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SEARCHING IN THE WILD: SWEDISH TEENAGERS' ONLINE SEARCHING DURING ENGLISH LESSONS

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Abstract: *All school leavers should have efficient online searching skills, defined here as the ability to select suitable search terms, feed them into a search engine, and make active decisions about which options to open from the results page. An additional element in our study includes the ability to search in English. As less than 1% of the Internet is in Swedish and about 60% is in English, this study assumes that Swedish school leavers will need to be able to use both languages. The study provides a qualitative, naturalistic account of the searching activities of Swedish teenagers in English classes from Grade 8 through to English 6 (ages 14-18 years). Screen recordings from normal English lessons were analysed and supplemented with stimulated recall interviews with 40% of the pupils. The study reveals low levels of ambition and limited digital competence combined with high levels of confidence. Most pupils were unaware that they could have achieved more. The same pattern emerged across four school years in eight different classes. We conclude that improvements in digital competence education require more modelling of skills such as searching, so that teenagers recognize the value of aiming high.*

Keywords: *online searching; digital competence; Swedish schools; L2 English; over-confidence*

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Introduction

The 21st century has witnessed remarkable changes in literacy skills needed to function effectively. Teenagers need to be able to search the Internet, often in English, which is an additional challenge for Swedish speakers. To search proficiently, second language (L2) learners need meta-cognitive skills to be able to identify search terms, skim texts for information, distinguish opinion from fact all of which demands language-specific knowledge that will not necessarily transfer positively into the L2. Therefore, the task of teaching these skills cannot be left to first language (L1) teachers. Teachers of English in Sweden need to address the English-specific literacy issues, including online searching and skimming.

Swedes need to conduct many of their searches in English as about 60% of the Internet is in English and less than 1% is available in Swedish (w3techs, 2023). Although we focus on the Swedish context, many other countries face similar issues as even 'large' global languages like Spanish only produce 5-6% of the content available on the Internet (ibid.). The capacity to search effectively in English is necessary for pupils' studies and central for life-long learning. In 2017, Sweden's National Agency for Education (NAE; Skolverket, 2017) revised the national curricula to emphasize digital competence. The key skills identified include searching for information, evaluating sources, and using digital tools efficiently. This change in the curricula recognizes weaknesses in the school system. However, Internet searching is not a "new" literacy: practical, research-based advice on how to teach searching has been available since before the pupils affected by this change were born (e.g., Guinee, Eagleton & Hall, 2003; Henry, 2006).

Despite its obvious importance, few studies investigating online readers using English as a foreign language have been conducted. Not a single article on this topic has appeared in *Digital Culture & Education* since its conception, although a special issue (Volume 3:1) on the gamification of L2 education appeared in 2011, followed by articles examining specific activities such as specially designed games (Uzun, Çetinavcı, Korkmaz & Salihoglu, 2013), using Facebook (Çakir & Atmaca, 2015) or Skype (Ockert, 2015), and blogging (Bowen, Lantz-Andersson & Vigmo, 2016). Without wishing to denigrate research on how game-play, social media and gamification might contribute to L2 education, we see a great need to understand how teenagers learn to conduct normal searches for information online.

The few studies of online searching that do exist tend to use simulations of the Internet with poor external validity (Akyel & Erçetin, 2009). In Sweden, the 2010 Education Act specifies that educational practice, regulations and policies should have a "disciplined grounding of practice in research" (§5). Sweden thus requires research-based knowledge about how pupils search online, where problems arise and what needs to change.

This article presents a snapshot of what is currently happening during English lessons in Swedish schools. The participants in the study and their teachers had all received training on how to use advanced search functions (including Boolean parameters) during an intervention. Prior to the intervention, explicit training on how to search during English lessons had mostly focused on formulating questions and selecting key terms. The youngest participants were in Grade 8 (14-15 years) and the oldest were in English 6 (17-18 years). The data was collected at the end of restrictions imposed due to covid-19. The pupils were in school, but had worked online extensively during the pandemic.

Aim and Research Questions

This study aims to provide a qualitative, naturalistic overview of what is currently happening during English classes in Swedish schools when pupils search online. To fulfil this aim, the study begins

by mapping Swedish pupils' online searching actions to determine how well they can locate sources on the Internet. The pupils' own thoughts about their performances are also mapped.

RQ1: What strategies did the pupils demonstrate when searching online?

RQ2: How successful were these strategies?

RQ3: What did the pupils think about their searching skills?

Online Research and Reading: A review

The value of the Internet is dependent on users' abilities to locate, skim, critically assess and efficiently compile information. Combined, these skills are known as online research and comprehension (ORC) (Cho & Afflerbach, 2015; Leu *et al.*, 2008, 2015). The term acknowledges that reading for information online requires additional skills beyond textual comprehension. In an early study, Leu and colleagues identified five key skills involved in ORC: 1) identifying important questions, 2) locating information, 3) critically evaluating the usefulness of information found, 4) synthesizing information to answer questions and 5) communicating information to others (Leu *et al.*, 2004, p. 1572; see also Leu & Zawilinski, 2007). The list suggests a linear process, although it has been acknowledged that individuals may move backwards, for example, to reformulate the question based on a critical examination of the information found.

The first three skills are particularly evident in the process of searching for information, which Henry describes as "gatekeeper skills" (2006, p. 616) given their centrality in providing access to information. She continues: "Reading educators need to have strategies and skills to assist their students and teach them how to not only search for information on the Internet but also how to read on the Internet" (*ibid.*, p. 617). We subscribe to this view, noting that online searching involves some elements that are unique. Although searching, evaluating, and skimming are needed irrespective of medium, the precise tools (e.g., performing a Boolean search, interpreting domains in the URL, simultaneous scrolling and skimming) are specific to digital interfaces. These skills demand active choices (e.g., deciding on the search terms), evaluative judgments (e.g., scanning links to determine which are worth opening) and critical reception (e.g., reading the website in a focused manner).

Knowledge of how search-engines function and how informational websites are structured form two of the "prior knowledge" types identified by Coiro and Dobler (2007). They also note that online reading places more emphasis on skills such as forward inferencing and skimming as well as decision-making cycles (plan-predict-monitor-evaluate) than analogue reading (*ibid.*, p. 235). In a later study, Coiro (2011) was able to demonstrate that these skills are distinct from offline reading comprehension. Her study of teenagers found that high levels of online reading skills could even compensate for lower levels of knowledge about the topic (*ibid.*, p. 374). This finding implies that pupils who engage in searching activities during their free time may transfer those abilities to school contexts, although Greenhow and Lewin identify a "digital dissonance" between the use of digital technologies in home environments and in school environments (2015, p. 15).

Arnesen, Elstad and Christophersen (2017) have examined feelings of agency generated by free time and school-based activities among 3400 Nordic youth aged 15-17. Their findings supported the idea that digital dissonance exists but, contrary to their hypothesis, they found that "the more students identify with formal schooling, the stronger their sense of agency in informal online learning" (*ibid.*, p. 110). It thus behoves educational systems to ensure that competent Internet use is fostered in formal learning environments. Arnesen *et al.* also found that "the more students identify with online culture, the less they identify with school culture" (p. 111). This may explain

our own findings at the start of the project. We found that pupils reported high levels of self-confidence and low levels of anxiety (Nordlund, Kokkola & Rydström, 2023). However, our findings did not indicate a simple cause-effect relationship between self-efficacy and success. On the contrary, we found that pupils tended to be more confident in their skills than their modest abilities warranted. This may be because the activities pupils engage with in their free time do not require the ‘searching for information’ skills that are often needed in educational contexts.

A study by van Deursen, van Dijk and Peters (2011) provides a more nuanced understanding of how age relates to self-efficacy. Their study distinguished medium-related Internet skills (technological competence) from content-related Internet skills, such as the capacity to use the Internet strategically to find information. They found that age is negatively associated with medium-related skills (giving rise to the notion of ‘digital natives’), but is positively associated with content-related skills. Moreover, they found that “content-related skills do not grow with years of Internet experience and the number of hours spent online weekly”, which indicates that specific education is needed (ibid., p. 125). In terms of self-efficacy, the use of apps and playing video games appear to produce high levels of confidence that are unrelated to many important medium-related skills needed to function effectively online.

Apart from our own study, the research on searching cited so far mostly stems from the New Literacies Research Lab at the University of Connecticut, and – since the language of the pupils is not mentioned – the unstated assumption is that the subjects are using their dominant language, English. (The studies by Arnesen, Elstad and Christophersen, and van Deursen, van Dijk and Peters examine attitudes towards Internet use, not searching itself, and neither study takes the language of the Internet into account.) Even so, the teenage subjects studied by the New Literacies Lab are far from efficient in their use of even simple digital techniques such as feeding search terms into Google and scrolling through the outcomes in their L1 (Goldman *et al.*, 2012; Leu *et al.*, 2015). The International Computer and Information Literacy Study (ICILS) indicates similar results in other L1 contexts (IEA, 2019).

ICILS was designed to assess, among other things, aspects of searching and skimming this study also considers. ICILS has two main dimensions. The first focuses on knowing about and understanding computer use, accessing and evaluating information, and managing information. The second focuses on producing and exchanging information. Both actual competency in and attitudes towards these dimensions were examined. Background information, including parental education and access to computers and books in the home, was also collected. The first key message presented by ICILS is that “Digital natives are not digital experts: Young people do not develop sophisticated digital skills just by growing up using digital devices” (IEA, 2019, p.7). The need to state this finding is more remarkable than the result itself. We do not expect young people to develop *sophisticated* skills in sports, literature, history, geography or human biology just because they grow up surrounded by opportunities. And yet, belief in the highly skilled ‘digital native’ is pervasive, internalized and unhelpful (Nordlund, Kokkola & Rydström, 2023; Ofcom, 2014).

Shockingly, the 2018 ICILS results revealed that less than 2% of the 46,000 Grade 8 pupils who participated could critically evaluate the sites they found online. The study also found that providing pupils and their teachers with information and communications technology (ICT) equipment does not necessarily result in the development of necessary digital literacy skills. Pupils need to be taught how to use computers effectively, and their teachers need to be supported in their use of ICT in teaching (IEA, 2019, p.13). However, ICILS found that effective learning of digital searching does not seem to directly connect with the *quantity* of teaching. The report indicates that 74% of pupils had received education in searching for information and 68% had received education on deciding whether Internet information was relevant for their school studies and

providing sources (*ibid.*, p. 19).

Sweden did not participate in the 2018 ICILS, although it is participating in the 2023 assessment. However, Sweden did participate in PISA 2009, which included the Digital Reading Assessment designed to evaluate pupils' skills in three areas: access and retrieval, integration and interpretation, and reflection and evaluation. Sweden's results were average on all measures (OECD, 2011, 2015). Both PISA and ICILS evaluated pupils' ability to search for information using artificial versions of the Internet, rather than examining their ability to use a natural search engine – such as Google – that requires keyword entry to generate a results page. As studies of information seeking online demonstrate (e.g., Bilal & Kirby, 2002; Schacter, Chung & Dorr, 1998), these are essential aspects of reading to learn from online information. In the following section, we examine the situation in Sweden, first on a national level and then by examining data collected using Google on the natural Internet to search for information.

The Situation in Swedish Schools

Although the PISA tests are blunt instruments for measuring the full complexities of educational systems, they successfully identify national trends. Swedish adolescents' declining scores on international tests of reading comprehension in the first decade of the millennium (OECD, 2011, 2017) justifiably awoke concern (Skolverket, 2012, 2013). In response, the NAE initiated the Boost for Literacy programme (Läslyftet), which appears to have halted the decline, but not restored Sweden's international ranking. Moreover, the program only addressed L1 reading difficulties and, when the results are examined in detail, the improvement in the average score was produced by improving the scores of pupils who were only slightly below average, leaving the scores of the weakest pupils unchanged (Kokkola & Öqvist, 2018). Little attention has been paid to reading in English, perhaps because Swedish pupils fare well in tests of L2 English (Council of Europe, 2012).

The Swedish Government decided to clarify and strengthen the role of digital competence in the national curricula (Regeringskansliet, 2017). This includes searching for information, evaluating sources, the effective use of digital tools and understanding digital systems and services (*ibid.*). The documentation specifies how digital competence should be supported within the subjects of mathematics, technology, social science and Swedish, but provides no specific guidance for English.

Our colleagues, Rizk and Rodriguez (2021), used a browser extension to collect c.a. 90 hours of searching behaviour from 120 pupils aged 14-15. The data was analysed to identify strategic patterns (e.g., using keywords effectively; refining searches), behaviour at points of difficulty (e.g., using Google translate) and over time, domains visited and switching between languages. The data was aggregated to produce four search profiles, which their teachers considered helpful for identifying when intervention is needed. This was the starting point for our study.

At the start of the project, we ran Vocabulary Size Tests (VSTs) on 147 pupils aged 14-16 (grades 8 and 9) in eight classes at three Swedish schools. (VSTs are considered an effective means of measuring language competency.) The VST scores were compared with the reading difficulty of texts the pupils chose to read to reveal that neither Swedish pupils nor their teachers set themselves sufficiently high goals in terms of learning outcomes (Nordlund, Kokkola & Rydström, 2023; see also Kokkola & Öqvist, 2018).

In sum, the challenge for English teachers in Swedish schools aiming to improve their pupils' online searching skills do not need to focus on general language competences, but rather on the metacognitive skills needed in searching situations. However, many teachers struggle to search online effectively (see Arrastia, Zayed & Elnagar, 2016). To address these problems, the teachers,

a teacher-researcher and two researchers met once a month to discuss advanced L2 literacy education in English for a period of two years prior to the collection of data reported here. During these meetings, the teachers were presented with analyses of the data submitted previously. The findings were discussed and the next stage of data collection was collaboratively agreed. Four of these sessions were specifically on searching skills. A further two workshops with an outside expert on advanced searching techniques were also offered. These workshops focused on Google, as Chrome is the default browser on teachers' and pupils' school computers in the municipality. The data was collected in the autumn semester, so the pupils had not spent much time with these particular teachers. They had 2-4 lessons on online-searching in the English classes immediately prior to the data collection.

Participants and Ethics

The pupils were volunteers from eight classes, from Year Eight through to English 6, aged 15-18 years, and their teachers. The searching activity was part of normal schoolwork and so all pupils in each class participated in the activity. Forty-seven volunteer pupils within these classes allowed the research team to record their screen while they searched. They were asked whether they would be willing to be interviewed. Eighteen agreed, signed a consent form and provided the pseudonyms used here. They then uploaded the screen-recording software VLC onto their school computers, downloaded and shared the screen-recordings, thereby making three active decisions to participate after signing the permission form. Those who agreed to be interviewed met the same researcher again 1–2 days later. Oral consent was sought at the start of the interview, with the reassurance that they could withdraw at any time. No pupils did, but six screen recordings were excluded due to technical errors. The SORAB scores (see below) from Grade 9 were not delivered. The attendance of teacher volunteers at meetings was calculated into their work plan.

Methods and Data Sets

SORAB

The SORAB (*Survey of Online Reading Attitudes and Behaviours*; Putman, 2014) was used to collect data on the pupils' and teachers' confidence in their ability to conduct online searches. SORAB is a standardized test assessing: 1) efficacy for reading online, 2) efficacy for online-skill implementation, 3) motivation, 4) self-regulatory practices within Internet reading, and 5) anxiety.

Online searching behaviors: screen recording data

The screen recordings were analyzed both quantitatively and qualitatively. A search was defined as pressing the return tab to produce a search result using a search engine (mostly Google, but some 8th graders used Bing). Most pupils focused on the task and only conducted assignment-related searches, but two pupils spent the lesson selecting music (one in Grade 9, one in English 5) and one playing a game (Grade 9). For this reason, searches that related to the school assignment were distinguished from off-topic searches.

The means of searching was divided according to whether pupils used the simple search tool or advanced search. Entries were further categorized as to whether the pupil wrote a phrase, a question or search terms. Information about how frequently they allowed Google to complete the phrase or correct a spelling error was recorded. Field-notes and screenshots on the advanced search functions were collected to reveal whether the pupils were able to use the different elements of a Boolean search. In addition, data on augmented searches (i.e. modifying search criteria) was collected.

Data on the pupils' actions in relation to the result list was also tabulated. To assess whether pupils made active decisions, data about whether pupils selected the first or next item on a result page was recorded and distinguished from 'Choice' indicating that the pupil did not simply work through the results list. Sometimes the first choice was a good choice, but sometimes it opened an advertisement. Fieldnotes in the score-sheet separate these. While a high 'choice' score indicates pupil autonomy, only the fieldnotes reveal whether first/next were good choices. Choosing *not* to open a site and the use of snippets were also recorded. Data on the number of unique sites visited (i.e., sites with a unique URL) was kept. Pupils often returned to the same sites during the session, but returns were not counted.

Stimulated Recall Data

Immediately after the lesson, the screen recordings were examined and moments when the pupils searched and scrolled through results were identified. These were then shown to the participants during their next English class to prompt them to remember their thoughts while performing the task. The pupils could choose whether they wanted to be interviewed in English or Swedish and could change language at any time. The interviews were transcribed for content, with additional fieldnotes presented alongside the transcript (Bowles, 2018).

Following the work of Braun and Clarke (2006), the transcripts of the stimulated recall interviews were analysed thematically in relation to the research questions. When the fuller analysis of the screen recordings became available, the interviews were re-examined for more insights into the thinking behind specific actions.

Results

To communicate our findings more effectively, we present the interview data alongside other data.

	Gr 8	Eng 5	Eng 6	Pupil Mean	Teachers
Efficacy for reading online	3.1	3.3	3.1	3.2	2.9
Efficacy for online skill implementation	3.1	3.4	3.1	3.2	2.8
Motivation	2.4	2.8	2.5	2.6	2.5
Internet value/interest	3.0	3.0	2.9	3.0	2.9
Self-regulatory practices within Internet reading	2.7	2.9	2.7	2.8	2.3
Anxiety	1.6	1.4	1.5	1.5	1.6

Table 1. SORAB scores.

The SORAB test uses a four-point scale. The results indicate high levels of self-confidence accompanied with low levels of anxiety, with no significant difference between the classes. The teachers are marginally less confident and more anxious than their pupils. They noted that they have confidence in some situations (e.g., searching for materials to use in their classes), but feel less confident in others (e.g., finding published research in a database). They felt that their pupils were often over-confident. Elin commented that "it's kind of fun to find something that they can't [do]" because the pupils "think they do online searching", but they actually need considerable guidance. Elin thus enjoyed opportunities when pupils recognised the limits of their abilities, and she could show them how much more could be achieved.

The pupils' confidence in their online skills – regardless of age – was also evident in the interviews. When asked about whether they would change anything if conducting the search again, most of the pupils expressed self-satisfaction, and said they would not do anything differently: “I actually think I'd do the same. I think I got good information” (Pikko, E5f). Similar expressions of self-satisfaction appear in most interviews, irrespective of the quality of the search. El profesor (E9b), as an example, added ‘English’ to her search terms and explained that “the results were in English, so I guess that was better” when augmentation actually made the results worse. Instead of results describing her topic from the different angles needed for her assignment, the augmented search results were limited to hard facts. Of the eighteen pupils interviewed, only one thought looking at a few more pages would have been better and three pupils acknowledged that their search terms could have been more specific.

Screen-recording data

The number of searches was highly dependent on the length of the lesson, the length of the recording and the nature of the task set by the teacher. In seven of the eight classes, the teacher set a task requiring pupils to gather and evaluate information for an essay or oral presentation. Pupils were expected to run a mixture of dirty searches followed by more refined searches based on the results. However, one of the 8th Grade teachers generated quizzes on four topics she knew interested her pupils (e.g., cheerleading). Pupils were expected to find very precise answers to as many of the questions they could during the lesson.

The different tasks prompted distinct patterns of searching. As can be seen in Table 2 below, Class E8b pupils had a considerably higher number of searches than pupils working on essays or presentations that required finding and evaluating material on a particular topic. To generate a comparable figure, the number of searches per hour was calculated. The mean does not differ greatly between the age groups and the range for all groups reveals extensive individual variation.

	N =	Task	Searches per hour (mean)	Range	Mean per year group
E8a	11	Essay about a person who inspires you with their good deeds	21.95	6.53-37.56	8 th Grade 23.91
E8b	4	Answer a series of short questions	29.31	21.33-40.85	
E9a	9	Essay on gun control debates in the US and Sweden	18.66	7.06-33.91	9 th Grade 17.34
E9b	6	Essay on a disastrous event	15.35	4.53-26.18	
E5h	2	Essay about mythical creatures	9.66	4.19-15.12	Eng 5 19.83
E5f/g	8	An oral presentation about a Phenomenal Phenomenon	14.58	6.0-26.67	
E6	4	Five paragraph essay contrasting two points of view on the climate crisis	18.92	18.14-40.35	Eng 6 18.92

Table 2. Searching tasks in each class.

The use of quiz-style questions by-passed the first key skill needed for effective Internet use: identifying important questions. As a result, all four pupils searched entirely on topic, swiftly. Pupils working on the essay or presentation tasks were given guidance on selecting suitable search terms, but struggled to identify routes that would lead them to the information they wanted. Instead, they tended to go online in search of inspiration: “I didn’t really know what I was looking for” (Nell, E9b), “I was just looking for things and I just wanted to see other things before I chose which one I would include” (Rania, E9a), “I was just looking and scrolling to see if I found anything interesting” (Mr, E9a). While understandable, this meant that pupils who were not able to think of a person who inspired them, a disastrous event or a ‘phenomenal phenomenon’ spent a large section of the lesson using phrases such as “people who has done something great” (My, E8a). Such pupils had little to guide them when scrolling through the results of their searches. Mr (E9a) scrolled through three pages of results explaining that “I thought that if I keep on going, I might find something there”, others were simply looking for ideas that would help them get started: “I was just looking for more facts, sort of. Something to write about” (Melker Røhde, E5g).

Amalgamating the other data collected – such as the use of whole phrases or individual search terms – into figures and means obscured the value of the results. For instance, William (E8a) only used four unique sites, but was able to produce almost an entire page of English text: the longest text produced by any participant. In contrast, Roland (E8a) reused his search lists several times, opening 12 unique sites, but did not write a word. Reducing this information to averages does not enable us to answer the question “How successful were the searches?”. Success was primarily evaluated in terms of whether the searches enabled the pupils to complete the assignment their teachers had set and pupils’ feelings of success. However, we also provide our own reflections on the quality of the pupils’ searching behaviour, evaluating the quality of the sites they visited and the degree of autonomy they exhibited. Below, we present the types of data collected along with a few examples to give a sense of the patterns we saw in the data.

Pupils tended to reuse the same strategies throughout the recorded session. Pupils who wrote phrases to run dirty searches, repeatedly wrote phrases; pupils who used individual search terms, repeatedly used search terms. Equally, the ability to make active choices when faced with a list of results (as opposed to slavishly clicking open every result) was fairly consistent. The one exception to this was the decision as to whether to use advanced or simple search.

Although all the participating teachers had received additional training, including the use of advanced search functions, only one of the 8th Grade teachers specifically encouraged pupils to use advanced search during the lesson. 9/11 of the volunteer pupils in that class at least tried it, but only two persevered. Frans (E8a) ran 7/23 of his searches using the advanced search, but did not write a word. Sune (E8a) ran 3/7 searches using advanced search, and 2/4 of the simple searches were to check a term in the text read. He was able to use tabs effectively, and returned to the results pages several times, visiting 15 unique sites from five searches. In the other 8th Grade class and both 9th Grade classes, no pupils used advanced search. One pupil in English 5 and all four volunteers in English 6 tried advanced search, albeit not successfully. Simply finding the tool proved challenging. Bob (E8a) needed five attempts to locate advanced search, and then used simple search in a separate tab to find terms to fill into the various sections. Pello (E6) used simple search to locate advanced search four times in 51 minutes. Each time he used the advanced search tool, but only once in a way that has potential to function differently. On the other occasions, he simply puts words into the “include all the following”. In the end, he gives up and writes a message to say that he is frustrated, hungry and has an exam in two hours.

None of the pupils interviewed normally use the advanced search function: some because they were not aware of its existence (despite the teacher intervention), others because they consider it

more time-consuming, but mostly because the simple search tool is “the normal way” (William [E8a], among others) and easier: “I know what results I will get” (Big Papi, E9a). A few pupils also commented on the possibilities of carrying out more advanced searches with the simple search tool, e.g., by using quotation marks around words or phrases.

One reason to their inefficiency could be that the advanced search felt new. JAG123 (E6) commented that “It was the first time I used the advanced search, so I felt like a beginner” and Pello (E6) used the advanced search because his teacher had shown him: “I wanted to use ‘smart search’, which I hadn’t used before.” Many pupils also fell back in old routines and used the simple search after a while: “I forgot about the advanced search” (Sigge, E8a).

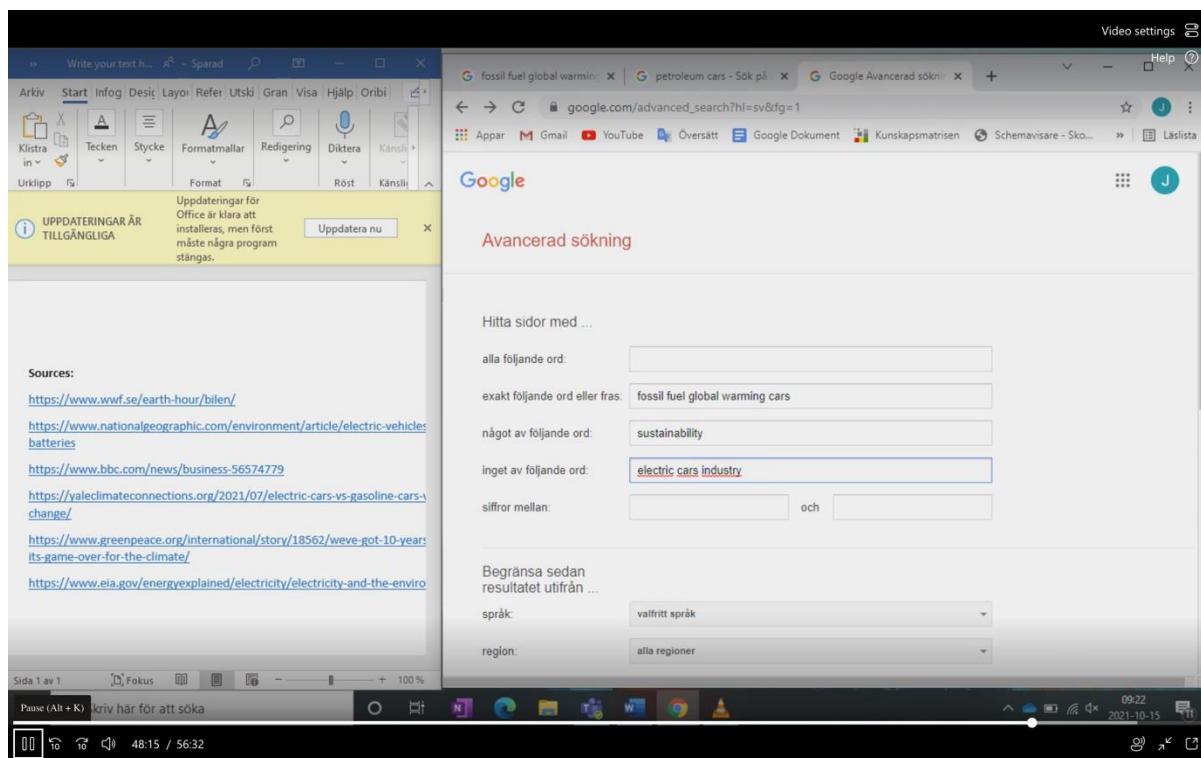


Figure 1: Best use of advanced search in the data

Even students who managed to use advanced search successfully are not able to do so consistently. For instance, JAG123 (E6) used simple search to find terms to fill into the advanced search fields, and then managed several advanced searches which are ‘successful’ in the sense that information is fed into more than one category (see Figure 1). However, of her 14 uses of the advanced search tool only four led her to sources she considered sufficiently valuable to note down. This is mainly because she misinterpreted the type of information needed. The final four searches insist on the ‘exact phrase’ “fossil fuels global warming cars” (which we interpret as terms placed in the wrong field), followed by an exclusion of “electric cars”, modified with additional words such as ‘industry’. Furthermore, JAG123 was one of several pupils who seemed to think that simple and advanced searches select from a different Internet. She tests for reliability by searching for the authors, e.g., “Dr. Andersson” and “Ian Morse”, apparently unaware of how common these names are, which is especially odd in relation to the common Swedish family name, ‘Andersson’.

As Figure 1 shows, JAG123 was able to split the screen so she could write notes while seeing the

website. Only three pupils in the entire data set were able split to the screen in this way (one in English 6 and two in Grade 8), and another English 6 pupil could split the screen between word and pdf, but not between Chrome and Word. As a result, he spent 1:06 minutes of sustained effort toggling between the web page and his word document checking the spelling error in 'sustainable'. The ability to split the screen is not a search-related skill, but it revealed more sophisticated digital skillfulness than anything else in the data. The inability to split the screen wasted pupils' time and caused them to focus on the technology rather than the content of texts. Since their English teachers had not taught this skill, pupils who did so were transferring skills from another context, quite possibly in their home lives. Most pupils seemed unaware of the potential to be more skillful.

So far, all the pupils we have mentioned came from either Grade 8 (aged 14-15) or English 6 (aged 17-18). Although the high-school pupils definitely had a better command of English than the secondary-school pupils, progression in searching skills was uneven. William (E8a) was the most successful in terms of completing an essay writing task in the entire data set, and two of the 8th Grade pupils answering the quiz were able to answer more than 15/20 of the questions set, whereas a pupil with three more years of experience struggles with the spelling of 'sustainable'.

The weakest performers in terms of searching were in 9th Grade. This group included the highest number of off-topic searches, including Big Papi (E9a) who spent much of the time selecting music, and EE (E9a) who spent just three minutes on the task and the rest of the time playing a game. Nevertheless, they willingly volunteered to share their screen recordings and Big Papi was also interviewed. None of the 9th Graders used advanced search, although more than half the pupils augmented a simple search on at least one occasion (sometimes prompted by Google to do so). In terms of completing the task, the two most successful pupils in Grade 9 adopted very different strategies. Haj (E9b) found just one site and wrote based on this, checking a few terms later in the lesson. This pupil produced the most writing among the 9th Graders, but less than William (E8a). Mr (E9a), in contrast, ran five searches and then carefully selected from the 16 original sites she visited. She did not stay on the pages long enough to read them, but simply bookmarked the sites containing "good" or "enough" information for the task, which she planned to start writing during the upcoming class.

Most pupils wrote either phrases or questions, frequently allowing Google to complete the phrase or correct spelling errors. For the pupils answering the quiz questions, writing a complete question was the most efficient searching strategy. Älvan (E8b) ran 18 of her 24 searches this way, and on each occasion was able to answer her question from a snippet (rather than opening a page). She was able to maintain focus and produced the highest number of searches per hour (40.85) in the entire data set. However, she could not identify the URL and often copy-pasted the results page instead.

The approach used by Älvan was not appropriate for the other pupils who needed to find and evaluate good quality information. Sune (E8a) also made fairly extensive use of phrases and copy-pasted snippets as a means of gathering information. Of the 22 original, school-work related searches he ran during the lesson (39.4 searches per hour), 12 were phrases and six snippets were copy-pasted. He was not a particularly focused pupil: nine of his searches were for music. At the end of the lesson, he had a body of copy-pasted material, most of which was selected with minimal effort. In terms of completing the school assignment, Sune's strategy might be as efficient as Älvan's. However, both techniques indicate a high level of passivity and a willingness to accept what is easily on offer.

Even though there were pupils who gave some serious thought to how to formulate and reformulate their search terms, pupils admitted that they simply chose terms that "felt like the best" (Sune, E8a), and were satisfied with the results. Their feelings of satisfaction bore little

relation to the quality of the outcome. For instance, Haj (E9b) tried several similar search terms (Exxon Valdes – what is Exxon Valdez – Exxon Valdes – Exxon – Exxon Valdez), apparently without realizing that they would yield more or less the same results. Similarly, Big Papi (E9a) tried putting his search terms in a different order: “I assumed that you get other results if you write them in another way. But I didn’t really. I got the same results.” Many pupils conducted several searches using the same terms, sometimes because they forgot what terms they had already used, but more commonly because they were incapable of refining their topics. As Nell (E9b) explained: “I always get so many hits ... There’s so much information about my topic.” Nevertheless, they expressed feelings of satisfaction and were proud to share their lacklustre achievements with the interviewers.

In the interviews, it became apparent that pupils quite often did not have a strategy for selecting from their search results. Comments include: “I just picked a page. There wasn’t any reason really” (Sune, E8a), “I don’t think I thought that much about it. Just that it was interesting information” (El profesor, E9b), “I just chose the first alternative that seemed OK” (Big Papi, E9a), “I always click on the first hit because that’s the easiest thing to do” (Mike Oxmaul, E5g). At times, however, the pupil was satisfied with what the first hit could give: “The answers were right in front of me. Why look at more sources and get the same answer?” (Den personen [E8b], who was looking for answers to questions decided by the teacher).

Discussion

The New Literacies research team identified knowledge of how to use a search engine as one of the key elements of prior knowledge (e.g., Coiro & Dobler, 2007). Despite the intervention with the teachers and explicit class teaching, the pupils were still very limited in their understanding of how search engines function. Pupils who used the advanced search rarely used it efficiently. In the interviews, many revealed a lack of understanding as to how quotation marks or Boolean terms impacted their search results. Their poor quality medium-related Internet skills were compounded by the additional content-related challenges posed by searching in their L2. Recalling Coiro’s (2011) finding that high online reading skills can compensate for lower levels of knowledge about the topic, we suggest that the teaching of explicit digital skills may be even more important when pupils are working in an L2. Simply knowing how to split the screen would generate more time for working on the tasks set as opposed to toggling back and forth to copy instructions or check spellings.

Henry (2006) claims that “Once students have a good grasp of the organization of various search engines, they are much more successful in conducting searches and reading information” (p. 617). The pupils in our study lacked this “good grasp”, despite their teachers’ extensive training. We suggest that a major part of the problem is that the pupils believe they have a “good grasp” of the search engines, and seem very satisfied with their results, mostly unaware and unconcerned by their lacklustre performances. Whilst self-confidence and a corresponding lack of anxiety are undoubtedly necessary for effective learning, we suggest that over-confidence is a major issue that needs to be tackled by showing pupils how much more they could achieve.

In general, Grade 8 pupils were more willing than the older pupils to try the advanced search. They were more explicitly encouraged to practice using it, which indicates the importance of teacher input. The pupils’ dislike of ‘feeling like a beginner’ reveals low self-efficacy, despite their confidence on the SORAB scores. It also indicates that they expect to be proficient already at the age of 16. From this, we conclude that advanced searching should be taught early – Grade 7 or 8 – and frequently while pupils’ tolerance for uncertainty is sufficiently high. Despite monthly meetings, teachers of English still felt that this was not one of their responsibilities, and we suspect that other subject teachers feel the same way with the result that the skills are simply not being

taught. This is unacceptable. All school leavers should know how to find information online.

Advanced search was not necessary for completing the assignments set. It would have been more time-consuming for pupils answering the quiz questions. In the other direction, there seems to be little need for pupils aged 14 and above to practice the kinds of searching skills needed for answering closed, quiz-style questions, they are ready for more advanced tasks. This suggests that more attention needs to be paid to designing tasks that benefit from more advanced searching practices.

The essay tasks on gun control, mythical creatures and climate crisis were complemented with additional questions to guide the pupils. The gun control and climate crisis essays required the pupils to compare two contexts (gun control in Sweden and the USA) or two points of view. The mythical creatures task identified five mythical creatures and had a series of questions about them (e.g., about the origins of the myth). The somewhat more closed nature of these tasks allowed pupils to assess whether they were finding suitable materials or not, although it also made them passively reliant on the Internet. For instance, both pupils interviewed about the mythical-creature task (E9b) had run a search concerning the appearance of dragons, rather than simply writing up what they already knew. This inability to combine pre-existing knowledge with searching activities also explains problems with deciding on a topic.

The lack of development in the tasks set is an additional concern. The curriculum does not provide teachers with sufficient support in knowing which skills should be taught when. As a result, pupils are being set similar tasks throughout their education rather than following a planned progression. The curriculum should be more precise about matters such as promoting pupils' ability to independently formulate a problem, seek for information, evaluate information, combine previous knowledge with new information as well as specific digital skills such as creating a document, splitting a screen, and using advanced search tools.

Concluding Remarks

This study aimed to provide a qualitative, naturalistic overview of what is currently happening during English classes in Swedish schools when pupils are searching online. Our data reveals that, already at the age of 14, pupils are proficient at finding answers to highly contained, pre-formulated questions in English. This is undeniably a valuable skill and pupils should indeed feel satisfaction in their ability to complete 15+ such enquiries in under an hour. The task could have been improved by adding instructions on how to split the screen so that they could see their search results and the quiz simultaneously, and how to identify the URL. All four pupils who submitted their screen recordings demonstrated that they knew how to run this kind of search, and so it seems that the lesson was simply rehearsing skills the pupils had already mastered. Moreover, the data also revealed that pupils simply read snippets and did not feel any need to check the veracity of their findings. In terms of the task that they were set, this was a reasonable assumption. Nevertheless, if pupils are not capable of more complex searches by the time they leave school, their ability to operate in the real world will be restricted.

The style of searching should relate to the task set. The other tasks involved finding, evaluating, summarising and synthesising texts, but – in terms of task-design – the tasks did not indicate progression between the 8th Grade and English 6. If anything, the tasks became more scaffolded, not less. English 6 had the most tightly defined essay task (five paragraphs, contrast, set topic) and the 8th Graders the most open task (“someone who inspires you with their good deeds”). Pupils did better on tasks with specific guidance, but often lacked the ability to connect their previous knowledge with their searches.

Few pupils demonstrated the ability to run an advanced search, and several indicated hostility – or at least frustration – with learning new skills. This suggests that the pupils feel unwilling to admit that they are still learning. A clearer sense of development and insight into the fuller potential of the technology they have available would be beneficial. Clearer delineation in the curriculum would help subject teachers understand more precisely what they should be expected to cover in their courses.

This study provides only a snapshot of what is happening in four schools in one Swedish town. Caution is needed when generalising from such a small sample. However, we had been working with these teachers for two years without producing much change in the pupils' searching behaviour. Another easy way to dismiss the significance of the findings would be to point out that our results are only about school assignments, and perhaps we should not expect pupils to be particularly engaged in the tasks assigned to them. This comment has been made on oral presentations of our findings. We find it deeply disturbing. The task was indeed part of the pupils' normal school assignments, but all pupils could follow their own interests within certain limits. Even the pupils who were answering a barrage of 20 closed questions had a choice of four topics. The volunteers were willing to show us what they did during lessons, and undertook several extra steps in order to ensure we could see what they had achieved, which implies some level of commitment to helping researchers understand their abilities. (This commitment was also reflected in the comments of the pupils – they felt that they were doing all that was required.) And while the number of participants is not particularly high, we visited eight different classes in four schools in a medium-sized town. If the best search in these many different environments is that which appears in Figure 1, then we think that grave concern is warranted. Quite simply, if pupils in eight classes do not manage better than this, then when, exactly, should we expect them to learn to take searching seriously?

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