 million users within two months (Skopeliti and Milmo 2023). The effect in the media was also palatable. Every news outlet commented on the revolutionising power of ChatGPT to either bring forth a utopian future or a dystopian one (Johnson 2022; Milmo et al. 2023; Naughton 2023). Based on Natural Language Processing (NLP) and using Generative AI means that ChatGPT is able to produce a unique response with human-like text and maintain a conversation creating "realistic natural dialogues" (Tlili et al. 2023, p. 2). However, what really makes ChatGPT stand out in comparison to previous chatbots are mainly data and power (Wu et al. 2023). As suggested by James Bridle (2023) in The Guardian, for the last 20 years the big tech companies have harvested a huge amount of data from our everyday lives and built ever more powerful computers to handle it. The leap forward in AI development we are seeing now is the result (Bridle 2023). Even compared to the previous GPT version, GPT-2, the current ChatGPT is much more advanced in terms of scale. GPT-3 is based on 175 billion parameters compared to GPT-2's 1.5 billion (Tlili et al. 2023, p. 2). Because of this huge dataset ChatGPT is more diverse in the types of tasks it can perform. From a simple prompt it can write complex code, a college level essay, provide educational material and much more.

Some have pointed out the potential for ChatGPT to completely change the way we search, a few even going so far as calling ChatGPT a "Google killer"(Grant and Metz 2022; Mok 2022). Interestingly, ChatGPT does not agree with this statement. When I prompted it to answer the question "some people argue that the development of ChatGPT is a 'Google killer', do you agree?", it answers back that this is not an accurate view. It points out how Google Search and ChatGPT serves different functions as one is a search engine matching keywords to web pages, while the other is a language model which generates responses to natural language queries. It concludes that even though "ChatGPT is a powerful tool that can assist users with language-based tasks, […] it is not a replacement for Google Search or Google's other services" (ChatGPT 2023-01-26). This statement by ChatGPT can

be contrasted with the fact that Google has the ambition of introducing natural language AI into their search engine (Shah and Bender 2022). Also, as previously mentioned, Microsoft has already launched a version of their search engine Bing which includes a chatbot function run on the GPT-4 system. It seems the aim is to replace search engines at least partially with natural language AIs.

1.4 Disposition

The disposition of the thesis is as follows. Following this introductory chapter is a literature review of current search infrastructure focusing on search engines. Also included in the literature review is research on artificial intelligence in relation to librarians and education, and early research into ChatGPT is also presented. Following on from the literature review is a chapter introducing the theoretical concepts used for the analysis. Here Jutta Haider's and Olof Sundin's *infrastructural meaning-making* and Taina Bucher's *algorithmic imaginary* are introduced and discussed in relation to the study. Following, is a presentation and discussion of the chosen method for this study. I used semi-structured interviews to gather the empirical data for this study. The transcripts from the interviews were analysed using grounded theory. A combined section of analysis and discussion of the empirical data is then presented. Finally, there is a concluding chapter which presents the answers to my research questions and any further conclusions drawn from this study.

2. Literature Review

This chapter is divided into three sections, *search engines, artificial intelligence and librarians*, and *ChatGPT*. In the first section on search engines, research on current search infrastructure, with a focus on Google Search, is presented. In the following section, research which looks at librarians' understanding of AI and their views on its impact on the sector is presented. Finally, one study and one academic article looking at ChatGPT's effect on and usage in a school context are discussed.

2.1 Search engines

When thinking about online web search today it is impossible to not think of Google. In the West, Google Search is the most used search engine and has become such an obvious part of our life that the verb "to google" is part of the common vocabulary. A relatively early and important contribution discussing Google's place and effect on society is Siva Vaidhyanathan's *The Googlization of Everything (and why we should worry)* (2011). Vaidhyanathan (2011) describes how Google's different services are increasingly integrated into all parts of society and culture, which affects how people act and think. As the title indicates, Vaidhyanathan (2011) calls this *googlization.* Since Vaidhyanathan's (2011) publication, Google Search has become increasingly integrated into everyday life. This has had a number of consequences a few of which will be highlighted here: trust, invisibility and bias.

Search engines and trust

Several researchers have highlighted the trust we put in Google to provide us with relevant information. Vaidhyanathan (2011) explains that our trust in Google relates to its capacity to provide seemingly relevant information fast and consistently, especially in comparison to its competitors. Haider and Sundin (2019) adds that when using a search engine, we do not only choose to trust the sources provided but we trust that the search engine will provide us with accurate and relevant results. Halavais calls this "an object of faith" (2013, p. 2). Reidsma (2019) adds to Halavais' (2013) statement arguing that there is an assumption because the information appears high up on Google Search the information must have in some way been vetted, and it is therefore trustworthy. Noble (2018) connects this trust to the image that search engines driven by algorithms are inherently neutral actors. Therefore, trust in Google Search functions in two ways; we both trust Google to provide relevant information and we also trust that the information provided can be

seen as trustworthy, and this trust is largely supported by the idea that the algorithms running the service are neutral actors.

This trust which Google has acquired leads to an uncritical acceptance of the systems which forms how the information is gathered and represented to us by Google. Haider and Sundin (2019) argues that we also need to think critically about how we trust in non-human actors and what effects this have on how we search for information. This will be further developed in the chapter *theoretical frameworks.*

Search engines and invisibility

The ease of using Google Search and constant availability due to mobile technologies has "made the activity of searching for information a potentiality in almost any social practice" (Haider and Sundin 2019, p. 79). The fact that we are able to search for information anywhere, at any time and that it is largely accepted to do so makes the practice of searching for information invisible in everyday life. Haider and Sundin (2019) calls this the *mundane-ification* of search; searching for information is so seemingly easy and accessible that one does not think about doing it, it has become part of a routine. The invisibility of search is also connected to the trust we put in search engines as being reliable sources of information, as discussed above. Trust in Google Search and the ease and simplicity of using Google Search for any information need causes Google Search to become invisible, we never really think about that it is there, what it does or how it functions, it simply fades into the background.

However, the transparency of Google Search is more complex, as Cecilia Andersson (2021) show in her study on Swedish teenagers' use of mobile devices and its relationship to search. Andersson (2021) uses the conceptual framework of frame analysis to show how teenagers adapt their use of technology and online tools depending on which role they are performing. Andersson (2021) show that teenagers, on the one hand, have a great awareness of how online search is dependent on the social context. For example, in the role of the "information literate pupil" they perform information literacy in the form which is taught by the school (Andersson 2021, p. 105). At the same time the presence of mobile devices leads to "online search being done without much reflection", they expect to be able to search anywhere and at any time and that a search engine will provide them with answers (Andersson 2021, p. 118). Andersson's research highlights how teenagers both display an awareness of how search and mobile devices fits into a social context, at the same time as the routine of using search engines "allows it to fade into the background" (2021, p. 119).

Search engines and bias

Safiya Noble's book *Algorithms of Oppression* (2018) continues to be influential on how search engines and bias are viewed. Noble (2018) argues that search engines, like Google Search, are not neutral actors, rather they reflect and amplify society's biases and prejudices. Noble (2018) show how Google's algorithms and search results reinforce stereotypes and discrimination against marginalised people, especially people of colour and women. What Noble (2018), and others, see as the most serious problem is that search engines returning these biased and discriminatory results "are frequently perceived as 'objective' and 'normative'" (Shah and Bender 2022, p. 229). This perception is both connected to the view that technology are neutral actors and to the trust placed in search engines being able to provide the best, most relevant results, as discussed above. As Shah and Bender develops, when presented with a list of results mainly containing stereotype-confirming beliefs it is easy to perceive these results as reflective of societal beliefs or as simply presenting the world as it is, and not understanding that a search engine is not an "objective source of disembodied knowledge" (2022, p. 229).

These three aspects of Google Search, the trust we put in the system, the invisibility of both Google Search and search as a practice in everyday life and the biases and stereotypes presented to us by Google Search are believed to be potentially exasperated by the introduction of natural language AI in search engines. Shah and Bender (2022) argue that a chatbot interface with a disembodied voice providing a seemingly 'objective' answer to a question could seem as more trustworthy and authoritative. This could, on one hand, cause someone to not seek any alternative answers to their question, therefore putting a stop to a more explorative search process. On the other hand, Shah and Bender also see a risk of biases and stereotypes being further amplified by natural language AI whilst simultaneously making it harder for a user to "recognize and refute those biases" (2022, p. 229). The complex technology of AI language models could also cause the system and its workings to become even more transparent. This study provides valuable insight into school librarians working with media and information literacy believe they will tackle these potential consequences of AI in a school context.

2.2 Artificial intelligence and librarians

Libraries have traditionally been key actors in making new and emerging technologies accessible to their communities. Many researchers see librarians as key to educating the public on AI (Ridley and Pawlick-Potts 2021; Finley 2019). However, several studies have highlighted a lack of understanding among librarians

of the impact AI development can have on society and on the profession itself. Wood and Evans (2018) in their study laments that AI is a topic which is seemingly discussed everywhere but in the library literature. Wood and Evans state that "for a profession that has done more than its share of coping with disruptive technologies over the years, we librarians are not in any meaningful way discussing AI as compared to those in other professions" (2018, p. 4). Wood's and Evans' (2018) survey focus on academic librarians in North America and their perceptions of AI, and their results show that few librarians thought it would have any major impact on the profession in the near future. This, Wood and Evans (2018) point out, goes against what experts in the field are predicting about the development and spread of AI in society. However, Wood and Evans (2018) defined AI as an IBM Watson supercomputer. This limited definition of AI may have affected how the librarians responded.

Arlitsch and Newell (2017), like Wood and Evans (2018), point to how little AI features in LIS literature, and they see this as alarming. They state that "libraries were slow to adapt to the first wave of Internet technologies" and urge the LIS field to recognise the huge effects AI will have on society, including their own profession (Arlitsch and Newell 2017, p. 796). Arlitsch and Newell (2017) are mainly concerned with the substantial job loss AI is predicted to cause within all sectors of society and do not discuss what effects AI could have on our current information landscape or search infrastructure. A later study, also focusing academic librarians in North America, saw a slight increase in the awareness of AI and the potential effects it could have on the library sector (Hervieux and Wheatley 2021). This study also highlight the high number of librarians who believed they did not interact with AI in their everyday lives (Hervieux and Wheatley 2021). Hervieux and Wheatly pointedly states, "given that AI is nearly inescapable in today's digital society, the number of librarians that indicated a personal use of AI should have been near 100%" (2021, p. 6). However, they also admitted that knowing if a product uses AI can be difficult for anyone to know as not every "application is transparent about its use of AI within its component" (Hervieux and Wheatley 2021, p. 7). What is more, Hervieux and Wheatly did not provide a definition of AI for their survey motivating their choice with the aim of the study being to "measure librarians' understanding of the concept" (2021, p. 8).

Interestingly, a study of Nigerian academic librarians from 2022 showed a high awareness of the use of AI in academic libraries in advanced countries and they believed it to be important for Nigerian academic libraries to incorporate the

technology as well (Ajani et al. 2022). What is more, a qualitative study by Cox et al. (2019) interviewed not just librarians in the UK but also other key stakeholders in the sector. Here the results show a greater awareness of the huge impact AI is predicted to have on all parts of society within the coming years.

A majority of the studies presented above focus on the academic library and they all use a variety of definitions of AI. None of the studies mentioned here focus explicitly on AI technologies for information seeking, however, several of the respondents in these studies mentioned information seeking or search as an area which will be impacted by AI. Especially in the study by Cox et al. respondents posited that AI recommendation systems could develop so that searching becomes unnecessary as the system would "anticipate your needs" (2019, p. 423). They also thought that the development of AI could lead to a diversification in how people search (Cox et al. 2019).

Even though Swedish libraries are tasked with the promotion of knowledge of how information technologies can be used for information seeking, learning and participation in cultural activities, very little has been written about how Swedish librarians are working with emerging AI technologies to fulfil this goal. One recent study by Haffenden et al. (2022) also declared the general lack of LIS research on AI technologies. For their study Haffenden et al. (2022) developed a Swedish version of Google's natural language model BERT by training it on material from the Swedish National Library's collection. They conclude that there are several benefits for libraries to take an active part in the development of AI technologies (Haffenden et al. 2022). Haffenden et al. (2022) study differ vastly from my own, but both studies aim to provide insight into AI development in relation to Swedish libraries, which is currently lacking.

In a school context, various AI technologies will most likely be integrated into education in the near future as several influential actors advocates for it. The OECD, EU and UNESCO all advocates for the integration of AI in schools in order to improve it (UNESCO 2019; Vincent-Lancrin and van der Vlies 2020; European Commission 2020). For his master's thesis, Thomas Norehall (2022) compiled the emergent trends of AI integration in schools based on conference articles produced at AIED 2021 and LAK21. In his literature review he concludes that the main focus of AI development in schools is on pupils. From the conferences, AI is portrayed as being able to support pupil learning through monitoring, support, and motivation. According to Norehall (2022) a majority of the papers presented during the

conferences focus on AI taking on different aspects of the teacher role. In the summary provided by Norehall (2022) of these two conferences nothing is mentioned of school libraries or school librarians' role in relation to the incorporation of AI in schools. Neither was there any mention of how AI would affect how pupils search for information or on AI's effect on information infrastructure. This is also reflective of research in general as I have been unable to find any research specifically looking at these two topics. This thesis therefore fills an important gap in this research field.

2.3 ChatGPT

Understandably, few academic articles have yet been written about ChatGPT. One study and one academic article that have been published, Tlili et al. (2023) and García-Peñalvo (2023), both focus on ChatGPT's effect on education. As these overlaps with the interests of this thesis, both will be presented and discussed here. Especially the study by Tlili et al. (2023) presents several areas of concern when it comes to ChatGPT in an educational setting.

Tlili et al. (2023) presents a comprehensive early study of the perception of using ChatGPT in education. Their study takes on more of a teacher perspective when it comes to the introduction of ChatGPT in schools. Tlili et al. (2023) have used three different methods to gain an understanding of how ChatGPT could be introduced in an educational setting and the potential pitfalls of the technology. First, a social network analysis of tweets to understand public discourse on the use of ChatGPT in education. Secondly, interviews with stakeholders, and finally, they analysed three educators' user experience of ChatGPT. Their study provides quite a mixed response to the usage of ChatGPT within education. In general, the result from the twitter analysis, interviews and user experience were positive. Several areas were highlighted where ChatGPT would be a positive addition in an educational setting, both for pupils and teachers. Mainly ChatGPT's ability to generate texts on a variety of topics in an easy to understand language for pupils and educational material for teachers were both lifted as potentially positive outcomes (Tlili et al. 2023). However, several issues were also raised.

The perceived usefulness of ChatGPT was hindered by the unreliability of the responses and limited information range. The version of ChatGPT tried in Tlili et al. (2023) study only contains data up to the end of 2021 (which is the same for the participants in trying out ChatGPT in this study). ChatGPT is also prone to give false responses or 'hallucinate', provide a plausible sounding but completely made

up response to a query it does not know the answer to (Tlili et al. 2023). It is important to remember that natural language AIs are not "performing natural language understanding", meaning ChatGPT does not understand the question asked, it simply tries to answer it based on probability (Bender et al. 2021, p. 610). This of course becomes an issue when using the application for information seeking as one can never be sure of the validity of the response. García-Peñalvo (2023) argues that cross-checking results with other sources is an essential digital literacy skill. The issue of not comparing sources is not limited to ChatGPT but also for results generated by a search engine or information presented on social media. A respondent in Tlili et al. (2023) study also urges for a focus on critical thinking when using ChatGPT in a research setting. Another issue, in connection to this, is that ChatGPT, in its current form, cannot provide the information sources which informs its answer. This is both an issue with concerns to being able to verify the answer and results in the loss of authorship attribution as well. García-Peñalvo argues that this leads to a "deterioration of the principles of open knowledge in terms of proper attribution" (2023, p. 4).

ChatGPT's ability to produce large quantities of original text from a simple prompt, has also led to concerns about pupils' ability to cheat using the technology. Especially text assignments have been talked of as becoming redundant. Tlili et al. (2023) also mentions this, but what they see as the more important issue is that services sold as being able to detect the usage of an AI are easy to fool. García-Peñalvo (2023) writes that the fear of pupils using technology to cheat is nothing new. He argues that "whenever the assessment of knowledge or competencies mediated by technology arises, doubts about authentic learning by those who undertake the task appear" (García-Peñalvo 2023, p. 3). García-Peñalvo (2023) further argues that the fear that text assignments have now become obsolete is a non-issue, as these types of tasks already became obsolete with the advent of information becoming freely available online to copy and paste without critically engaging with the material or proper attribution to the original source. He argues "the problem is the same that is currently present with this kind of tasks, changing ChatGPT for other resources, for example, Wikipedia" (García-Peñalvo, 2023, p. 3). Both Tlili et al. (2023) and García-Peñalvo (2023) see that skills required for a text assignment could come to be replaced by new skills such as prompt engineering, which could be defined as an understanding of how to interact with natural language AI or how to ask the right question in order to get a satisfying answer.

Finally, Tlili et al. (2023) raises privacy as an ethical issue. They point out that a user could unconsciously reveal private information about themselves through repeated interactions with ChatGPT (Tlili et al. 2023). Interestingly, neither Tlili et al. (2023) nor García-Peñalvo (2023) raise the issue of bias. As mentioned in the section *search engines and bias,* it has been shown that there are built in biases in current search technologies and when presented with these they can seem as confirming stereotypical views or being a reflection of societal beliefs (Shah and Bender 2022; Noble 2018). Shah and Bender (2022) worry that this problem could be exasperated with the introduction of natural language models in search technologies. They argue that even though current search technologies are not perfect, the nature of the result list do provide the opportunity to ask critical questions like "where do these comes from? What else is in the corpus but not returned?" (Shah and Bender 2022, p. 229). In comparison, a natural language based chatbot provides a single answer, which does not reveal that the result is synthesised from multiple sources and comes from a seemingly objective disembodied voice with access to "all the world's knowledge" (Shah and Bender 2022, p. 229).

Even though both García-Peñalvo (2023) and Tlili et al. (2023) focus on ChatGPT in a school context neither article mention school librarians, despite school librarians being information specialists tasked with educating on information sources and critical thinking. Once again, this thesis fills an important gap in the research.

3. Theoretical perspective

In this section I will discuss the theoretical concepts applied to the empirical data of this study. First, Jutta Haider's and Olof Sundin's concept of *infrastructural meaning-making* is presented. This is a concept which Haider and Sundin developed from infrastructure theory, which will also be briefly introduced in this section. Following on from this, Taina Bucher's concept of the *algorithmic imaginary* is introduced. Both concepts will also be discussed in relation to how they are applied in this study.

3.1 Infrastructural meaning-making

In their book *Invisible Search and Online Search Engines* (2019) Jutta Haider and Olof Sundin argue for the development of media and information literacy education in schools. Haider and Sundin argue that we need to broaden our view of media and information literacy from only pertaining to a critical evaluation of information and information sources, to also include "an understanding of the various paths we use to get the information we get" (2019, p. 110). Their research show that how we search for information and the consideration of how search results are presented to us, is essentially absent from media and information literacy today. They suggest the concept of *infrastructural meaning-making* to make visible the infrastructures of search which shapes the way we source and get information and how they, therefore, inherently shapes knowledge creation. Haider's and Sundin's (2019) focus are on search engines, but it can be broadened to any way in which we search for information online, whether through social media or, as is the case for this study, an AI chatbot. Understanding how the infrastructure of these platforms or services shape how you search and what you see is crucial to understand how meaning is made.

Haider and Sundin (2019) developed the concept of infrastructural meaning-making from infrastructure theory. At first glance, infrastructure as a term may seem straightforward. For many the word will conjure up images of roads, cables, railroad, phonelines and the like, but infrastructure can also refer to systems which gathers and organises information, like a library catalogue or the Internet, so called information infrastructures (Star and Bowker 2010). Key researchers within the field of information infrastructure studies, Karen Ruhleder and Susan Leigh Star argues that infrastructure should not be seen as something stable but rather

relational, the daily work of one person becomes the infrastructure for another (Star and Ruhleder 1996). This relational aspect of infrastructure is of relevance as one could say that search infrastructure is the daily work of school librarians but is something which fades into the background for their pupils. Further, Star and Ruhleder (1996) also see infrastructure as situational and embedded in use. The study of infrastructure exists within a variety of academic fields but significant development of the conceptual apparatus of infrastructure was done in tandem with looking at digital technology and "how we deal with information" (Haider and Sundin 2019, p. 54).

Star and Ruhleder (1996) developed eight defining characteristics of infrastructure, only two of which are of relevance for this study.[2] One inherent characteristic of infrastructure is transparency (Star and Ruhleder 1996). Infrastructure is something which fades into the background and often becomes invisible. As made evident in the section on *search engines and invisibility*, the constant availability of Google Search and its ease of use has made search as a practice invisible. It has also made the infrastructures which enable search largely invisible in everyday life. Another key characteristic of infrastructure is that it becomes visible upon breakdown (Star and Ruhleder 1996). Star and Ruhleder (1996) states that infrastructures such as bridges or telephone lines become suddenly visible when they do not function. As the transparency of infrastructure makes it inherently difficult to study, breakdown then becomes one entry point for researchers to study infrastructure. Haider and Sundin (2019) argues that in relation to search infrastructure we also need to consider breakdown beyond the purely technical. Search engines can of course breakdown in the technical sense, and this does happen, but these instances are rare and far between. Instead, Haider and Sundin consider the aspects of infrastructure which is "situated, relational and emergent in use" meaning that breakdown also can occur "in relation to practices and situations" (2019, pp. 56-57). In this sense breakdown often happens on a personal level. For example, this could be related to practices as in Andersson's (2021) study where pupils are aware that using Wikipedia as an information source for a school task is frowned upon. Another example is Noble's (2018) experiences of encountering racists and sexists search results on Google. Personal experiences like these reveals something of search infrastructures and their functions.

[2] For a complete list of all eight characteristics of infrastructure see Star, S. L. and Ruhleder, K. (1996), 'Steps towards an ecology of infrastructure: design and access for large information spaces, *Information Systems Research*, 7(11): 111-134

Moreover, infrastructural meaning-making highlights how search infrastructure is sociotechnical in the sense that search is always an exchange between human and the technical.[3] We adapt to the technology we use, for example Noble (2018) argues that the single search box on Google Search encourages us to fit our question within the confines of that box. On the other hand, by using the platform we provide it with data which the algorithm learns and adapts from, creating a feedback loop. By applying infrastructural meaning-making therefore also leads to an introspection of our own behaviour in relation to search infrastructures. For example, how one shapes a question when using Google Search affects the answers you get. Formulating a question like "coffee *is* cancerous" versus "coffee is *not* cancerous" will supply different results, often confirming what you already believe to be the answer. This shows an advanced use of search infrastructure on behalf of the user (Haider and Sundin 2021). Haider and Sundin argues that the gaze must also be turned inward to ask ourselves, when using these platforms, "what we do, how we search" (Haider and Sundin 2021, p. 110). However, Haider and Sundin (2019b) cautions against self-reflection in the sense of focusing on the isolated self. Rather we need to reflect "on the self as part of a culture or community of shared norms and values" (Haider and Sundin 2019b, p. 110). What is more, Haider and Sundin also want to highlight "how knowledge is dependent upon trust also in nonhuman actors" (Haider and Sundin, 2019, pp. 117–18). As discussed in the section on *search engines and trust* several scholars' research show how we in general trust search engines to provide us with relevant information (Halavais 2013; Noble 2018; Reidsma 2019; Vaidhyanathan 2011). We trust that what is presented at the top of the search page is the most authoritative source, without questioning what about that particular source has led to it being presented as the top result. Infrastructural meaning-making is then applied to also investigate and reflect upon how we trust (Haider and Sundin 2019b).

I will use infrastructural meaning-making as a lens through which I view my gathered material. It allows me to investigate how the participants interact with search infrastructure and whether they view search infrastructure as meaning-making. This both in relation to how they perform media and information literacy now and how they see this being affected by AI in the near future.

[3] Haider and Sundin subscribes to a sociomaterial tradition.

3.2 Algorithmic imaginary

In conversations with users of various social platforms, such as Facebook, Twitter, and Instagram, Taina Bucher reveals that even though users claimed to know nothing about how algorithms work, they still had "more or less elaborate theories about what algorithms are and ought to be" (2018, p. 115) Bucher calls this the *algorithmic imaginary*, "ways of thinking what algorithms are, what they should be, how they function, and what these imaginations, in turn, make possible" (Bucher 2018, p. 114). Bucher (2018) focuses on personal experiences of an algorithm becoming known and how these experiences then have an effect on how we interact with the algorithm. For example, one of Bucher's (2018) informants told of how for her community page on Facebook she had different strategies when posting to get the greatest traction for a post. These could be posting at a specific time and day of the week, including several pictures in the post, using specific words, etcetera. These strategies were developed from noticing how certain posts seem to gain a lot of traction, whilst others did not and trying to figure out why. These stories both reveal how algorithms can make themselves visible or known in everyday life, but they also highlight how algorithms affects us and how we in turn affect the algorithm.

The concept is developed from theories on affect, specifically Bucher focuses on "the ways in which algorithms have the capacity to affect and be affected" (2018, p. 94). Algorithms have the power to shape our behaviour online. In her book, Bucher (2018) discusses algorithmic power from several different angels. With the concept of the algorithmic imaginary, she argues that algorithmic power does not solely lie in the technical workings of the algorithm. Bucher (2018) highlights that how people perceive the algorithm to work affects their behaviour towards it, which in turn influences how the algorithm process data or inputs in the future, creating a feedback loop. Therefore the social power of algorithms, Bucher argues, "stems from the recursive relations between people and algorithms" (2018, p. 116). The feedback loop of these systems makes it so that strategies, like those employed by Bucher's informant for her Facebook community page, is both created as a response to the algorithm and then in turn has an effect on the future workings of the same algorithm. This is in alignment with how infrastructural meaning-making also makes one consider one's own behaviour in relation to search infrastructures.

For this study I will draw on the concept of the algorithmic imaginary to also include school librarians' perceptions of AI. Bucher (2018) focuses specifically on machine learning algorithms. Unlike a deterministic algorithm which will always

produce the same output given a particular input, a machine learning algorithm will "learn to predict outputs based on previous examples of relationships between input data and outputs" (Bucher 2018, p. 24). Machine learning algorithms are in this sense not so different from AI as both systems are reactive to how the system is used. What is more, AIs are often built upon algorithms, and sometimes it can be hard for the general public to distinguish between what is an AI and what is an algorithm. I argue, therefore, that a development of Bucher's concept to be an 'AI imaginary' is possible. For this study, whether in discussion of algorithms or AI, I will keep using the original term *algorithmic imaginary*.

The term algorithmic imaginary may suggest that the relation is illusory, however Bucher (2018) argues that this is certainly not the case. She states, "the sites and situations through which people encounter and experience algorithms arguably shape ways of thinking, talking and feeling about them" (Bucher 2018, p. 116). Haider and Sundin (2021), in discussion of Bucher's concept, develops that the algorithmic imaginary puts focus on the stories people tell themselves and others about algorithms. These stories are ways for people to communicate their experiences of algorithms and AI, when they may lack the technical vocabulary to do so. The algorithmic imaginary therefore allows me to move away from looking at school librarians' understanding of AI or algorithms as 'right' or 'wrong', as some previous research has. Instead, their stories of their interactions with ChatGPT or other AI technology, becomes the focus for the analysis. For Bucher (2018), the algorithmic imaginary highlights the different ways algorithms influence our online behaviour. For my study the focus is on how school librarians' understanding of AI technologies for information seeking affects their instruction on media and information literacy.

4. Method

In the following section the method used for this study, semi-structured interviews, will be presented. Why I chose semi-structured interviews, and the strengths and limitations of this method will be discussed. I will also present the selection process and how I gathered, coded, and analysed the material. The method used for analysing the empirical data is grounded theory. Finally, a section on any ethical considerations which are relevant for my study concludes this chapter.

4.1 Choice of method

For my research I chose the qualitative method of semi-structured interviews. Interviews allows for the gathering of knowledge and information about individual persons' experiences and feelings about a situation or phenomena (Ahrne and Svensson 2011). This is of value to my research as I'm interested in school librarians' personal experiences of media and information literacy instruction and ChatGPT. Their individual thoughts and experiences on these two topics are very much in focus here, which lends the interview as the best method for gathering the empirical data. Using a qualitative method also allows for a more in-depth exploration of school librarians perceptions on AI. As presented in the literature review under the section *artificial intelligence and librarians*, most studies referenced used quantitative methods, which can allow for greater generalisability, but they provide limited insight into why the participants answered the way they did. In an interview there is further opportunity to gain an understanding of the underlying reasons for a participants' perception or views on a certain phenomenon.

Interviews can be performed in many ways. Both trough a closed structure, wherein one follows a set of questions for each interviewee, and by having a completely open structure where the interview can be seen more as a conversation between the interviewer and the interviewee. The advantage of a more open structured interview is that one can adapt one's questions and their order to the person and situation at hand (Ahrne and Svensson 2011). Eriksson-Zetterquist and Ahrne (2011) writes that this does not stop one from having some set questions and a general plan in mind when performing the interview. The authors also argue that it is to them unnecessary to define qualitative interviews as unstructured or semi-structured. Despite this, I will be using the term semi-structured interviews for my research as

it is a commonly used term which gives an indication of how the interviews were designed and performed.

For my interviews I made an interview guide wherein I had certain questions that I aimed to have answered. However, the order of the questions and how they were asked changed with each interview. This type of structure also allowed me to ask "unplanned" follow-up questions to the participants which gave me more insight into the issue at hand. The interview guide can be found in the Appendix 1.

There are some limitations to using interviews as a method. First, the interview gives a limited understanding of the phenomenon being studied. One cannot be sure that what the informant say they do is the same as how they act (Ahrne and Svensson 2011). Secondly, the interview and the empirical material it produces is a product of a specific time and place which can never be reproduced. A frequent criticism of interview studies is therefore its lack of generalisability. There is a tradition of viewing scientific knowledge as something that is applicable to every situation, at any time, with any person (Kvale and Brinkmann 2009). However, Kvale and Brinkmann (2009) questions the need to be able to generalise. They argue that a strength of the interview study is that the "personal perspectives of interviewees […] can provide distinctive and receptive understanding of the everyday life world" (Kvale and Brinkmann 2009, p. 171). As I have taken a more exploratory approach to this study, I subscribe to Eriksson-Zetterquist's and Ahrne's (2011) argument that an interview can perhaps not provide all the answers, but it can produce important insights. Generalisability in relation to this study will be further explored in the *conclusion.*

A final limitation to the interview as a method is that the interview situation is not a dialog between equal parties. There is an inherent power imbalance present as the interviewer is the one which enters the conversation with knowledge of the scientific field, decides the questions, and she is also the one who starts and ends the conversation (Kvale and Brinkmann 2009). It is important to keep the hierarchical nature of the interview in mind, and this is further explored in the section *ethical considerations*.

4.2 Selection of interviewees

The interviewees were chosen through the process of snowball selection. My first point of contact was with a librarian I had been recommended to get in contact with. This was a librarian who was knowledgeable on the subject at hand, and they then

referred me on to other school librarians they thought would be appropriate interview subjects. After each interview I asked the informants to refer me on, and through this process I gathered the empirical material. I chose to use this type of selection method as I wished to interview school librarians who have some interest in or previous knowledge of AI. Even though AI may be very present in the media at the moment, most people have very little knowledge of what it is or even notice when they encounter it in their everyday lives. Previous studies have also shown that librarians have limited knowledge of AI (Arlitsch and Newell 2017; Hervieux and Wheatley 2021; Wood and Evans 2018). To be able to gain some insight into school librarians' perception on this phenomenon some previous knowledge or interest in the topic is of value. A random selection of informants was therefore not applicable here. Using snowball selection also saved me time getting into contact with school librarians that fit the profile for the study.

One limitation with snowball sampling is that there is a chance that the interview material will be resemblant, meaning the informants will likely refer me on to people they know and one could therefore assume they share similar experiences and views on AI (Ahrne and Svensson 2011). Another limitation is the difficulty in knowing if the sample of people being interviewed are representative of the larger group (Ahrne and Svensson 2011). These limitations are similar to interview studies as a whole, and as stated previously, the results of this study might not be generalisable but can provide insight into how school librarians who have an active interest in the current development of AI technologies for information seeking will adapt their media and information literacy practices to suit.

4.3 Implementation

In total, seven school librarians were interviewed for the study. They came from a range of schools, with three working at primary and secondary school (ages 6-16), one at a secondary school (ages 13-16) and three working at sixth form college or high school (ages 16-19).[4] The interviews either took place at their place of work or they were conducted over Zoom, using Lund University log in details which allowed for higher security. All the interviews were recorded using either my phone or the recording function on Zoom. The interviews lasted between 45 to 60 minutes. Each interview was then transcribed in its totality shortly after the interview took place. Some amendments have been made to the transcripts, such as removing repetitive words and added commas and punctuation. This was done with the aim

[4] In Sweden primary and secondary school is referred to as *F-9 skola*, secondary school is referred to as *7-9 skola*, and sixth form college or high school is called *gymnasieskola*.

of creating more reader-friendly citations. The interviews were performed in Swedish and only citations which are presented in the analysis below have been translated into English. There is always a risk that meaning will be lost or confused when both translating oral language to written and when translating from one language to another. I have taken care to use English words and phrases which suits the English language, and which makes for readable quotes, but keeps with the sentiments originally expressed in Swedish.

I deemed it important to have informants who had an interest in AI and decided therefore to not consider from what type of school the participants work at. I believe the narrowing down to only consider school librarians from, for example, secondary school would have severely limited my chances of the interviewees then also having any previous knowledge of or interest in AI. How the participants work with media and information literacy and how this is discussed with the pupils is of course age dependent, but what is considered essential knowledge for the pupils to learn remained largely similar for all informants. Therefore, I do not see that the participants coming from a range of schools as a disadvantage for this study. What I found had a greater effect on how they worked with media and information literacy was how integrated they are in the pedagogical work of the school. Some of the participants only saw the pupils regularly once per term or even year, whilst others saw every class of pupils regularly throughout the term. This does create differences in how much they can confer about media and information literacy to the pupils. However, this does not limit their ambitions for instruction on nor what they think the pupils need to be taught in relation to media and information literacy.

The selection method was successful in the sense that all but one informant had already tested and read up on ChatGPT before even being contacted to take part in the study. I therefore only tested ChatGPT with one of the informants. All the other informants actively showed me their chats or sent examples of how ChatGPT had answered certain questions. This display gave me further insights into their perceptions of ChatGPT and how it in some cases developed from being impressed to testing ChatGPTs limits and discovering its downsides.

4.3.1 Analysis

The transcripts were analysed using grounded theory. Grounded theory was developed by Glaser and Strauss in the 1960s. It had a considerable impact on qualitative research performed in a range of disciplines and is an analytical method which is still much in use today (Alvesson and Sköldberg 2017). The central focus

of the method is to generate new theoretical ideas from the data (Gibbs 2018). This is done by looking at the data with an open mind and generate codes which are based on the data, and not apply existing theoretical ideas to the data in the early stages of the analysis (Gibbs 2018). Since its inception grounded theory has evolved. Charmaz and Belgrave (2012, p. 349) see three variations to grounded theory: a constructivist approach, objectivist, and postpositivist. Like Charmaz and Belgrave (2012), I subscribe to the constructivist approach. Constructivist grounded theory recognise that meaning do not solely emerge from the data, but is also affected by "our social, epistemological, and research locations. Thus, our standpoints, starting points, and end points influence our data analyses" (Charmaz and Belgrave 2012, p. 349). An objectivist approach to grounded theory "avoid being influenced by existing theoretical assumptions", a constructivist approach, in contrast, "assume that researchers already possess theoretical and research knowledge concerning their substantive field" (Charmaz and Belgrave 2012, p. 355) and view it as important to reflect on this prior knowledge. Belgrave and Charmaz also see value in applying theoretical concepts to the data if this is done in a way which questions whether the theory "cloud or crystallize their interpretations of data" (2012, p. 355).

The first four interviews were performed within a close time frame of each other, whilst the last three interviews were more spaced out. I therefore started the analytical process after I had transcribed the first four interviews. This initial coding then had an effect on the last three interviews, with some questions being more directed or areas being more actively explored. This is in line with a constructivist grounded theory approach of working back and forth between analysing and gathering data. The codes of the initial four interviews were then compared to the codes from the last three, looking at where the participants agree or contrast in their views. The codes from all seven interviews were then gathered into categories. These categories were then compared again to the empirical data to see that it matched. From this process some categories were also arranged in a hierarchical order. As suggested by Charmaz and Belgrave (2012), throughout the process I asked how my theoretical concepts could clarify the data, or whether it clouded it. I found that infrastructural meaning-making and the algorithmic imaginary allowed me to explain certain behaviour and therefore bring forward the analytical process.

What is more, I used the computer program NVIVO to organise my codes and categories. The program was especially helpful in allowing me easy oversight over my material. The program also allowed me to create and keep track of several layers

of hierarchies. This became essential as the complexity in the participants' perceptions of AI involved layers of themes and perspectives. The program also kept my analysis grounded in the gathered material as I could easily see how many of the participants expressed a certain view, therefore avoiding the mistake of making sweeping statements concerning all participants. Using a coding program, though helpful, means that you are bound to the workings of the program. This means that my way of organising the material might have been affected by how the NVIVO allowed me to organise it. On the other hand, a program cannot think or generate theories for you but, as Charmaz and Belgrave states, "it can help us see what we've been thinking" (2012, p. 357).

In the analysis, a frequent use of citations is the approach. This is used with the purpose of transparency, allowing the reader to make their own interpretations of what was being said. As this study takes a more explorative approach, I also wanted the participants' voices to come forward.

4.4 Ethical considerations

The current ethical principles for research as stipulated by the Swedish Research Council states: "people's wellbeing shall be given precedence over society's and science's needs" (SFS 2003:460, author's translation). This means that a teleological perspective on ethical questions cannot be applied, the individual's rights and wellbeing must be prioritised over any positive results for society or science due to the research (Ahrne and Svensson 2011). This is especially applicable to studies which touch on topics such as race, politics, sexuality, etcetera. This study does not deal with any of these more sensitive subjects.

Ahrne and Svensson (2011) discuss a number of ethical considerations to have in mind when conducting a study. First, informed consent. For this research project the interviewees were informed about the nature of the research project and given the opportunity to decide to participate or not in the study. Each participant was sent a consent agreement a couple of days before the planned interview and asked to confirm that they agree to the terms via e-mail (see Appendix 2). On the day of the interview, I again brought up the nature of informed consent and received oral confirmation from the participants that they understood and agreed to the terms. Second, confidentiality. For a small study like this, anonymisation cannot be guaranteed for the participants. In the consent agreement this was made clear and that the participants instead will be deidentified. For this study deidentification means not disclosing the participants' names or places of work in the final essay. I

will be using fabricated names when referring to any of the individual participants. Confidentiality also concerns the data gathered. The participants were informed that the interviews will be recorded. As mentioned, I used my phone to record some of the interviews. As I deemed storing these recordings on my phone a risk, I promptly moved the audio files to safer storage and deleted the recordings from my phone as soon as possible after the interviews were concluded. The recordings will only be in the possession of the interviewer and will be deleted upon the project's completion.

A final ethical aspect which must be kept in mind during an interview study is power imbalance. A power imbalance can occur in many ways. As previously discussed, the interview is inherently a dialog between two unequal parties. The interviewer sets the terms for the interview and asks all the questions whilst the informant's role is simply to answer the questions. The situation can also be seen as intimidating from the perspective of the interviewee as the interviewer often is a person of higher education and has previous knowledge of the scientific field. What is more, Kvale and Brinkmann (2009) discuss how in an interview a friendly rapport can arise between interviewer and interviewee which leads to the interviewee disclosing feelings or information which they had no intention to disclose. The researcher also holds significant power over how the data is gathered and then interpreted. Kvale and Brinkmann (2009) states that one needs to keep in mind the wellbeing of the individual throughout the research project, and not simply during the interview.

During the interviews I perceived that the power balance between me and the interviewees to be relatively equal. As the informants all have the same educational background as me, the power imbalance which can occur due to higher education was counteracted. I might have been more up to date on the scientific field being discussed but the informants all have practical experience of working with these questions for years, and for some, several decades. All the informants were also my senior which also counterbalanced the inherent power I held as the interviewer.

5. Analysis and discussion

In this chapter an analysis and discussion of the empirical data will be presented. The chapter is divided into three sections. First, the interviewees' experiences of working with media and information literacy within the realms of current search infrastructure is analysed and discussed under the headline *views on media and information literacy*. This is done with the aim of being able to contrast their views on current search infrastructure with the development of AI technologies for information seeking. Following this is a larger section called *perceptions on ChatGPT and AI*. This part is divided into four themes which all deal with different perceptions on ChatGPT that were identified from the empirical data. Finally, the section *future of media and information literacy* concludes this chapter with a discussion on how the incorporation of AI technologies for information seeking will affect media and information literacy instruction in the future.

5.1 Views on media and information literacy

During the interviews the participants were asked to explain how media and information literacy instruction looks like today. This was done with the aim of both gaining an understanding of how MIL instruction could be affected with the onset of AI and of how they view current search infrastructure with the purpose of contrasting this with their experiences of interacting with ChatGPT. The topic of media and information literacy was discussed both in general terms and with references to specific experiences. This topic was much discussed in relation to their pupils, especially in relation to how they view their pupils' knowledge of current search infrastructure. Three main themes emerge here: *search infrastructure*, *invisibility*, and *trust*.

5.1.1 Search infrastructure

All participants discuss, in various ways, Google as a company and how different aspects of this affects search in different ways. One aspect that was brought up by nearly all is the fact that Google is a profit driven company mainly funded by advertisement. This was discussed in relation to why Google's services are for free, as can be seen in this quote,

> Both social media and search engines are commercial actors, many of the pupils don't get that […] But I always try to bring it up that being a commercial actor means they're profit driven, and since you don't pay for it, a lot of the time the cost is your integrity.
>
> *Oscar*

One participant saw a direct connection between Google's advertisement business and how they design their search engine,

> I would argue that it has an effect that Google in the end is an advertisement company, that about 80% of their income comes from ads, it has an effect on how they think about information seeking.
>
> *Henrik*

This is in line with Haider's and Sundin's (2019) concept of infrastructural meaning-making, that also infrastructure shapes how information is created and presented. The same participant also discuss how different motives has an effect on the type of information that is generated and presented on different platforms. He does this by comparing Google to a non-profit organisation like Wikipedia,

> I think it's really important to understand the difference between these companies who must turn a profit and for example Wikipedia. So, I put a lot of effort into getting them (the pupils) to understand how different organisations work.
>
> *Henrik*

Comparing different platforms or services, especially Google and a database, can be seen as an effective way of making the pupils aware of how different search infrastructures function and how it can affect the information provided.

Several of the participants also discuss influencers, and how the influencer economy, like generating more likes or other types of interaction, can affect their behaviour and content creation online,

> Someone shows an "unboxing" video where someone that got, that opened a box of Lego, and he had gotten this sent to him. And then we discussed how this could affect the motive, not a word I use with them, but "what effect can the product being sent to him have on what he says about it?"
>
> *Oscar*

Another participant elaborates on this, saying: "well this influencer […] it's not like they present true or false information, but they have an agenda, and why do they have that?" (Nathalie). Discussing motives rather than true or false information is to engage with questions beyond what one participant calls "old, traditional source criticism" (Anne). Source criticism[5] is a concept which originates from history as a research field. It is a method where one critically examines an information source based on four criteria: authenticity, dependence, time of creation, and bias or tendency (Limberg 2021b). In a school setting these criteria are often translated into questions of who, what, how, when, and why. Limberg (2021b) mention that these

[5] Source criticism is a direct translation of the Swedish word "källkritik". The translation is not perfect but as there is no other translation in English which properly encapsulates the concept of source criticism, this is the chosen translation for this thesis.

questions mostly aim to establish whether a source could be considered true or false. Several of the participants see the classical source criticism criteria as insufficient for the current digital landscape, as can be exemplified by this quote,

> It starts with that we talk about searching for information and that you have to be aware of which sources you go to, and that these old criteria who, why, how, isn't enough anymore, we must also consider why we get the search results we get!
>
> *Anne*

This could be seen as what Haider and Sundin (2019) mean with the concept of infrastructural meaning-making. Traditional source criticism is interested in the source itself, not in how or why you come across that source in the first place, which, as expressed in the quote above, also needs to be considered to gain an understanding of how meaning is made.

For the interviewees taking part in this study, one can argue that they actively engage with infrastructural meaning-making. They are all trying to make the pupils understand how search infrastructure creates meaning and how it shapes the information we get. For some of the participants, they engage with this type of media and information literacy instruction more and with a clearer purpose than others, but from the interviews it became clear that some level of infrastructural meaning-making is present in all of the interviewees' media and information literacy instruction.

5.1.2 Making the invisible visible

During the interviews all participants expressed that they perceive Google to be largely invisible to the pupils. This can be exemplified by this quote,

> They use Google, and often they don't even think that they're using Google, they go to Safari […] and when you write in the search bar at the top it goes automatically to Google. So they don't even think that they're googling, they think they're using Safari to get to their information.
>
> *Irma*

Most also saw this to be an issue with the teachers,

> Even teachers I've heard say "search in Safari" […] because they (pupils and teachers) don't see a difference between these things, it's just some kind of infrastructure to them, like a road, they never really reflect upon it.
>
> *Oscar*

This perception is in line with previous research in the field. Especially Haider's and Sundin's (2019) concept of the mundane-ification of search in everyday life show how Google has merged with the background, becoming largely invisible to most people. Also, Andersson's (2021) study concludes that pupils do not reflect

much over online search as they expect to be able to do it anywhere, at any time and receive an answer. Because the participants perceive Google Search to be invisible to the pupils, they all engage in making Google Search more visible during lectures relating to media and information literacy. They all use different strategies to achieve this. It can be noted that terms like transparency, invisibility and making visible, are terms that were largely used by the interviewees themselves.

Through the process of infrastructural meaning-making (a term not used by the participants) they try to make visible the infrastructure which the pupils take for granted every day. An overarching strategy for all librarians is to discuss issues surrounding how we find and evaluate information in dialog with the pupils. Two librarians use a special technique called "conversation googling". This is a technique where they visualise search by using a projector so that the whole class can search together and see what happens when different strategies are applied,

> I use the term "conversation googling", which really means that we search together. So, the teacher or the librarian have a computer connected to a projector so that everybody can see what's going on, and then we talk about "what do we do when we search?"
>
> *Filip*

> I work a lot with "conversation googling" which is a technique where the librarian or the teacher stands at the front of the room, have the screen thrown up on the wall so that all the children can see it. Then we have a subject which is relevant for what they're working on […] and then they simply get to think about this with me. We come up with search terms […] we connect them in different ways.
>
> *Irma*

By using this technique search becomes more visible in the sense that it is enlarged, it is made visible by being projected onto the wall, it also becomes the focus for the class.

Several of the participants also use the act of comparison as a strategy to make Google Search and how it functions more visible and tangible to the pupils. This is mostly done by comparing the results received on Google Search to a database like NE. One participant, working at a school with access to several different types of databases, actively discusses what type of information the different databases provides as they contain different forms of data. An example she highlighted was when trying to find out common foods eaten in Rwanda by comparing the results of Google Search to the database Landguiden,

> We were going to find out what they eat in Rwanda […] So we googled "what do they eat in Rwanda?" And then I found lifestyle bloggers, that wrote recipes for fancy chicken dishes […] and fancy pictures and the like. Then we went to Landguiden and looked at what they eat in Rwanda, and well they eat corn, corn porridge. Chicken, it's only the rich [who eat that].

Anne

This becomes an active engagement with infrastructural meaning-making, clearly showing that the paths we take to get the information we get informs our knowledge.

A final strategy which was employed by all participants was to discuss media and information literacy in relation to something the pupils are actively working on, as exemplified in the following quotes, "I get the teacher's [lesson] plan and then I tailor make the lessons based on the teacher's [lesson] plan" (Anne).

> Then we can adapt it much more to what's happening in the classroom right now […] And then we have a genuine information need, the pupils are curious […] and we can then use that to discuss MIL-stuff.
>
> *Filip*

This makes the discussion more concrete, and the pupils then also have an active information need which they can explore together.

5.1.3 Trust

An overarching aspect which appears from discussions on search engines and how to make these visible is that the pupils trust in Google Search being able to provide them with an answer to any question. This can be discerned from participants expressing that the pupils will use Google Search for all of their information needs, "because they will Google" (Anne) or "I always try to when they say 'let's Google it' I always try to say 'yes, we can use a search engine, there're several search engines but Google is the most common one so we can use that one" (Filip). What is more, the interviewees also express that many of the pupils have an inherent trust in that what they see online is the truth. Several of the participants simply state in reference to this "they are not very critical" (Oscar). This participant provides a more specific example of how many of the pupils take the information they meet online at face value,

> Last Monday I met a pupil who claimed that Vladimir Putin rides on bears, he said it like it was the truth! […] There was one pupil who claimed that you're not allowed to say mummy anymore because that's offensive to Egyptians.
>
> *Oscar*

This interviewee works at a school with young children, which can perhaps be understood from the above quote, but pupils' lack of critical thinking skills is reflected upon also by participants who work with older pupils, even those in their late teens. One participant working with younger pupils employ more traditional source criticism questions to help young pupils establish a sense of what is a

trustworthy information source, “and then we do the source criticism questions who, what, how, when, and why and together we try to discern ‘could this be a good source?” (Irma). Other participants try to highlight that information or content online is not necessarily true or false, but created with different intentions in mind, as seen in this previously referenced quote, “well this influencer […] it’s not like they present true or false information, but they have an agenda, and why do they have that?” (Nathalie). As mentioned previously, discussing what intentions influencers or online companies can have is one strategy used to engage pupils with thinking critically about the information they meet online and why they are presented with this information.

In conclusion, the interviewees express a coherence in how media and information literacy instruction is performed. They all agree that when it comes to Google Search it is invisible to the pupils. They also lack a technical competence to understand how search works and how to do it effectively. They agree that current criteria concerning traditional source criticism is insufficient when it comes to dealing with the current digital landscape and they all engage with concepts of infrastructural meaning-making to make the pupils aware of how infrastructure shapes information and knowledge.

5.2 Perceptions on ChatGPT and AI

In general, the perception of AI in general and ChatGPT in particular among the interviewees were varied. Both positive and negative aspects were raised on nearly all topics discussed in relation to AI and ChatGPT. For the following discussion, most conversations centred around ChatGPT and how it functioned at the time the participants tried it out. Important aspects of this version of ChatGPT to note are its inability to reference information sources, the training data only contained information up until the end of 2021, and it was not connected to the internet. At times, other AI technologies were discussed, for example AI image generators were mentioned and the updated Bing with GPT-4 system. Sometimes the discussions also led the participants to consider AI technologies for information seeking in general, but overall, the following topics were discussed with mainly ChatGPT in mind.

In line with the concept of the algorithmic imaginary, the interviewees perceptions are not presented as being right or wrong, rather their interactions with ChatGPT and the conclusions they draw from these are viewed as informing their behaviour towards ChatGPT and also how they will present ChatGPT to the pupils.

To start, it can be said that all participants expressed a feeling of being impressed when first trying out ChatGPT, as can be seen from the following quotes: “my first reaction was like ‘wow, this is amazing!” (Filip) and “write a poem’, ‘write a haiku’, ‘write a story’, like that type of prompts were also impressive in the beginning […] that you can ask an AI bot to do those type of things is incredible” (Henrik). Most interviewees also saw how ChatGPT could be a useful tool in their own work, for example eliminating or helping with routine tasks such as writing a short text about a book, getting a questionnaire on a specific subject, or being a source for inspiration, “For my own work I think I’ll use it a lot […] also for inspiration” (Nathalie).

> Ask it like “I’m giving a class on critical thinking and digital footprints, what should I not miss to bring up?” And it gives you a very good answer to that, so used in this way I think it is very good.
>
> *Henrik*

> I have a little page where I give book recommendations […] I can imagine using it for something like that, removing this type of tasks where you’re only producing a generic text.
>
> *Oscar*

When discussing ChatGPT in relation to the pupils, its effects on search infrastructure and how they will tackle ChatGPT within the realms of media and information literacy, the responses are nuanced. Following, ChatGPT will be discussed in relation to four main themes which were categorised from the empirical data. These themes are *ChatGPT and cheating*, *ChatGPT your friendly neighbourhood robot*, *ChatGPT and searching for information* and, finally, *ChatGPT, ethics and the law*.

5.2.1 ChatGPT and cheating

With it being a school setting, it comes as no surprise that several of the participants discussed ChatGPT in relation to cheating. As mentioned previously, this has been discussed frequently in the media since the launch of ChatGPT, with the district of New York in the U.S. even banning its use in schools (Querolo 2023). In a Swedish context, using ChatGPT for cheating has largely been discussed in relation to higher education (Bengtsson 2022). In the following quotes the participants can be seen mimicking the different sides to the debate, with one participant expressing worry that they will not be able to know if a pupil has written the text themselves, “is this such a big paradigm shift that we need to re-design the educational system, because we cannot be sure if the pupils themselves have written the essay?” (Filip). Another expressed that a greater focus needs to be put on referencing information sources to combat cheating, saying, “if we teach them that then I think, or that’s one of the

easier ways right now to combat AI written text" (Oscar). In contrast, one interviewee expressed a despair at the debate surrounding cheating, indicating that pupils have always cheated even before the advent of the internet, "What I'm saying now is nothing new. The kids who are smart and have the language skills have always been able to cheat. Even before the internet!" (Anne). Another participant agrees that the discussion on cheating is overblown and that the introduction of ChatGPT is nothing new,

> There's always something new coming along that is… Wikipedia! That was also, a lot of teachers don't want [the pupils] to use it, and I mean it's also about… well what is knowledge then?!
>
> *Nathalie*

In this last quote larger philosophical questions are being asked surrounding what can be considered knowledge. As an example, this participant had showed a group of teachers that ChatGPT can provide pupils with arguments for and against any given subject. The ability to be able to argument for and against is a knowledge requirement in Swedish schools (Lgr 2022), but if a pupil gets help with this task is that considered cheating or have they simply had some help on the way,

> If a pupil can't find an argument against something then they can get help with that, but does that mean that they haven't done any independent thinking? Or have they been helped to think? So, there's a lot of philosophical questions surrounding knowledge creation. What is knowledge? And how do I make knowledge into my own?
>
> *Nathalie*

In a similar vein, another participant compares the discussions surrounding ChatGPT making the skill of essay writing obsolete to how previous technological developments led to similar fears surrounding what skills are necessary to learn or not,

> I'm thinking about when we write essays today the system automatically corrects your spelling which means knowing how to spell isn't as important anymore, I think many people were horrified when the spelling function came "now they won't learn how to spell anymore!"
>
> *Filip*

These questions surrounding what is knowledge or important skills to learn are in line with García-Peñalvo's (2023) argument that new technological advancements always lead to a fear surrounding authentic learning. García-Peñalvo (2023) also argues that essay assignments became obsolete with the advent of easy to access information sources which could be copied and pasted without critically consider their content. Some of the participants agree with García-Peñalvo's (2023) argument. For example, one participant compares how pupils copying text from ChatGPT is the same as copying text from anywhere else. She discusses this in relation to that the pupils are aware that they should not do it, that it is cheating, but

do it anyway due to time constraints or just simply wanting to have something to hand in.

> We can see that pupils have used it (ChatGPT) already and they've been caught and that's, it's exactly like, they know they're not allowed to take text and copy from the internet. Even though you know you're not allowed, you do it anyway because you end up in a situation where you're short on time and you think it's a quick solution.
>
> *Nathalie*

One could perhaps say that ChatGPT has simply put a spotlight on how education have not adopted with the times.

On the topic of cheating, two participants raised that in the future they see that a greater focus will need to be put on reference management. As expressed in the following quote, this is seen as the main way of combating AI generated texts, "if we teach them that then I think, or that's one of the easier ways right now to combat AI written text" (Oscar). The same participant mentioned that he does not currently discuss how to reference sources with the pupils, but with the advent of ChatGPT he feels that he would have to start,

> I haven't worked at all with source management, or not like how it's used within academic writing, which I think is what we need to use to combat AI written texts.
>
> *Oscar*

This strategy is mentioned by other participants as well as a potential solution to combat pupils using ChatGPT to cheat. On the other hand, these participants recognise that knowing how to reference sources and actively doing so is a skill the pupils should already be taught, it simply has not been the main focus. Greater focus on source management was also seen as something which could be turned into a positive consequence of ChatGPT. One participant suggested that one could turn ChatGPT's limitations into a learning opportunity,

> Let's say […] that ChatGPT writes a short text, about 200 characters, then the pupils are tasked with providing sources for this text, namely they will have to search for information, and they have to like see is this correct?
>
> *Nathalie*

ChatGPT could therefore provide a new entry point to discussions on search and critical thinking with the pupils.

All of the participants agree that banning ChatGPT is not the solution to the issue of pupils using the chatbot to cheat, "the time of prohibition is past, long ago" (Anne). Many reference that discouraging pupils from using Wikipedia did nothing to stop pupils from using it, it simply hindered conversations on what Wikipedia is and its limitations and strengths, "it doesn't work as some teachers say "you're not

allowed to use Wikipedia", yes, well they (the pupils) will do it anyway so what we need to do is to teach them about Wikipedia" (Anne). The participants express that Swedish schools should not repeat former mistakes. As one participant puts it, "maybe it's a bit more like this, accept the situation, move on, learn it and make the best of it" (Irma).

5.2.2 ChatGPT, your friendly neighbourhood robot

As interacting with ChatGPT is meant to be conversation-like, the chatbot can come off as deceptively human-like. This aspect of ChatGPT was discussed in positive terms by one of the participants. She could see huge benefits for the pupils using ChatGPT as a personal tutor at home, "I think a lot about seeing it as a personal tutor at home! If you as a pupil is stuck, well ask it "explain photosynthesis to me because I don't understand" (Nathalie). This view is largely in line with previous studies like Tlili et al. (2023) who looks at ChatGPT from the point of view of using it as an educational aid in schools. Also, as presented by Norehall (2022), conference articles on AI and education largely focus on AI taking on parts of the teacher role. What is more, the same participant also feels that the debate has mainly focused on the negative aspects of ChatGPT and not considered how the chatbot could help young people experiencing loneliness or struggling with suicidal thoughts,

> If I'm feeling super lonely and I need support on how to think about, well if (ChatGPT) can answer that you could call BRIS or, I mean it could also be that it will help loads of people, but we can't see that know because there's such a big focus right now "you can use it to cheat."
>
> *Nathalie*

Most of the other participants saw that ChatGPT's supposed human-side could lead to negative consequences. For some of the participants there is a worry that with ChatGPT being more human-like the technology or infrastructure will become invisible to the user,

> Let's say you start with ChatGPT and say "hey, I'm writing an essay about [a given topic] and I need material for it" […] then it's like they are taking to me maybe, but they still don't know where the information is coming from […] and I imagine that the technology will end up further and further down, like become less and less visible, which simply makes it harder to manipulate. You can manipulate if you use a traditional database and start to search and try out different combinations words and such, in this way you manipulate it to get what you want, and that's based on you knowing how the database works.
>
> *Lars*

As expressed in the above quote, the simplicity of interacting with ChatGPT, that it can seem like you are having a conversation with your school librarian, hides the complex technology which makes interacting with ChatGPT possible. As

mentioned previously, all of the participants see that Google Search is largely invisible to the pupils and there is a worry that the introduction of AI chatbots will further hide how search works and shapes information dissemination,

> I believe that all these technological developments make it less transparent what's happening […] Even teachers struggle to differentiate between "what is a search engine", "what is a web browser", and now it will be even harder "where does this information actually come from?"
>
> *Henrik*

This is in alignment with Haider's and Sundin's (2019, 2022) view that discussions on media and information literacy also need to include discussions on making visible the infrastructures of search in order to understand how meaning is shaped by these systems.

Another participant worried that because ChatGPT answers in such a seemingly confident and conclusive way, the pupils could take the information provided "at face value" (Irma) and not think critically about it. Shah and Bender argue that search engines based on natural language processing can "come across as too authoritative, as providing answers to questions rather than pointer for where to look further suggests finality to the answer" (2022, p. 228). This is not unlike how some of the participants see that ChatGPT will affect the information process of the pupils. Here there is a potential for ChatGPT to worsen an already existing issue with how we search for information today. Like Haider's and Sundin's (2019) and Andersson's (2021) research show, people expect to be able to search anywhere and find information fast. Reidsma (2019), among others, discuss this in relation to that we outsource our trust to the search engines providing the best and most relevant answer. This could potentially be an issue also with technology like ChatGPT, that ChatGPT is assumed to be providing the best, most comprehensive answer. As suggested by Shah and Bender, because ChatGPT answers in a human-like way it "makes people more likely to trust [it]" (2022, p. 222). When I asked if some of the other participants saw a similar issue with ChatGPT, that pupils would assume everything ChatGPT said is true because of its likeness to a human, those asked agreed that this is a potential effect of ChatGPT. This question was not part of the interview guide and therefore not asked of every participant. On reflection I also asked this question in a manner that was closed which led to the participants not discussing it any further.

5.2.3 ChatGPT and searching for information

Natural search vs prompt engineering

When it comes to the participants' views on what ChatGPTs effect on search and search behaviour could be, the results were again varied. Initially, a majority of the participants were positive towards the potential effects ChatGPT could have on the future of search when asked. They were especially positive towards the potential of this type of technology being an easier search tool for the pupils to use. They express that AI chatbots allows for a more *natural* way of searching for information, "I definitely feel that […] it's more suited to the way people actually search and talk, I think that's a good thing" (Henrik). As can be detected from this quote, it is considered something positive that ChatGPT allows for a more conversational-like way of searching. This is especially discussed in relation to the pupils, that this is a more natural way for them to search for information.

> It will make them better at search, in any case, because they are more used to searching in this way, like when you talk to someone instead of this made up, I mean it is a more natural way, that is the way we search for information when we talk to each other. Whilst the way we search on, for example, Google or a database that is artificial in a way, it's something you have to learn, so yeah, this will be easier for them.
>
> *Oscar*

> To get effective search results in Google you have to know more about how you search. Here you can be pretty free in how you write, and I think, I don't know if this is correct, but I imagine that it's easier to get better results with ChatGPT, than it is with a search engine […] they ask a long question with a question mark at the end, well that's perfect for ChatGPT.
>
> *Nathalie*

During discussions on media and information literacy instruction, several of the participants express distraught over the pupils writing complete sentences in the search bar for Google Search and expect effective results,

> They expect results with minimal effort. So, when you start to talk to them about creating search terms which are relevant and combining them in different ways, so have they already written their question in Google with a question mark at the end!
>
> *Nathalie*

All participants discuss with the pupils how to turn a research question into relevant search terms to be applied to search engines or databases. This is considered a skill which the participants deem that most of the pupils lack. The advent of ChatGPT is therefore viewed as positive as, in comparison to current search technologies, it does not require this type of search skill. As expressed in one of the above quotes, with ChatGPT there is no need to learn an artificial language, you can instead

converse with ChatGPT as you would with a friend or teacher and acquire knowledge effectively this way.

In contrast, some of the participants highlight that interacting with ChatGPT is not so different from interacting with current search engines. Some of the participants mention that how the question is asked very much affects the answer, as expressed in the following quote:

> Well, what will happen is that you'll have to become good at formulating questions. Because if depending on what search terms we use in a search engine affects the outcome […] then depending on how I ask the question in ChatGPT, as well, I'll get a number of different answers, and that I can have an effect on those answers by asking more nuanced questions.
>
> *Filip*

Knowing how to formulate a question to a natural language AI and work with follow-up questions to achieve a satisfying result is a skill often referred to as *prompt engineering* (Short and Short 2023). As can be seen in the above quote, Filip equates knowing how to formulate questions to an AI as similar to learning how to search effectively with search engines. This is a skill which some of the participants thinks needs to be taught, "so, this type of "prompt competence" I believe will have to be taught actually" (Henrik). What is more, prompt engineering is also seen as a new type of skill which might replace other skills, like being able to generate a text,

> Instead of being good at formulating a text, like it was before, must I instead be very good at formulating a question to an AI. So, it will become a new type of skill, instructive text might become more important, it might replace expositive and explanatory text.
>
> *Filip*

The idea that the pupils must learn how to interact with ChatGPT to get a satisfying answer, goes against what was previously expressed that ChatGPT will be a more natural and easier way for the pupils to search. Two contrasting views appear. On the one hand, ChatGPT is seen in a positive light as it allows for a more natural and conversational-like way of searching for information. This is seen as positive as this is closer to how pupils search for information in everyday life and requires no learned skill. On the other hand, others express that interacting with ChatGPT, knowing how to formulate one or a set of questions to get a satisfying answer, is not unlike learning how to search effectively with search terms on Google Search.

One of the participants referred to knowing how to search effectively with a search engine involves learning an artificial language, as seen in this previously referenced quote,

> I mean it is a more natural way, that is the way we search for information when we talk to each other. Whilst the way we search on, for example, Google or a database that is artificial in a way, it's something you have to learn, so yeah, this will be easier for them.
>
> *Oscar*

Even though ChatGPT is meant to mimic human conversation, it is nothing like actually interacting with another human person. As Bender et al. states, human conversation is characterised by "individuals who share a common ground and are mutually aware of that sharing […] who have communicative intents which they use language to convey" (2021, p. 616). Interacting with ChatGPT cannot fulfil these criteria of conversation as "the training data never included sharing thoughts with a listener, nor does the machine have the ability to do that" (Bender et al., 2021, p. 616). There is therefore nothing 'natural' about interacting with ChatGPT. Arguably, one could conclude that interacting with ChatGPT might not be so different from Google Search in the sense that both requires skills in understanding how to get the best out of the system through the worded input you give it and that interacting with these systems is to use learnt, artificial language.

Unreliable source for information

In general, most of the participants regarded ChatGPT as being an unreliable source for information seeking. Several aspects of ChatGPT led to this interpretation of the service. Some participants see ChatGPT as an unreliable source for information as the answer is so greatly affected by how the question is posed,

> So, depending on how you formulated that question on turmeric, ChatGPT would give you these two different answers […] so for me it's not that great of a tool if you want to find unbiased information, as it's so dependent on how you asked the question.
>
> *Oscar*

This concern is similarly raised by Tlili et al. (2023) in reference to how to guarantee equality of education if ChatGPT provides different answers to every pupil. One could argue that this is an issue also with Google Search, as the personalisation of search results can lead to two people asking the same question to have different results presented to them. On Google Search you can also formulate the question so that the results confirm your beliefs. As mentioned in the section on infrastructural meaning-making, engaging with a search engine in this way shows an advance use of search infrastructure (Haider and Sundin 2021). The issue with engaging with ChatGPT in a similar way is that ChatGPT can be seen as providing clear cohesive answers which does not encourage further investigating (Shah and Bender 2022). Google in comparison, at least provides sources and therefore choices, which, as expressed in this quote, allows for more reflection:

> I would say it's much more that you have to think for yourself with Google, it's about going through the links and consider what's most reasonable to click on. […] Here (with ChatGPT) it feels like I get an answer which is very black or white, there's not much to compare to.
>
> *Irma*

Another participant expressed themselves similarly,

> I would say that the advantage with Google is that it per definition provides its sources, […] I ask a question, I get a list of results, and from there I can choose how to proceed. […] Whilst with ChatGPT I'm always within the system, I never leave the system.
>
> *Filip*

Shah and Bender agrees that especially when using search for browsing or sense-making something like ChatGPT will "not provide the user with a list of options which they can explore according to their own criteria" (2022, p. 226).

The version of ChatGPT the participants had tried out could not refer to any sources which further added to the feeling that the information provided is unreliable, "it's very easy to get information from it, the hard part is getting it to reveal from where it got this information from and whether it's true" (Filip). As mentioned above, Google is seen as a more reliable source for information seeking as it "per definition provides its sources" (Filip). A contrasting view expressed by one participant holds that the lack of sources is not an issue as ChatGPT can provide these, if you ask the question in the right way,

> I think it also depends a little on how you ask the question, because […] I've asked "could you give me a source to the above written text?" or something. It can't give me an exact source, but it can give me "look into this link and this book and this" which would mean I could use those same sources.
>
> *Nathalie*

However, other participants had tried out the same strategy, but found that ChatGPT more often than not made-up names of researchers and publications. According to one of the interviewees, this continues to be an issue also with ChatGPT based on GPT-4 which is part of Microsoft's updated Bing. The participant who had been able to try Bing said that even though this version can provide links to the information referenced in the response, the links did not always work as intended:

> The links work, but […] what it says should be stated in these links that is not always the case, sometimes it works great and sometimes it doesn't work at all. It makes things up like crazy!
>
> *Henrik*

Some of the participants also found ChatGPT unreliable as it consistently makes things up, as mentioned in the quote above and elaborated on here, "there's no built in 'truth or lie detector' in this model, rather it is generating words depending on context" (Henrik). As indicated in that quote, ChatGPT's purpose, or what the

system is trying to do, is not to provide correct information or sources, but to provide a plausible, human-sounding answer to your prompt. This is a result of ChatGPT being a natural language model. As Bender et al. (2021) makes clear in their article, AI chatbots based on natural language processing does not understand the question and answer it from this understanding. Natural language models work based on training and by statistically working out what words and sentences to form. One could say that the answers ChatGPT provides are always made up, it is only a side effect of the system that it also provides the correct answer to your question (Bender et al. 2021). Most of the participants consider this to be an important aspect of ChatGPT which the pupils will have to be taught. One interviewee framed the issue of made-up answers as something comical, that you accidentally learn misinformation,

> I get another way of explaining something and of course if it answers completely coco, well then you'll learn something wrong (laughter).
>
> *Nathalie*

In contrast, another participant sees this as a potentially huge issue as misinformation can spread and establish itself as the truth,

> Since it produces a lot of misinformation, it doesn't have this built in lie-detector, then people will likely spread that [mis]information they get from these chatbots which then establishes itself as some kind of truth. There are many ways in which this misinformation can emerge and be spread.
>
> *Henrik*

As discussed in the *literature review*, several studies have shown that there is an inherent trust in current search technologies for providing us with relevant and accurate information. Haider and Sundin (2019) argue that we outsource our trust and our critical evaluation of sources to the algorithms running the search engine. This is also reflected in the empirical data with several of the participants seeing their pupils trusting that Google will provide them with an answer. This trust arguably stops many people from thinking critically about these systems. As García-Peñalvo (2023) argues taking any answer from ChatGPT or Google Search and not reflect upon its meaning or verify the validity of the response is a mistake. He argues,

> This is an essential digital literacy competence that not only relates to this type of generative AI tools but also occurs when results are obtained from a search engine or social media and are not cross-checked with other sources, resulting in the spread of fake news and inaccurate content.
>
> *(García-Peñalvo 2023, p. 3)*

One could, as García-Peñalvo (2023) essentially argues, ask if there is a difference between current search technologies and ChatGPT when it comes to the amount of

misinformation these systems could spread. One participant ponders that the focus which ChatGPT has put on questions surrounding critical thinking and the verification of sources could be a blessing in disguise,

> Interviewer: So I imagine that there might be a greater focus on this that you always have to verify the information, in a way that we haven't done with Google?
>
> Lars: Yeah, even though we should have done that, maybe this is a blessing.

Looking at these responses through the lens of the algorithmic imaginary, these experiences of finding out that ChatGPT has answered with made-up information is formative to how some of the participants view the system and will in turn affect how they introduce ChatGPT to the pupils when discussing media and information literacy. Not everyone expressed a technical understanding of why ChatGPT is prone to hallucinate or produce misinformation, but they still developed an idea of how ChatGPT functions through repeated interactions with the chatbot.

The issue with reliability is also connected to the data ChatGPT is trained on and the fact that we cannot know what this is, again exemplified by this quote,

> At this level, I would never recommend using this type of AI tool for information search, because you don't know where the information is coming from and whether you can verify it.
>
> *Filip*

The issue with the training data was, however, mainly discussed in relation to ethical issues and the law, which will be developed further in the following section.

Most participants remain sceptical towards using ChatGPT as a source for information. This scepticism is based on several aspects of ChatGPT, the effect the formulation of a question has on the answer, its tendency to make things up, its inability to provide any sources, and the lack of transparency on what type of data the chatbot has been trained on. All of these coalesce to create a complex situation were explaining and making pupils aware why they should be vigilant of ChatGPT's answers could become difficult as it is connected to so many different aspects of the chatbot. Interestingly, Google Search was in this context talked of as the more reliable source for information, even though it arguably shares many of the same issues as ChatGPT does.

5.2.4 ChatGPT, ethics and the law

Ethics and ChatGPT was not discussed at length by the interviewees. In fact, most of the participants did not touch upon these issues. However, some of the participants did raise some ethical concerns when it comes to ChatGPT and since

ethics in relation to these new AI tools are topics which are discussed greatly both in the media and in academic research, the ethical issues that were raised will be discussed here.

Data gathering and privacy

One ethical issue raised was in relation to data gathering and privacy. One participant discussed how it is important to make the pupils understand why ChatGPT is for free[6] and in what other ways are you paying to use this service,

> Who is it that contributes to all this data? Because that is something everyone, not only pupils, struggles to understand that the more you participate and give up your identity […] then it's your data that you trade with in a way. It's the data that's worth something.
>
> *Nathalie*

The issues of data gathering were not only discussed in relation to ChatGPT, but as something which permeates our culture in general, "I always try to bring it up that being a commercial actor it means, they're profit driven, and since you don't pay for it the price, most of the time, is your integrity" (Oscar). Furthermore, one of the participants also believed that the way ChatGPT gathers and stores data is unique to AI language models, and that it is potentially illegal. He said that he had discouraged the teachers at his school to use the tool as he does not think it complies with EUs General Data Protection Regulation (GDPR), especially with the clause *the right to be forgotten*,

> I haven't seen anything where I can ask them to remove this, and I don't think, considering how the system is built, that it's possible, ehm, I mean technically it shouldn't be possible to take out the things I've entered into the system once it has learnt from it.
>
> *Oscar*

GDPR regulates the ways in which personal data can be gathered, used processed and stored (Regulation (EU) 2016/679). The right to erasure, which is also called the right to be forgotten, refers to article 17 and 19 of the GDPR. These articles state that you have the right to have all your data erased by a data controller without any undue delay (Regulation (EU) 2016/679). The question is, as the participant state in the above quote, can one ask to have all of one's information removed from the system of an AI chatbot once it has learned and adapted based on the information? In fact, ChatGPT has been banned in Italy based on privacy concerns. The Italian government doubts that ChatGPT follows the regulations set by GDPR and until OpenAI can prove that they do, the service is banned in Italy[7] (McCallum 2023). Tlili et al. (2023) discussed privacy and data gathering in relation to that it

[6] At the time of the interview the pay for premium version of ChatGPT had not yet been introduced.

[7] ChatGPT became available in Italy again on 28/04/2023 after OpenAI had amended the service to comply with the privacy concerns stated by the Italian government. For more information see McCallum, S. (2023) ChatGPT accessible again in Italy. BBC News https://www.bbc.com/news/technology-65431914

is unclear whether the conversations had with ChatGPT are stored or not. During a test, ChatGPT said that no conversations were stored, whilst on OpenAI's website it says that conversations are stored and used for further training (Tlili et al. 2023). Tlili et al. (2023) also worry that young users, unaware of the privacy issues, might reveal more than intended about themselves when conversing with ChatGPT. This was not reflected upon by any of the participants.

What is more, one participant highlighted that the data ChatGPT has been trained on might also contain private information, "such ethical issues like 'what kind of images has it been trained on?' There have been pictures from hospital records for example, such horrible stories" (Henrik). For some of the interviewees, then, discussing privacy and data gathering in relation to ChatGPT is seen as something important as the pupils should be made aware what can happen to their online data. These discussions can also be seen as being connected to infrastructural meaning-making as the topic of training data and gathering data is revelatory of ChatGPT's infrastructure.

Copyright

In a similar vein, one participant suggests that a greater focus will be on questions surrounding copyright when discussing media and information literacy in the future, both in relation to whose data ChatGPT is trained on and who can be considered the author of an AI generated text or image,

> All those established artists who feel misused now when their images are partly being used illegally as the foundation for this. It's a super interesting discussion! Who owns something? Who is the author of this text that I've gotten from ChatGPT? There's no human copyright holder but there's still some engineer somewhere and there's me who have provided the conditions for the text.
>
> *Lars*

This was also discussed in relation to art pupils who already now uses the internet to gather inspiration for their creations, discussions on copyright are therefore already part of the course. The participant wondered how these discussions on copyright will have to be amended with the advent of easy and free to use AI image generators. Authorship, copyright, and whose data ChatGPT is trained on are all topics which have also been discussed frequently in the media. Shortly after the release of ChatGPT there were questions surrounding if the chatbot could be considered the author of an academic article (Stokel-Walker 2022). In an article in the Guardian, Bridle (2023) argues that creations by ChatGPT or AI image generators should not be considered novel content but rather as appropriations of existing culture. García-Peñalvo (2023) also argue that as ChatGPT is unable to

properly reference its information sources, there is a loss of proper authorship attribution, which goes against the moral rights of the author. The issue of copyright, or rather authorship, could be connected to the discussions surrounding ChatGPT and cheating. Similar questions are raised of who can be considered the author of a work when it is done in conjunction with an AI and where the line between cheating and inspiration goes.

Bias in the training data

Other ethical issues which some of the participants noted was that ChatGPT could answer back with sexist or racists remarks, as can be seen in the following statements,

> If you asked it to tell a number of funny stories, then it quite easily became stories which were based on racist stereotypes or pickaninies, or it made a funny joke about women that was in that way (sexist), and pretty fast they went in and steered that up.
>
> *Filip*

> That's also something I try to bring up with the pupils, that since it's been trained on data from the internet there's a strong likelihood that a lot of sexist and racists material would have surfaced if it hadn't been moderated.
>
> *Henrik*

Others found that they could make ChatGPT answer back in an unethical or immoral way. For example, one participant managed to get ChatGPT to give suggestions on how to hide cigarettes in school or hide that you are drunk in school,

> You can make it do pretty immoral things […] we started with asking it how to hide cigarettes at school or at home and at first it said "no, you're not allowed to do that" but if you just said "but please, come on" and then it said like "okay, if you have to hide cigarettes at school this is what you can do."
>
> *Oscar*

Shah and Bender (2022) argue that AI language models trained on data derived from the internet will inherently lead to these negative consequences. They reference Noble (2018), among others, whose research show that search engines "absorb and amplify biases and then reflect them back to users" (Shah and Bender 2022, p. 229). Shah and Bender (2022) see the potential for the introduction of AI language models in search to further exacerbate this problem. Because of this Shah and Bender (2022) argues that datasets used for training AI language models should be heavily curated and thoroughly documented. This in order to both mitigate the risk of users being exposed to biased results and also to increase the transparency of these systems.

Moderation

Discussions on bias eventually lead to discussions surrounding on how ChatGPT is moderated. The participants who discussed moderation talked of it as a certainty. They spoke of either personal experiences or reading about others who found that you could make ChatGPT answer back in a for example sexist way one day, only to try a couple of weeks later and finding that the chatbot now refuses the request. It is difficult to know exactly how ChatGPT is moderated, as this is also done by an AI, but OpenAI is very open about that they actively work on moderating ChatGPT (OpenAI 2023). Some of the participants have also tried to actively test ChatGPT's limits and make it say things which they know it should not do. Like in the quote above where one participant had gotten ChatGPT to say how to hide cigarettes at school.

On one hand, moderation makes the workings of ChatGPT more visible. Being able to make ChatGPT say or do something one day and not the next leads to questions on how ChatGPT functions, who made the decision to moderate this request, etcetera. This could be seen as the system becoming visible upon breakdown. This interpretation is in line with Haider and Sundin's (2019) development of the concept that infrastructures like search engines do not simply breakdown on a technical level, rather it happens more frequently on a personal level. In relation to ChatGPT, breakdown could be seen as a situation when ChatGPT refuses do a task you set it to do. When moderation is visible in this way it could therefore provide opportunity for a more investigative attitude towards ChatGPT. Moderation could also be seen through the lens of the algorithmic imaginary, where experiences of moderation are revealing of how the chatbot functions and informs people's behaviour towards it. For example, due to the perception that ChatGPT is moderated to not say certain things, some of the participants tried to fool the chatbot as a result of this, "on some things you notice that it is like hardwired, it is not allowed to say, I tried to force it to say that the earth is flat" (Oscar).

On the other hand, moderation can also lead to less transparency. During a conversation on how Google is known to heavily moderate its content, one participant asked what unknown consequences this can have,

> They (Google) are pretty though on content moderation now days, which one could discuss whether that is a good thing, could it make it harder to find narrow information or will they favour the big sites and more established knowledge?
>
> *Henrik*

In relation to chatbots it would be even harder to know what information is being favoured and what is being supressed as ChatGPT's answer synthesises information from several different sources without giving any indication to which sources are more heavily relied on.

5.3 Future of media and information literacy

When it came to discussing ChatGPT in relation to media and information literacy specifically, all of the participants expressed the importance of educating the pupils on what ChatGPT is and how it functions, as exemplified by these two quotes,

> My plan is to show them how Bing, but also how ChatGPT works, and also try and lift the engine's bonnet and try to explain how, well how these large language models work. It could be a bit difficult to try and get them to understand because oneself barely understands.
>
> *Henrik*

> ChatGPT builds its texts based on statistics, like now I've written this then statistically this should follow and then it just keeps going, that this text bank that it's built on makes this possible. Then, when you understand that, it makes it a bit less magical, and if you can make the pupils understand that then maybe they'll see that it's not for real, there isn't something, it isn't a person, there's no consciousness here, it's only mathematics.
>
> *Lars*

As seen in the first quote, understanding how AI language models work and then explaining this in an accessible way to pupils of varying ages could prove to be challenging for many school librarians. However, as displayed in the second quote, it could become very important in order to combat pupils thinking that ChatGPT understands them or that ChatGPT is sentient. The strategy of revealing the inner workings of ChatGPT, or rather its infrastructure, aligns with the concept of infrastructural meaning-making. Most participants expressed, in varying degrees, that they would discuss the technical side to AI in order for the pupils to gain an understanding how this affects how information is shaped and displayed by these services. This can be compared to how they currently discuss how Google Search is a for-profit advertisement company and what effects this have on how they structure their search engine.

As with making visible the workings of Google, the act of comparing sources and platforms remains one of the key strategies also for ChatGPT. Several of the participants mentioned that they would compare the answer given by ChatGPT to Google Search results, "if you were to use it as a MIL method then you would have to compare it to a normal search on Google Search" (Irma). Such a comparison would lead to questions on how they differ and why, which are questions which relates to the concept of infrastructural meaning-making, and is a strategy already

employed within current media and information literacy instruction. Moreover, none of the interviewees mentioned that they would compare the results of ChatGPT to that of a database like NE. This could be because ChatGPT is seen as incomparable to a database, the two systems are too different to offer any value by comparing them. It could also be because many of my interview questions referred specifically to Google Search. This does not mean that the interviewees would not consider discussing ChatGPT in relation to a database with the pupils.

Some of the participants worry that easy to use and conversation-like search will hide the increasingly complex technology which makes this type of search possible. Being able to talk to ChatGPT as you would to a friend or a teacher has the potential to further hide the infrastructure which decides what information you are shown and why. On the other hand, ChatGPT could be more transparent because the chatbot often answers back that it will not answer a certain request if it for example goes against the moderation rules set by OpenAI. I would also argue that when one discovers that ChatGPT has provided false and made-up answers this also makes visible the nature of AI language models and how they answer based on probability and not understanding. This limitation could be turned into an advantage as it offers an entry point into discussing the infrastructure of ChatGPT within the realms of media and information literacy. It could be that as the system is further developed, breakdowns like these will be less common or better hidden, but as ChatGPT functions right now I would argue that it is much more revealing of its infrastructure than, for example, Google Search.

Finally, some participants offered suggestions on what is needed for school librarians to be able to integrate AI technologies for information seeking into instructions on media and information literacy. Two participants both felt they needed more opportunities to learn about these new technologies, both from academic sources but also through collaboration with other relevant actors,

> I believe I would need more knowledge. In part in relation to how AI is built but also getting to know how, ehm, I'm thinking programmers, IT forensics, other school librarians, other people that work with MIL, how would they instruct on it, so that we could take inspiration from each other. […] or if there's some course for school librarians, I would happily take a short course on AI only to like gain the knowledge on how I could implement it
>
> *Irma*

> Interviewer: What do you feel that you need as a school librarian to be able to keep up with this AI development?
>
> Filip: Oh, great question! More competence development! […] I don't think I would have been as aware or had time to do as much with this if I hadn't had the network in the council. Because there we have several amazing school librarians who work with this in several different ways,

> and we can share and talk about it, so more opportunities to talk about it, and not only with school librarians but with other experts also, like some form of exchange of experiences about this.

Another felt that it is really important for school librarians to keep up to date with the development on AI technologies for information seeking,

> I think the greatest lesson to take on if you as a school librarians will be working with this with pupils is to constantly read up on this. It has been a crazy development in this field these last six months, but because this field is so mobile I think the greatest challenge for school librarians is to keep á jour!
>
> *Henrik*

Questions on what the interviewees see that they need in order to keep pace with the development of AI technology were not part of the interview guide. These questions were unplanned follow-up questions and as such were not asked of every participant. Looking at what resources or skills school librarians need to be able to keep up to date on AI could be an area for further study. As this field is seeing exponentially fast development it will be important to focus on how to educate school librarians on AI without the information becoming irrelevant after a couple of months. What skills do school librarians need which are transferrable to future development of AI?

6. Conclusion

The aim of this thesis is to provide insight into how AI technologies for information seeking will potentially form future school library operations, especially in relation to instruction on media and information literacy. This was explored by interviewing Swedish school librarians with the aim of answering two research questions: (Q1) How do Swedish school librarians perceive AI technologies for information seeking in relation to their perception of current search technologies? (Q2) What AI specific literacies, if any, do Swedish school librarians see need to be developed and worked into future media and information literacy instruction?

The perception that the school librarians taking part in this study have of AI technology for information seeking is complex. Some saw the introduction of language model AIs in information seeking as something positive in comparison to current search technologies. Mainly in relation to this new technology allowing the user to search in a more natural and conversation-like way. In contrast, knowing how to formulate one or a set of questions was identified as a future skill which the pupils will have to learn in order to effectively converse with an AI chatbot. Most participants also saw the development of AI technologies for information seeking as exciting and could see many uses for it in their own work. This was contrasted by the fact that all participants saw ChatGPT as an unreliable source for information, and current search technologies where links and sources are presented to the user is seen as the superior as it allows for independent thinking and an easier verification of the sources. Specifically, when comparing Google Search to ChatGPT, Google Search was, more often than not, seen as the better service. I find this to be interesting since Google Search arguably deals with many of the same issues which have been identified with ChatGPT, such as the results being affected by how the question is posed, biased results, the risk of being exposed to racists and sexists material, and the spread of misinformation. Despite this, the interviewees still mainly saw Google Search in a positive light when compared to ChatGPT. This could be explained with ChatGPT's inability to display its information sources. As previously discussed, this is seen as a huge limitation by most participants, and Google Search is in comparison therefore seen in a more favourable light. It is interesting that many of the interviewees viewed Google Search as a more reliable source for information only because Google Search provides a list of results. As mentioned in the section *moderation,* there is no way of knowing how Google has edited the results list and what results it is hiding or suppressing. Viewing Google

Search as the more reliable source therefore goes against the idea of infrastructural meaning-making as the sources themselves are posited as the more important aspect rather than considering how and why the sources are presented. I would argue the favourable attitude towards Google Search also has to do with Google Search simply being the norm, as displayed by one participant who referred to searching on Google Search as "normal" (Irma), when compared to searching with ChatGPT. For nearly two decades Google Search has dominated the online search market and has become an integral part of everyday life. ChatGPT offering a completely new way to search will inherently lead to people feeling sceptical about it. I would argue that going forward, this is something to remain cautious about. Google Search might be a good search engine, but it has many flaws, and these should not be forgotten even if by comparison ChatGPT is viewed as a worse service when it comes to information seeking.

In terms of ChatGPTs consequences on media and information literacy and the potential for AI specific literacies, the participants largely agree that the introduction of AI technology will not have any serious impact on the way they instruct on media and information literacy. Different strategies which align with the concept of infrastructural meaning-making, such as comparing search results, discussing the technical side to search, and making search visible, will be equally applicable to instruction on AI. A few of the participants see that future skills might need to be developed or become more important in relation to AI, specifically knowing how to interact with ChatGPT to get effective results. However, one can ask how different this skill is from learning how to develop search terms for search engines? If anything, some participants see that AI technologies for information seeking could worsen already existing issues with current search technologies, such as an increase in the spread of misinformation and increasingly complex technologies being hidden behind a façade of an easy-to-use search service, making instruction on media and information literacy even more important.

This thesis has provided an initial insight into how school librarians see AI technologies for information seeking's position within library operations. Even though ChatGPT comes with its own sets of challenges, ChatGPT's place in media and information literacy instruction is seen as obvious, and all of the participants agree that it is useless to ban the service. They see more benefits of introducing ChatGPT into education now and working with the tool, highlighting both its strengths and limitations. The temporality of this project and the use of a qualitative method for gathering of the empirical data leads to a lack of generalisability of the

results and conclusions presented here. I have no intention of arguing that the results presented in this study is generalisable to all Swedish school librarians. That is not the aim of this thesis. Rather in this initial phase of research into AI technologies for information seeking in relation Swedish school libraries, the aim is to give an initial explorative conclusion to this phenomenon. As AI technologies are only now having a societal impact in the area of information seeking, this thesis provides initial insight into the perceptions of a professional group that will have to handle this technological development on a daily basis. As can also be detected in the analysis, despite the small number of participants, numerous views on ChatGPT and its impact on media and information literacy were expressed. Not even within this group there is cohesion or always a possibility to generalise among the participants. This is a testament to the complexity of this issue. It also hints to the fact that this is a completely new phenomenon and strategies on how to handle this new technology within media and information literacy is still being developed. This is an area which is in a constant flux, and that is being reflected in the results of this study.

What is more, there is an inherent difficulty of studying and writing about a phenomenon which is constantly changing and evolving during the time of writing. The ChatGPT that existed at the start of this project is not the same as the ChatGPT that you can interact with today. This is both due to the active development of the service by OpenAI but it is also due to the nature of AI technologies. ChatGPT learns and adapts from every conversation with every user which leads to a constant evolvement of the chatbot. Any future studies done on ChatGPT, and similar technologies, will therefore also have to consider the potential temporality of the research. In addition to this, AI technologies in general has throughout this project been discussed in the media, with topics ranging from how it will affect how we work, to regulation, to the end of the world. Limiting myself to only looking at ChatGPT from an information seeking perspective in relation to school librarians has allowed me to focus on my empirical material and stay close to the views presented by the interviewees, and not the media.

Further research

Going forward, as ChatGPT and other AI language models like it are cemented further within society, its effects on information seeking and information dissemination will need to be further researched. Shah's and Bender's (2022) article offer a speculative conclusion to how AI language models could function for different information needs. As this technology now is accessible to researchers, looking at how search actually functions with AI language models from a user

perspective, especially looking at different search needs or scenarios, will be of interest. What is more, further research into AI technologies for information seeking's use and position within libraries in general, is of importance.

Another theoretical framework considered for this study was that of institutional theory. That theoretical perspective could perhaps provide more insight into how ChatGPT is being implemented in schools. Institutional theory could also give more of an idea of how both internal and external factors affect the implementation of ChatGPT in an educational setting, in a way that this study could not explore.

Another area for further research is pupils' use of social media for information seeking. This was something which was brought up during the interviews, but which I did not have the opportunity to explore further within the realm of this thesis. One of the participants saw pupils' use of social media for information seeking as a certainty and included discussions on social media during their lectures on media and information literacy. Others were more sceptical about to what extent pupils actively searched for information on these platforms or whether they are simply fed with information. As AI technologies are about to enter the realm of social media, Snapchat has already introduced it, looking at social media's place in pupils' information seeking behaviour and how AI technologies can come to affect this would be of interest. What is more, only a few of the interviewees discussed ChatGPT in relation to ethical issues such as bias and the potential of being exposed to racists or misogynist results. I found this interesting as several of the participant discussed these issues in relation to social media platforms. I think there is further opportunity to investigate both how professionals who work with media and information literacy discuss bias with pupils and also how pupils experience bias from various platforms and services they use online.

A final concluding thought is that instructions on media and information literacy does not necessarily solve any of the problems which are present both in ChatGPT and Google Search. At best it makes the pupils aware of the issues and provides them with the knowledge of how search infrastructure shapes knowledge creation and meaning, but they will still have to live in a world where search infrastructures are dominated by for-profit companies who remain largely unregulated. Media and information literacy may give pupils the tools to navigate this reality but not necessarily any idea of how to change it. What perhaps is missing from instructions on media and information literacy in relation to search infrastructure, whether powered by AIs or algorithms, is agency. Agency in relation to how pupils can take

action against these systems. As one of the authors to the article “On the dangers of stochastic parrots: can language models be too big?” (Bender et al. 2021), Timnit Gebru, discussed recently in an interview in The Guardian, AI is often portrayed as this dystopian technology which will end human life. Gebru argues that this idea hides the fact that it is people who make, create and shape AI, and that we have agency over these systems (Harris 2023). The human side to AI should be more in focus when discussing media and information literacy. Libraries in general could take on a more active role here. Some libraries are already instructing the public not only on what AI is but offers the public an opportunity to build AI systems for themselves (Finley 2019). Initiatives like these empowers users to have an active involvement in the development of AI and also highlights the fact that AI is humans all the way down.

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8. Appendices

Appendix 1. Interview guide

Inledande ord

Tack för att du deltar i detta forskningsprojekt! I detta forskningsprojekt kommer jag att undersöka skolbibliotekariens förhållningssätt till och eventuella erfarenheter av informationssökning med hjälp av AI-teknik (chatbot mm.)
Intervjun beräknas ta ungefär 45-60min och kommer att spelas in. Inspelningen kommer inte att spridas vidare och kommer att bli raderad efter att uppsatsen blivit godkänd. De som blir intervjuade inom ramen för uppsatsen kommer att avidentifieras och alla personuppgifter kommer att behandlas konfidentiellt. Deltagande i undersökningen är frivillig och du har möjlighet att avbryta din medverkan om du så önskar.

Generellt

Hur länge har du jobbat som skolbibliotekarie? Hur länge har du jobbat här?
Kan du berätta hur tekniker för informationssökning förändrats under ditt yrkesliv, och hur det påverkar ditt arbete med MIK?
Berätta hur du jobbar med MIK idag? Hur behandlar du informationssökning?
Hur tänker du kring källkritik?

Artificiell intelligens

Hur skulle du definiera AI? Vad är din syn på eller erfarenheter av AI?
Vad för konsekvenser kan du se att utvecklingen av AI kommer att ha för ditt arbete som skolbibliotekarie?
Hur tror du utvecklingen av AI kommer att påverka hur vi söker information?

ChatGPT

Vad är din bild av ChatGPT? Vad upplevde du när du använde den första gångerna? Dina första tankar efter att ha testat den?
Har du erfarenhet av att söka information med hjälp av chatbotar?
Hur tror du att chatbottar som ChatGPT kommer att integreras in i skolbiblioteket?
Hur tror du att AI chatbottar kommer att påverka hur du arbetar med MIK? På vilket sätt?

Google Search vs. ChatGPT

Kan du jämföra din upplevelse av ChatGPT med Google Search?

I relation till MIK, hur tror du att arbetet med MIK skulle skilja sig/finns där några skillnader om pupilerna söker information på Google Search mot ChatGPT?

Både Google och Microsoft planerar att inkorporera AI chatbottar i deras respektive sökmotorer (Google Search och Bing), hur ser du på den utvecklingen? Vad för konsekvenser tror du det kan får för hur vi söker efter information? Hur tror du att en sådan utveckling skulle påverka ditt arbete med MIK?

Avslutning

Är där något du vill tillägga som vi inte har pratat om? Någonting du undrar över?

Appendix 2. Informed Consent

Mitt namn är Emma Brinkåker Pantzar och jag studerar på masterprogrammet ABM vid Lunds universitet.

Jag håller nu på att skriva mitt examensarbete i form av en masteruppsats som fokuserar på skolbibliotekariers förhållningssätt till och eventuella erfarenheter av informationssökning med hjälp av AI-teknik. Min studie bygger på att jag gör intervjuer med skolbibliotekarier om dessa frågor och hur de eventuellt kan påverka arbetet med medie- och informationskunnighet.

Intervjun beräknas ta ungefär 45-60min och kommer att spelas in. Inspelningen kommer inte att spridas vidare och kommer att bli raderad efter att uppsatsen blivit godkänd. De som blir intervjuade inom ramen för uppsatsen kommer att avidentifieras och alla personuppgifter kommer att behandlas konfidentiellt. Deltagande i undersökningen är frivillig och du har möjlighet att avbryta din medverkan om du så önskar.

Vänligen besvara med ett godkännande av dessa villkor.

Jag är mycket tacksam för ditt deltagande!

Mvh,

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