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Web Scale Discovery Systems and Library Instruction

A qualitative study of instruction librarians' practices and their perceptions
of discovery systems' impact on students' information literacy at three
university libraries

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Svensk titel: Discovery-system och informationssökningsundervisning: en kvalitativ studie om undervisningsbibliotekariers praktiker och deras uppfattningar av discovery-systemens inverkan på studenters informationskompetens vid tre högskole- och universitetsbibliotek

Engelsk titel: Web Scale Discovery Systems and Library Instruction: a qualitative study of instruction librarians' practices and their perceptions of discovery systems', impact on students' information literacy at three university libraries

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Abstract: The purpose of this thesis is to examine how instruction librarians' perceptions of web scale discovery services and their perceptions of the impact of web scale discovery on students' information literacy are reflected in their instruction practices in academic libraries. This study addresses how instruction librarians generally perceive WSDS and students' information literacy as well as how instruction librarians conduct their instruction sessions. The study's empirical data consists of the responses received through seven semi-structured interviews with ten instruction librarians at three separate universities in the Västra Götaland region. The study concludes that library instruction practices reflect many of the librarians' perceptions surrounding WSDS, most notably in the areas of source criticism and critical assessment of search results. The study also shows that the search strategies, techniques, and tools taught in instruction sessions are greatly influenced by librarians' perceptions of the usefulness of WSDS in student search processes. The librarians' responses demonstrate the importance of teaching students search strategies and techniques as well as helping them develop critical evaluation skills that will remain relevant as search technologies continue to evolve.

Nyckelord: Discovery, web scale, användarundervisning, informationssökning, informationskompetens, universitetsbibliotek, kvalitativa intervjuer

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1. Introduction

In many university libraries, the main search option presented on the library website start page is often a web-scale discovery system. Subsequently, the web-scale discovery system, or WSDS, is a service heavily used by both students and librarians at universities and their libraries. Because of its presence and prevalent use by students and librarians, the WSDS has a key role when it comes to how students seek, find, and use information, as well as how librarians approach instruction for students in information seeking. Academic libraries all over the world have implemented WSDS, and Sweden is no exception. Therefore, we feel it is appropriate to take a closer look at the implications WSDS have had for libraries at Swedish universities, more specifically in the areas of library instruction and students' information literacy.

1.1 Problem Definition

With electronic resources existing side-by-side with traditional library collections, the information landscape has become increasingly complex (Gross & Sheridan, 2010). As a result of this growing complexity, web-scale discovery systems began to be developed. Since the introduction of the web-scale discovery service WorldCat in 2007, libraries have been implementing WSDS as tools for library users to seek and find information among the libraries' numerous information resources. WSDS ideally enable the user to conduct a search of a library's traditional catalog as well as all electronic resources and databases to which the library has access. WSDS was intentionally developed to resemble a Google-type internet-search interface that would mimic users' information seeking activities outside of the library (Richardson, 2013).

Instruction in information seeking is an increasingly important part of higher education on most levels, especially for undergraduate students who are relatively new to seeking information sources for their education and research. Navigating databases and learning to use the many different tools available in such resources can be complicated and confusing for students without some sort of guidance. Many academic libraries therefore offer courses in information seeking and retrieval either in general or as part of the specific programs students are studying. However, library instruction is constantly changing as libraries implement new tools such as WSDS for seeking and retrieving information (Buck & Mellinger, 2011). The arrival of WSDS on library websites has brought changes to the way students search for information, creating the need for library instruction to be adapted in accordance with these changes.

Use of WSDS in academic libraries is still relatively new, and its impacts are still being studied (Vaughan, 2011). Previous studies have addressed instruction librarians' perceptions of WSDS and students' use of WSDS, and only a few studies, mostly quantitative, have addressed the precise impact of WSDS on the way librarians instruct students in information literacy. Among the impacts of WSDS on library instruction were changes in how time was spent during instruction sessions (Buck & Mellinger, 2011). One of the major impacts of WSDS on students' information literacy has been identified as an increased need for students to critically evaluate information sources and search results (Seeber, 2015).

By conducting qualitative interviews with instruction librarians regarding their approach and strategies for library instruction since the implementation of WSDS, we can address issues that previous studies have identified as well as possibly uncovering new issues. We can also gain a clearer view of how academic librarians conduct their instruction sessions and perceive students' information literacy with regards to WSDS.

1.2 Purpose and research questions, delimitations

The purpose of this thesis is to study how librarians use WSDS in their information-seeking instruction as well as its impact on students' information literacy by comparing the findings from our interviews with themes identified in previous research regarding library instruction, search tools and students' information seeking. We have also used an information seeking model, by Kuhlthau, as a theoretical framework for our study. Our study was limited to the instruction of undergraduate students. It was also limited to universities in Västra Götaland that have implemented WSDS.

We also aim to examine the current library instruction and information literacy landscapes to see how they compare with the observations, predictions and recommendations presented in previous studies regarding the impact of WSDS on library instruction and students' information literacy. To do this we have used the following research question:

- How are librarians' general perceptions of WSDS and their perceptions of the impact of WSDS on student information literacy reflected in their library instruction practices?

In order to answer our research question and fulfill our research purpose, we have broken down the main research question into three sub-questions:

- What are instruction librarians' general perceptions of WSDS?
- How do instruction librarians perceive the impact of WSDS on students' information literacy?
- How do instruction librarians conduct their instruction sessions?

1.3 Background

This section provides background information regarding three major concepts in our thesis, *web-scale discovery systems*, *information literacy*, and *library instruction*. First, we explain what web-scale discovery systems are as well as how and why they were developed. Secondly, we give a brief explanation of the meaning of the term *information literacy* in the context of our thesis. Lastly, we address the role of library

instruction in education and information literacy and describe some general guidelines for library instruction, concluding with a short explanation of the impact of new technology on library instruction.

1.3.1 Web Scale Discovery Systems

Web scale discovery services and systems, or WSDS, are search tools which allow a library user to search and access all materials the library subscribes to with a single search (Sadeh, 2013). The term “web scale” refers to the expansive technology used to preharvest and centrally index the content of all the library’s accumulated information resources. “Discovery” refers to the user’s experience with the service, through which information is discovered by and delivered to the user (Vaughan, 2011). WSDS may also be referred to as *discovery services*, *discovery tools*, *resource discovery services*. For practical purposes, we will use the term WSDS throughout the rest of this thesis.

According to Vaughan, there are four characteristics typically possessed by WSDS: content, discovery, delivery, and flexibility. As mentioned above, the content of the library’s information resources are harvested and indexed. Discovery capabilities are provided through a single search box, in which the user can initiate a Google-like search as well as perform advanced searches. A single search yields immediate search results, which are ranked by relevance and which can easily be sorted, narrowed, and broadened through faceted navigation. Lastly, WSDS possess a flexibility which allows them to be customised by the library according to the library’s own needs (Vaughan, 2011).

WSDS are still a relatively new library tool, evolving from earlier library information systems, including traditional library catalogs and federated search tools. The first WSDS, OCLC WorldCat Local was launched in 2007, with Serials Solutions Summon appearing in 2009 and Ebsco Discovery Service and others appearing in 2010 (Vaughan, 2011). One of the primary goals in the development of WSDS was to provide library users with a scholarly information search environment which offered the familiarity and comprehensiveness of web search engines. Users would have access to a world of scholarly content with a single search from the library’s homepage (Sadeh, 2013). Furthermore, since articles’ full-texts could now be indexed, any word or phrase contained in an article could generate a point of retrieval for the user (Breeding, 2010). The user could further refine relevance-ranked search results by selecting any number of facets, or attributes, for example, publication type, year(s) of publication, specific journal(s), language, subject, and author. Additionally, the WSDS would integrate other library delivery services which would facilitate the physical or electronic retrieval, including document delivery, citation tools, and reservation requests (Sadeh, 2013).

WSDS, like the web search engines they were based on, were designed to be user-friendly, and as a result do not require the same information literacy that users needed to use more traditional library search tools (Sadeh, 2013). However, the role of WSDS as “gateway to information by users” (Vaughan, 2011 p.18) means that WSDS may have the potential to help form the information literacy of its users (Vaughan, 2011).

1.3.2 Information Literacy

Information literacy is a complex concept which is difficult to define, although many different organisations as well as librarians and other information professionals have made attempts to do so (Lau, 2006). One widely-used definition that has been adopted by the American Library Association (ALA) states that information literacy is an individual's ability to recognise an information need as well as to "locate, evaluate, and use effectively the needed information" (ALA, 2000 p. 55-56). The Society of College, National and University Libraries (SCONUL) define information in their core model, the SCONUL Seven Pillars of Information Literacy, as demonstrating an awareness of, as well as possessing information skills for acquiring, using, managing, and creating information effectively (SCONUL, 2011). The IFLA international standards for information literacy break down information literacy into three basic concepts: access, evaluation, and use of information. Accessing information involves recognising and/or defining an information need as well as locating and retrieving the information through identifying sources and cultivating search strategies. The evaluation of information involves the critically assessing and organising the found information effectively. Finally, using information involves ensuring it is applied and communicated accurately, properly, and creatively (Lau, 2006).

1.3.3 Library Instruction

The use of information, a basic part of education, is an extremely important resource for social and economical development as well as technological and scientific innovation. Therefore, it is important to understand how to effectively search for and find information. However, a person does not become information literate simply by being around information. The overwhelming amount of information available means that verifying and evaluating information is challenging not only for students but for individuals of all kinds. Information literacy plays a vital role in meeting educational goals on all levels. Librarians are therefore in a key position to assist students throughout the course of their educations (Lau, 2006).

A method of teaching information literacy using a constructivist approach based on education research is recommended by IFLA (Lau, 2006). Using this method engages students in solving problems using information. This method results in students actively thinking and investigating to gain new understandings, rather than requiring them to merely memorise facts. IFLA maintains that information literacy needs to be grounded in "resource-based-learning, information discovery, and inquiry-problem-based instruction" (Lau, 2006 p. 9). By collaborating with programs and teachers and planning exercises related to students' curricula, instruction librarians can play an important role in students' learning processes by helping students developing the necessary skills, values and knowledge for lifelong learning (Lau, 2006).

Library instruction in information literacy has seen swift changes in line with the development and implementation of online search tools. Traditional library instruction involved giving students a tour of all the library's physical resources, which included scholarly journals and other materials in print form. However, as scholarly journals started making their content available online, the need for libraries to instruct students

in online searching became apparent. Therefore, library instruction needs to be adapted to meet the students' changing needs (Seeber, 2015).

2. Previous Studies/Literature Review

Here we present some of the findings from previous research related to librarians' perceptions of WSDS as well as the impact of WSDS on library instruction and students' information literacy.

2.1 Librarians' perceptions of WSDS

A few studies have addressed the advantages and disadvantages related to the use of WSDS in academic libraries, as perceived by instruction librarians. One positive aspect is that students are able to explore resources they may not have previously used or been aware of, such as e-books, due to the fact that WSDS searches all the library's resources (Spezi et al, 2013). Buck and Mellinger's survey study of instruction librarians in academic libraries with the recently implemented WSDS Summon identified that a major advantage was that Summon gave "immediate access to full-text documents" (Buck and Mellinger, 2011, p. 165). Instruction librarians were also pleased with the convenience Summon offered by acting as a "one-stop shopping tool covering all topics and including all content types" (Buck and Mellinger, 2011, p. 166) and with which students were always able to locate something useful. One of the major disadvantages of Summon was that it gave too many results. Other significant disadvantages were irrelevant results and the inability to conduct a search according to certain disciplines or subject headings. A few librarians thought there were too many technical problems and that the WSDS was not appropriate for their populations (Buck and Mellinger, 2011).

Regarding the populations librarians felt WSDS are appropriate for, Buck and Mellinger's survey study found that the majority of responding librarians considered Summon to be most appropriate for lower-division students. The majority of librarians, 84%, taught Summon to lower-division undergraduates, while 51% taught summon to upper-division undergraduates. Only 30% taught Summon to graduate students. Another study by Buck and Steffy (2013) also showed that librarians were more than twice as likely to teach WSDS to lower-division students as to upper-division and graduate students (Buck & Steffy, 2013). Librarians also indicated that Summon was especially useful for cross-disciplinary studies and courses that did not have any appropriate subject databases (Buck & Mellinger, 2011). Buck and Mellinger also concluded that the librarians generally had a positive attitude toward WSDS and considered them to be a supplement to the existing search tools rather than a replacement, and it was predicted that more and more librarians would be integrating WSDS into their instruction sessions. (2011)

2.2 Impact on information literacy

The impact of WSDS on students' information literacy skills has also been a focus of several studies. At the time of Buck and Mellinger's (2011) study, many of the responding librarians felt it was too early to observe any impacts, although a few comments indicated that a few librarians had perceived some positive and negative impacts. Some librarians believed that Summon "promoted the concept of 'good enough'", and that students were not learning basic search skills (Buck & Mellinger, 2011, p. 171). Among the more positive impacts were that students could focus more on the search process and interpreting search results rather than on choosing and learning to use different databases. Most responding librarians were neutral or ambivalent toward Summon's impact on information literacy. While Summon was deemed easy for students to use, the way Summon determined relevancy made the search results confusing. Students faced such challenges as appropriately limiting searches to certain disciplines or by certain vocabularies. Identifying different types of sources in their search results was also a challenge, as search results often contained non-scholarly materials even when the students had limited their searches to scholarly or peer-reviewed journals (Buck and Mellinger, 2011). Fagan (2011) also found that WSDS had both positive and negative implications for students' information literacy. WSDS could have a positive effect on information literacy skills such as "selecting, organizing, citing, and managing records," since students would only need to learn how their library's specific WSDS interface functions (Fagan, 2011 p. 177). Librarians have also pointed out that the critical evaluation skills students learn when using a WSDS will be useful for students throughout the rest of their life (Spezi et al, 2013). On the other hand, WSDS could present challenges when it comes to students' abilities to identify sources, developing appropriate research plans, and using specialised services, such as subject databases. Traditional information literacy skills related to database searching, such as identifying keywords, using a controlled vocabulary, and developing and using search strategies could suffer without proper library instruction (Fagan, 2011).

2.3 Impact on library instruction

The impact of WSDS on library instruction has also been addressed in some studies. In Buck and Mellinger's (2011) study, comments indicated that many librarians experienced that Summon had changed their instruction in some way. One of the major changes identified was how much time instruction librarians spent on different topics during an instruction session. Some librarians commented that they spent less time showing the library catalog, Boolean operators and choosing databases and instead spent more time on such topics as advanced search skills, search refining and the research process. Some librarians focused more on broadening and narrowing searches as well as "identifying scholarly versus popular journal articles, evaluating sources, choosing keywords, presenting research as an iterative process, peer-review process, citing sources, and reading a citation" (Buck and Mellinger, 2011, p. 170). In turn Buck and Steffy (2013) also found that librarians were spending less time on how to choose a database and more time on skills that could be used with a variety of search tools, such as refining and assessing search results (Buck & Steffy 2013). Additionally, librarians' instruction sessions often varied depending on the nature of students' assignments as

well as on which course or programs the students were studying (Buck & Mellinger, 2011).

In a more recent study, Seeber presents recommendations for instruction librarians based on the changes in information literacy brought about by WSDS (2015). One major change suggested by Seeber is that library instruction programs need to move away from the traditional “one shot” model of presenting and explaining specific article databases (Seeber, 2015). The term “one shot” informally refers to single library instruction without any follow-up sessions (Reitz, 2015). Seeber maintains that the “one shot” session is no longer a sustainable approach to library instruction since database- and other search tool providers may frequently update and alter content and interfaces. Therefore, the instruction that librarians provide for a specific database may not be particularly useful for the student later on if and when the database updated or changed. A more sustainable approach to library instruction is for instruction librarians to invest more time engaging students in the critical evaluation of information. By focusing less on the specific formats, such as databases and other search tools, used to access information, librarians would have more time to teach students to understand and make critical assessments of the processes through which information is created, published, and distributed. Understanding and evaluating these processes is more crucial than ever for students as searches in WSDS can often yield huge numbers of results containing a variety of different types of information (Seeber, 2015). The main conclusion of Seeber’s study can be summed up with the following quote:

Perhaps the greatest asset of teaching students to think critically about how information is made is the sustainability of the lesson. Regardless of what new research tools are developed, or how the publishing industry is altered, the formative processes which lead to the creation of information will continue to determine the relevance and credibility of a source (Seeber, 2015, p. 27).

3. Theory

We have chosen to use Kuhlthau’s model of the Information Search Process (ISP) as an instrument for analysing the results of our interviews. Since the information search processes play a key role in students’ information literacy and thus also in the way librarians approach information literacy instruction, Kuhlthau’s model was deemed to be an appropriate theoretical framework to use in our analysis.

Kuhlthau’s model (2004) consists of the following six stages, each of which encompasses three dimensions: affective (feelings), cognitive (thoughts), and physical (actions). (Kuhlthau, 2004). The following list names the six stages along with some of the typical feelings, thoughts, and actions experienced and carried out by the user at each stage as well as common strategies used by students in each stage (Kuhlthau, 2004):

- **Task Initiation** - recognising an information need and preparing to select appropriate topics to investigate. The user experiences feelings of uncertainty and apprehension while pondering the assignment as well as possible topics and approaches to complete the assignment. The user often begins browsing library resources for ideas as well as

talking with others. Common strategies by students include brainstorming and discussions.

- **Topic Selection** - choosing research topic. The user weighs different topics against amount of information available and the requirements of the assignment. Feelings of confusion and anxiety are sometimes experienced, but the user often feels optimistic upon selecting a topic and/or approach. The user often consults information intermediaries, such as library staff, and conducts a preliminary search of library resources. Some strategies used by students are examining general sources to attain an overall view of possible topics, deliberating possible topics, and contemplating possible outcomes.
- **Prefocus Exploration** - examining information in order to pinpoint a focus. Feelings of confusion, uncertainty, and doubt may be experienced, and the user searches for information to help identify potential focuses. The user may be unable to properly express exactly which information is needed. Relevant information is located, and the user seeks to become better informed about the chosen topic. Students use such strategies as learning more about a topic through examining literature, identifying appropriate descriptors, and contemplating possible focuses.
- **Focus Formulation** - developing a focus based on the information discovered. Users often feel optimistic and confident about completing the tasks. The users have thoughts pertaining to the possible outcomes of different focuses by taking into account the available materials and requirements of their assignment. They may have a sudden insight while forming a focus identified from ideas gained while exploring information. Actions include organising reading notes into themes. Student strategies include surveying their notes, making a list of possible focuses, and combining themes to develop a focus.
- **Information Collection** - gathering information to refine and support the focus. Feelings of confidence and awareness of the extensive work required to complete the assignment are experienced, and the user is occupied with finding information to further develop the focus. While gathering relevant information, the user often organises the information into detailed notes along with bibliographic citations. The user often enlists the help of librarians to acquire specific sources. Some of the strategies used by students are searching for information with the use of descriptors and indexes as well as, conducting extensive searches of different types of materials.
- **Search Closure** - concluding the information search. The user feels a sense of relief and occasionally satisfaction or disappointment while considering additional information needs and deadlines, Users confirm information and references and often recheck sources for overlooked information. Students' strategies include revisiting the library to summarise their search and holding onto materials until the assignment is finished in case they need to confirm information.

In our analysis and discussion, we have drawn parallels between our findings and the different stages of Kuhlthau's model. In doing so, we demonstrate how instruction librarians' approaches to WSDS in instruction sessions contributes to the various stages of students' information search processes.

4. Method

In order to answer our research questions, we conducted semi-structured interviews with instruction librarians from university libraries in Västra Götaland. We contacted instruction librarians at three separate universities by directly e-mailing members of their library instruction teams to ask if they could participate in the study and/or forward the e-mail to any colleagues who might be interested. See *Appendix 1* for a copy of the email.

We chose to use the method *semi-structured interviews*, which are described by Wildemuth as an appropriate tool for gaining insight into “people’s experiences and their inner perceptions, attitudes, and feelings of reality” (Wildemuth, 2009 p. 222). Therefore, semi-structured interviews were deemed an appropriate data collection method for our study, as we wished to gain a deeper understanding of librarians’ experiences with discovery tools in information seeking instruction and students’ information literacy. We chose semi-structured interviews over other types of interviews, as semi-structured interviews provide room for flexibility while still maintaining a certain amount of structure to ensure the interviews would generate the data we needed to fulfill the purpose of our study.

Our interview sessions followed the schedule of an interview guide (*Appendix 2*), which, in the context of a semi-structured interview, is a “list of questions that does not require the interviewer to follow the wording of the questions strictly or to always ask them in the same order” (Wildemuth, 2009 p. 233-234). The outline of the interviews focused on three major topics related to our study objectives: WSDS, library instruction, and students’ information literacy needs. These major topics were then further expanded into a list of questions related to each topic, in order to generate more detailed answers. The interview questions were based on themes identified through the examination of previous studies and other literature related to the three major topics.

After completing the interviews, we compiled the responses in a Microsoft Word document and organised the responses according to the question number under each of the three major interview topics. We then conducted a *qualitative content analysis* of the responses, which is an appropriate method for subjectively interpreting large amounts of qualitative data by coding and identifying any generated patterns or themes. (Wildemuth, 2009). During qualitative content analysis of the interview responses, we identified several sub-themes for each major category and organised the responses according to these sub-themes. Upon completing the qualitative content analysis, we presented our results according to the generated sub-themes in order to make the presentation of our results more reader-friendly as well as to help facilitate our analysis and discussion of our findings. Finally, we conducted the analysis and discussion portion of our thesis by comparing our interview results with previous studies as well as by relating the results to the information seeking model we have chosen as our theoretical framework. We have also discussed our results in relation to our research questions.

Several different measures were taken to ensure the trustworthiness of the findings from our interviews. According to Wildemuth, qualitative research is considered trustworthy if it can be determined to be credible, transferable, dependable, and confirmable (Wildemuth, 2009 p. 313). Our findings can be seen as credible since participation in the interviews was strictly voluntary, which, according to Shenton (2004), increases the likelihood that the respondents gave honest and correct responses. We also made use of iterative questioning, which involves returning to previously addressed topics by asking probing or rephrased questions to gain further data and through which indiscrepancies can be detected and discarded (Shenton 2004). Our examinations of previous studies related to the interview topics also gives credibility to our findings, as we were able to draw parallels to existing knowledge (Shenton, 2004). With regards to transferability, our findings meet the requirements, as described by Wildemuth, of containing descriptions detailed enough for others to apply our results in another context or setting (Wildemuth, 2009). Shenton explains dependability as the ability of other researchers to repeat the study according to a detailed description of the processes involved (Shenton, 2004), which we have strived to do throughout the writing of our thesis. Finally, our study can be considered confirmable, in accordance with Shenton's description of confirmability (2004), as we have strived to report the respondents' experiences and thoughts as objectively as possible.

The empirical data for our study consists of information collected from seven semi-structured interviews with ten instruction librarians. All of the interviews were recorded with the respondents' permission. The interviews were conducted in Swedish, transcribed and subsequently translated into English, which provided the raw empirical data that was coded and organised for use in our results, analysis and discussion. The interviews were performed with both writers present, one to ask the interview questions and the other to take notes.

Finding librarians to interview that has professional experience in information teaching both prior to the implementation of WSDS and current has been proven difficult to find in larger quantity but not impossible. We conducted a total of seven interviews with ten librarians in three separate universities in the Västra Götaland region. Two of the interviews involved multiple respondents interviewed simultaneously, one with three members of a certain institution's instruction team, and the other with two members of another university's instruction team. The respondents' experience varied greatly from a few years to more than 25 years. Several of the respondents had been working with library instruction long enough to have experienced the implementation of WSDS in their library.

In order to protect the identities of our respondents and ensure they remain completely anonymous, we have chosen not to name the university libraries where the respondents are employed. In the email we sent to potential respondents, we stated that no names would be used in our thesis. The respondents were informed of the purpose of our thesis and assured that the data collected from the interviews would only be used for this purpose as well as that none of the data would be shared with unauthorised parties.

5. Results

In this section we present the results from our interviews. The results are presented in text form in the three main categories, WSDS, Information Literacy, and Library Instruction, addressed in our research questions and interview guide. Under each main category, the results are further broken down into more specific themes which were identified during the coding of the interview material. Under the individual themes, the most common perceptions of the respondents are presented along with the instances where there was less consensus or greatly different views. Direct quotes, as translated into English from Swedish, are occasionally presented for emphasis on particular topics. The librarians interviewed all work with library instruction and are employed at three separate universities in Västra Götaland. WSDS was implemented approximately four to five years earlier at each university. Eight of the ten respondents also worked with library instruction before the implementation of WSDS, and the respondents' library instruction occurs within different institutions and disciplines.

5.1 WSDS

The interviewed librarians' general perceptions of WSDS are presented in this section. We have grouped the results according to a few themes identified from the responses.

5.1.1 Advantages and Disadvantages of WSDS

The respondents displayed a generally positive attitude toward conducting searches in WSDS, as long as the students were not searching within a specific subject. WSDS were considered by the respondents to be an excellent tool for becoming familiar with the library's resources as well as locating references for known items. Respondents also shared the general opinion that WSDS are a good complement to libraries' subject-specific databases. One of the major positive arguments for the use of WSDS by students was the ability to directly access the material found in full text. It was mentioned that in some specific databases it takes many clicks to actually retrieve an article once located. Several respondents mention that, in some cases, the library may not even have full-text access despite the article being located in one of its databases, which could cause students considerable frustration.

“It was a nice effect when you started getting full-text linking in WSDS. There the change was like, not having to... ‘Congratulations, we found an article in Puben (database), well then we open a new tab and go to the list of journals, and then we search for the journal, and then we search for the year, then click to the issue’. Well, that was the big change. I really want to have WSDS. I would be very annoyed if they removed it” (Instruction Librarian no. 3).

Another positive aspect mentioned by the respondents was that WSDS functioned as a good starting point for conducting a search for information. The general consensus was that WSDS are more accommodating than databases regarding spelling mistakes, and the ease of use makes WSDS appropriate tools for new students who may be less information literate than more experienced users. The facets and ability to narrow the hits down to peer reviewed when searching for journal articles was considered a big

plus, as well as being able to choose which type of materials to search, but this feature did not always work properly, according to a few of the respondents.

However, when pertaining to students' attempts to find articles for an assignment in a specific subject, the respondents were a bit more critical toward WSDS. Several of the respondents mentioned that relevance-ranking and indexing were a bit problematic. As students may not be aware of these problematic factors, many of the respondents were concerned that students could potentially miss out on relevant material. Additionally, none of the respondents would recommend WSDS as a substitute for other search tools, such as subject-specific databases, when students need to conduct more advanced searches within a particular subject. Several of the respondents expressed concerns that the students might feel it is enough to use WSDS and that the overwhelming amount of results could cause students to miss out on truly relevant material since they often only look at the first page of results. Several respondents also mentioned that the WSDS might sometimes list the exact same title in more than one post, and they were concerned students would not realise this and become confused.

Regarding how well WSDS actually work at the universities, the respondents were critical towards relevance ranking and also how their WSDS did not necessarily show the actual resource first. For example, sometimes the first few links could be reviews or other material related to the desired resource, while the link to the actual specific resource might appear further down the list. When the subject of exporting references was mentioned the attitudes of the respondents seemed to differ slightly. Many of the respondents were of the opinion that exporting references from the WSDS to institutions' recommended reference programs usually worked quite smoothly. Others were concerned that the same material would sometimes be indexed in separate databases and therefore could give differing results when exporting, depending on how well and how much of the metadata was included. This might not always give satisfactory results when exporting and the respondents' felt that students should pay notice to this factor. One respondent mentioned another disadvantage with WSDS as being the inability to save search histories, which made it difficult for students to recreate a successful search in WSDS. Furthermore, two librarians at one of the universities were of the opinion that WSDS was not ideal for the type of material commonly searched for by the students at those institutions and therefore recommend their students to export from the specific databases where the material was collected instead.

5.1.2 Student use and perceptions of WSDS

Regarding how the students use WSDS to search for information, many of the respondents mentioned that students generally liked and appreciated the trial and error approach offered by WSDS. Several of them also found that the students to some extent could teach themselves how to use WSDS to access library resources.

All of the respondents mentioned that a major challenge for students searching for information with WSDS was in handling the massive amount of search results a single search could provide. According to one respondent (Instruction librarian no. 1), these huge lists of search results place considerable demands on students to interpret "what it is they have actually received". The respondents were in agreement that students are in

need of developing strategies to cope with this “information overload”. Nearly all the respondents mentioned that it was vital that students learn to review their search results with a critical eye, both in terms of the source material and the processes behind the creation and publication of scientific or scholarly articles. The respondents also deemed it important for the students to realise that, even though WSDS may seem to have familiar interfaces which are easy to use for accessing information, the actual use of WSDS may be more complicated than the students consider them to be.

5.1.3 Comparison to other search tools

Concerning the differences between WSDS and subject-specific databases when searching for information, the respondents found the most notable difference to be the amount of results received from a search. Several of them pointed out that the user-friendly interfaces and search tools used in WSDS made it simple for students to conduct broader or more general searches and narrow down their results afterwards. By contrast, the interfaces of subject-specific databases include different search options to perform a more specific search from the start.

Respondents also pointed out that WSDS searches all of the libraries’ resources, while subject-specific databases automatically limit searches to resources contained in those databases. Several of the respondents thought it was important that students understand this fundamental difference between WSDS and subject-specific databases when choosing an appropriate search tool. Using either tool exclusively could potentially cause students to miss out on relevant information. A few respondents also commented that it was not necessarily important that students know all of the exact differences between WSDS and databases, as long as they understand that each tool will render different types and numbers of results. One respondent also suggested that the differences between WSDS and databases will become less important as databases develop increasingly user-friendly interfaces with search options similar to WSDS.

The respondents were collectively of the opinion that it was important for students to be able to use both WSDS and subject-specific databases in order to perform different types of searches. Several responses reiterated that WSDS was a good starting tool for the students to experiment with searching before they continue with more advanced searches in subject-specific databases. One respondent pointed out that WSDS and databases are often described in terms of the differences between them, but they should actually be considered as complementary resources to each other.

5.1.4 Search techniques and strategies in WSDS

Regarding specific search techniques and strategies the respondents teach the students to use when searching with WSDS, their remarks were quite similar, but they had differing views on whether or not instruction in WSDS was actually necessary. It was generally agreed by the respondents that the use of facets to limit searches should be covered, while nearly all of the respondents found it absolutely necessary. One of the respondents maintained that the students could figure out how to use WSDS on their own. The rest of the librarians, however, found that the students appreciated some sort of guidance on using WSDS, even though most of the respondents considered their guidance more as tips rather than actual strategies. Another tip mentioned was how to

perform advanced searches with WSDS. A few respondents remarked that they occasionally covered truncation, but most of them commented that those types of strategies were usually taught when introducing students to database searches. Three of the respondents, who work at the same institution, said that they usually do not hold much instruction at all in WSDS, since the particular disciplines at their institution already have subject-specific databases particularly relevant for the students. Therefore, those respondents generally steered students away from WSDS and towards specific databases, since the students can find relevant results in their particular subjects of study straightaway using a subject-specific database.

5.2 Information Literacy

In this section, we present the interviewed librarians' responses regarding their perceptions of students' information literacy, both in general and with regards to WSDS. The results are grouped according to the several identified themes.

5.2.1 Impact of WSDS on information literacy

On the subject of how WSDS affects the way students search for information, many of the respondents said they received fewer questions about information searching at the reference desk than they received before WSDS were implemented. This was considered by the respondents to be a significant change. One respondent made the following comment:

The students might be less skilled in the technical aspect, but at the same time, it is not necessarily a problem anymore since they don't need to be. If you have very difficult search systems, the students would need to be very skilled to be able to extract anything relevant from them, but now one can be an amateur and still be able to find quite good results (Instruction librarian no. 2).

The respondents' shared opinion was that students generally seem to have become more self-sufficient in their search for information after the implementation of WSDS at their universities. At the same time, they feel that students generally do not actively apply or may not even be aware of any specific search strategies. The respondents displayed mixed feelings toward this new self-sufficiency. Since databases are also moving toward more simple and user-friendly interfaces, students may no longer need to learn specific search strategies and techniques to the same extent in the future. However, nearly all the respondents expressed a concern that this simplification of the search process might cause students in the early stages of their education to lose out on learning the thought processes needed for higher academic studies and more advanced information searching. Therefore, students would require more librarian instruction at a later stage when searching for information at higher levels.

"Information literacy is under constant change; earlier it was more going down to a specific shelf to collect a certain book. It was a more physical activity. At that time we had a lot of scientists here and journals in paper format, and they were sitting here leafing through them. Now they sit in their offices and receive everything in digital form. So we added a little box saying 'delivered to you by (the name of the library)' so they will understand that it is WE who give them this, not Google" (Instruction librarian no. 9).

5.2.2 What students need to know

Concerning what students need to know when searching for information, the respondents shared many common views. The respondents generally believe it is important for the students searching for information to realise that handling and using information can be a complex task. They also shared the view that students should be aware that it takes time to conduct searches that give the most relevant and useful results and that students may need to conduct numerous searches before getting acceptable results. Rushing a search and not taking time to evaluate the results could have a negative impact on the quality of information sources received. It was expressed by several respondents that students should not become discouraged if they do not receive perfectly relevant search results during their first search. They encourage students to keep trying and experimenting, perhaps borrowing keywords from other sources, for example, in both WSDS and different databases.

Using the right source for the right purpose was mentioned by nearly all the respondents, as well as being able to recognise different types of information sources. Several of the respondents expressed the importance of being able to formulate and translate clear study/research purposes and problems to searchable queries and terms. Many responses pointed out that students need to be aware that searches with WSDS often render large numbers of results, regardless of the query. Several respondents thought it was important that students understand that it is easy to be lured into believing a search is more relevant than it actually is when a search yields a large number of results. The respondents also expressed that it was essential for students to understand that WSDS are just one of many more places to find information, and knowing what types of material the students want specifically was considered important, as well as the ability to recognise scientifically produced material.

Several respondents considered the ability to critically evaluate sources and results to sometimes be more important than knowing and applying specific search strategies. One respondent pointed out that, while the tools for information seeking is under constant change, the thought processes involved generally stay the same and therefore continue to serve a purpose in students' future studies and occupations. Several respondents also thought that, since scientific thought processes are becoming more important in many professions, it is important for the students to learn how to think critically at an early stage.

Another point mentioned by a few of the respondents was that students need to have basic computer skills and be able to search for articles in languages other than Swedish, namely English, since so much scientific research is published in English and other more widely-used languages. One respondent pointed out, however, that the language aspect applied in some disciplines more than in others. For example, there is a large amount of Swedish resources available for certain disciplines, such as pedagogy, but significantly fewer in disciplines such as economics.

5.2.3 Necessity of library instruction

On the subject of the role of library instruction in students' information literacy, every respondent strongly emphasised the importance of library instruction in helping students' meet their information and educational needs. Several of the respondents commented that the need for library instruction is much more crucial than what students themselves feel they need, based on the librarians' interactions with students in instruction sessions. A point made by many of the respondents was that library instruction introduces students to the vast range of information sources available, as well as helps them to recognise and identify different types of information sources. The respondents shared the general sentiment that library instruction was most important for first-year undergraduate students in the beginning of their education. Without library instruction, students might not be aware of or able to locate all the different information resources available to them through the universities' libraries, much less how to conduct searches effectively in various resources. A few respondents even maintained that library instruction was crucial for students to complete their studies. Additionally, having instruction sessions in conjunction with particular courses, programs, and/or assignments could make the information search process more efficient for students. Since students were often able to find relevant information for specific assignments in the instruction sessions, they would not need to spend as much time searching on their own and thus be less likely to need to consult librarians at the reference desk for assistance. Many respondents additionally mentioned that library instruction is also helpful for students to learn how to handle citations and references correctly.

5.2.4 Critical evaluation of information

Being able to critically evaluate information was mentioned by all the respondents as a vital element of students' information literacy needs. One of the respondents expressed a concern that students might not review an article as critically as needed when the article appears to be particularly relevant for an assignment. Several respondents stressed that it was important that students do not automatically judge an article to be of good quality simply because it comes up during a search limited to peer-review or comes from a source that is usually trusted to be peer-reviewed. It was mentioned that students also, at least briefly, examine abstract, theory and method in order to try to understand the context in which the research was conducted and the audience for which it was intended. Many of the respondents felt that there was not enough time in the sessions to properly instruct students in the area of critical evaluation, but they try to give students some guidance and tips so that the students hopefully can further develop critical thinking skills on their own.

5.2.5 Understanding the scientific processes

Knowing the processes behind scientific and scholarly publishing was regarded by all the respondents as being an important part of students' information literacy. Two of the respondents remarked that understanding these processes was more important for students than "clicking around in databases" (Instruction librarian no. 3). One respondent expressed that universities are placing increasingly higher demands for their programs to reflect the values of the scientific community. An example given by one of the respondents is that researchers often have their "favorite" journals in which they strive to publish their research in. Another example is that researchers often choose to publish their findings in English regardless of where they are located since they will reach a wider audience and have a greater chance of having their works cited by others.

5.3 Library Instruction

Finally, we present the librarians' responses regarding library instruction practices, both in general and as related to WSDS. Again, the responses have been grouped into a number of themes.

5.3.1 Impact of WSDS on library instruction

The general sentiment among the respondents was that the critical evaluation of search results and information resources has become increasingly important for them to teach since the implementation of WSDS at their libraries. The often massive number of results from varying sources that are yielded from searches in WSDS makes critical evaluation much more challenging than searches in specific databases, according to one of the respondents. One of the respondents also commented that WSDS did not have any significant effects on library instruction in that particular institution, but that WSDS had some positive effects at the reference desk.

Regarding their focus on WSDS in instruction sessions, the majority of the respondents spent much more time on WSDS with first-year students and progressively less in the following years. Nearly all of the respondents said they hold instruction sessions for students on all levels, including undergraduate, graduate, and post-graduate students and researchers. At one university library the librarians taught WSDS exclusively to first-year students. Otherwise most of them felt the students needed more instruction in databases relevant for each program's particular discipline and subjects. Therefore, most of the respondents spent more time on database instruction than with WSDS, especially during follow-up sessions and when students had specific assignments.

The overall attitude toward teaching WSDS was that WSDS need far less explanation with regards to search techniques. WSDS were also considered by the respondents to be excellent platforms for handling and evaluating search results and information sources. Many respondents mentioned teaching students to use WSDS as a tool for handling

citations and exporting references in their assignments, as this function would be useful for students' continuing studies. Only one respondent recommended that students export references from a specific database instead. Otherwise, almost all the respondents believed students needed more instruction in databases specifically relevant for each programs' subject and thus focused more on databases, especially during follow-up sessions and/or when students had specific assignments. One respondent spent equal time with WSDS and databases.

5.3.2 General practices in instruction sessions

We asked the respondents to briefly describe how they typically conduct an instruction session with students. The frequency of instruction sessions varied somewhat among the respondents, but the respondents held sessions in conjunction with a particular program once in the beginning each school year, as well as before the students begin writing their theses. Every student could expect to have at least three library instruction sessions throughout the course of their program. The total amount of hours each respondent spent in library instruction sessions each semester was on average 45-60 hours, with slight variations between different university libraries.

Most of the sessions lasted two to three hours and were most often held with a lecture followed by a workshop. One librarian stated that in the cases of extremely large groups, the instruction may be presented solely as a lecture. There were many similarities in the way respondents conducted their instruction sessions, but all of the respondents remarked that instruction sessions were tailored to meet the needs of each particular group of students. The layout and focuses of an instruction session may vary considerably depending on the program and student level as well as on whether or not the instruction session occurred in conjunction with a particular assignment. Approximately the first half would be spent on teaching and demonstrating searches, and the rest of the session consisted of a workshop, in which students searched for information for their individual assignments on their own while the librarian was available to answer any questions and help the students with their searches. The sessions were often concluded with a class discussion about the search results the students received.

Workshops were considered to be an essential part of the instruction sessions, as the respondents collectively agreed that students appear to learn more when trying out different strategies and searches themselves. The workshops also gave the librarians an opportunity to ask the students' to explain their reasoning in how they conduct their searches and evaluate the search results. The workshop approach was also found to be effective way for the librarians to demonstrate problems that often arise in information searches. One example given was that filtering a search result list might generate a smaller, more manageable list of results, but relevant results could be lost if too many filters are added.

Several issues and topics were addressed in the respondents' sessions. Many of the respondents mentioned that they spent a significant amount of session time helping students clearly define the purpose of their assignment and searches as well as stressing the importance being consistent with their purpose. One respondent gave the example that students may find results that are somewhat relevant but that do not exactly support their purpose. In that case, the respondent said it is important to explain to the students that they should keep searching for items that are more relevant instead of being satisfied with results that somewhat support their purpose or changing their purpose to fit the results they found.

All of the respondents stated that nearly all of their sessions were part of a progression, consisting of an initial session with at least two follow-up sessions, as described earlier in this section. None of the respondents claimed to hold "one shot" sessions, and the unanimous view was that a "one shot" session simply would not suffice to cover everything students need to know about searching for information. Nonetheless, nearly all the respondents expressed that the number of instruction sessions and the amount of time spent in each session was not enough to cover all the topics they wanted to teach. Some said their instruction sessions could nearly be considered to be "one shot" since many students often receive instruction only once a year. Despite feeling that they do not have enough instruction time with students, a few of the respondents commented that some students are not receptive to having multiple sessions since it can be perceived as too repetitive and therefore uninteresting. All the respondents pointed out that they provide extra library instruction services in different formats as well as that students seem to appreciate having the option to receive extra help when needed. One university holds weekly workshops in information searching, and in each library students have the option to book sessions with librarians for extra help. Additionally, online search guides and manuals are provided on all the libraries' websites.

5.3.3 Cooperation with universities

According to the respondents, the majority of library instruction sessions are scheduled in accordance with the students' curricula, but the sessions are considered to be an external resource and are thus not officially a part of the curricula. At two of the universities, libraries offered additional library instruction sessions as a paid service. The respondents at these universities considered this problematic since some institutions may not have the budget to spend on instruction, and some teachers not being willing to spend resources for library instruction. Consequently, students might not receive valuable library instruction in institutions not willing or able to pay for library instruction.

5.3.4 Search strategies, tools and techniques taught

The respondents were asked to name different search strategies, techniques, and tools they consider important to address in their instruction sessions. The following list presents some of the examples given:

- Quick and dirty type searches
- Boolean logic and Truncation
- Block building
- Pearl Growing
- Facets
- Thesaurus
- Translating purpose/question to searchable terms
- Using known items from reference lists to initiate new searches
- Translating Swedish keywords to English
- Saving and/or documenting searches
- Evaluating sources and search results

WSDS were considered to be an excellent platform for applying some of the tools, strategies, and techniques listed. When translating research purposes and questions to searchable terms, a wider search could be conducted in WSDS, in which the students could examine the more specific subjects and keywords that appear in the facets afterwards. Upon choosing keyword appropriate for their purpose, they could continue with a more specific search. Students could also find relevant materials by examining reference lists and simply entering the title of an item in the reference list into the WSDS search box. Many of the respondents mentioned that they encourage students to save and/or document their searches in order to duplicate a successful search later on, which would be very difficult to do without knowing the exact steps taken in creating the search the first time.

Once again, nearly all the respondents said they demonstrate how to critically evaluate sources and search results, especially with first-year students. Much of the lecture portion of instruction sessions was spent illustrating how to apply critical thinking to information searching. Several respondents explained that they give students guidance in how to determine if an article is scientific or if it has been cited by others. Some also found it useful for students to learn to quickly judge an article's credibility by examining certain components, such as the method and theory described in the abstract, without actually having to read the whole article. One respondent pointed out they usually tell the students that an article with a "catchy" title could be a warning sign and should be examined more closely or discarded altogether.

6. Discussion and Analysis

In this chapter we analyse and discuss the results from our interviews in relation to problem definitions, purpose, and research questions. We also draw parallels to both the previous studies described in the literature review section and to the six stages of Kuhlthau's model of the information search process described in the theory section. The first part addresses the first sub-question of our main research question, dealing with the instruction librarians' general perceptions of WSDS as a search tool. The second part of the analysis addresses the second sub-question, which deals with librarians' perceptions of students' information literacy in connection with WSDS. Finally, the main research question is addressed by examining actual instruction practices in relation to the librarians' perceptions of WSDS and students' information literacy.

6.1 General Perceptions of WSDS

As shown in the results section, the librarians' expressed both praise and criticism toward WSDS. One of the best traits of WSDS, according to the respondents, was the usefulness of WSDS in searching for specific known items, such as an article or a course book. Since WSDS searches across all the libraries' resources, the students could save time and effort, which might otherwise be spent "clicking around" in various resources. Additionally, after a search has been conducted in WSDS, references can be exported quickly and easily from the WSDS. The respondents also give high praise for the full-text linking within WSDS, which librarians in previous studies also mention as a huge plus (Buck & Mellinger, 2011).

One of the most common themes mentioned by the respondents was that source criticism, which has traditionally been an important factor in information searching, is even more crucial when searching with WSDS. This increased importance is mostly due to the large search yields, described by some respondents as "information overload", since the implementation of WSDS in university libraries, a sentiment that mirrors Buck and Steffy's findings (2013). In order to find relevant material with WSDS, it is often necessary to conduct a broad search and narrow down the search results with facets rather than attempting to formulate and conduct a very specific search from the beginning. This strategy of searching broadly and narrowing down the results was expressed as one of the methods most commonly taught in sessions and used by students at undergraduate level in the three universities, and this strategy also fits in well with Kuhlthau's description of the third stage of the information search process, "prefocus exploration", in which the user performs a general information search to identify potential focuses (Kuhlthau, 2004).

As mentioned by the respondents, several problems with WSDS have been observed regarding relevance ranking, narrowing options, and indexing issues, all of which increase the importance of critically evaluating search results.

Despite some of the obvious flaws with WSDS that were pointed out, it appears the interviewed librarians generally appreciate those search tools. While none of the respondents thought that WSDS could replace other search tools or that WSDS should exclusively be used to search for information, their perception of WSDS as a supplement to other search tools is a sentiment that reinforces Buck and Mellinger's findings that instruction librarians generally consider WSDS a complement to other search tools and are comfortable teaching it alongside these other tools. (2011)

6.2 Perceptions of Student Information Literacy and WSDS

Regarding the impact of WSDS on students' information literacy, a common opinion among the respondents was that students have become more self-sufficient in their information searching, even more so as databases are also moving toward more user-friendly interfaces. An aspect that emerged during our interviews was the difference in views of the necessity of library instruction. While all of the respondents stressed the importance of teaching information seeking skills to students, several of the respondents believed that the students themselves might sometimes think they already know how to perform adequate searches based on previous experiences with web search engines. As such, the students might feel that library instruction is a waste of their time, and this may create problems with how receptive the students are to library instruction. This attitude could possibly be reinforced As database providers take measures to mimic the interfaces of familiar search engines, this attitude could possibly be reinforced and potentially present further challenges for instruction librarians. Potential consequences could be the growing need to promote the importance of knowing the differences between search systems as well as promoting information literacy as a set of skills which must be continually developed.

The respondents did express that this particular impact could be seen as both an advantage and disadvantage for students. On one hand, students do not necessarily need to learn many specific search strategies and techniques to be able to find information in WSDS. On the other hand, the students may miss out on learning basic search skills, which would cause complications when they need to perform more advanced searches to find relevant information for their assignments. Librarians in previous studies have also expressed the concern that students may not be learning basic search skills when WSDS are implemented (Buck & Mellinger, 2011), as well as skills needed for database searches, such as identifying appropriate keywords and subject terms (Fagan, 2011).

Many respondents remarked that WSDS were a good starting point for research, which also ties in with the "prefocus exploration" stage of the information search process, as the student seeks to learn more about specific topics (Kuhlthau, 2004). However, the respondents were in agreement that WSDS were generally only useful to a certain point for students when searching for information for assignments. As mentioned in the problem definition, WSDS typically resemble a Google-type interface (Richardson, 2013), and while this type of interface may feel familiar for students, the respondents

were adamant that students need to go beyond the single search boxes of WSDS. For more advanced searches, they recommended that students consult subject-specific databases. The respondents stressed the need for students to understand which types of materials can be found in WSDS as opposed to databases. This is a crucial step for students in the fourth stage of Kuhlthau's model, "focus formulation", as students seek to gain an overview of available materials (Kuhlthau, 2004). WSDS are generally deemed more appropriate for students, usually first-year undergraduates, who are not used to searching for information on an academic level. This stance correlates to Buck and Mellinger's finding that the majority of instruction librarians taught WSDS to undergraduate students while significantly fewer taught WSDS to higher level students (2011).

WSDS was also considered by the respondents to be very useful for a "trial and error" approach for students with little information searching experience. Since WSDS was not as sensitive toward spelling errors and was less dependent on specific keywords and subject terms, students were almost always able to locate some useful material (Buck & Mellinger, 2011). While this was generally thought to be a positive aspect of WSDS, the respondents of this study also emphasised that students should not stop searching as soon as some relevant materials were found in WSDS but should instead continue with a search in a subject-specific database if possible. Another issue with students using WSDS could be that because all of the information to which the libraries have access is indexed and searchable there, the students might think that finding everything they need will be quick and easy process.

Most of the respondents in this study believed that the tips, tricks and strategies taught in their instruction sessions would not be particularly useful outside of their studies. However, when comparing this statement with the fact that many providers of digital databases are developing interfaces more and more similar to search engines and WSDS, which was also mentioned in the interviews, this might come to change in the future. Knowing how to find information and critically evaluate information are not exclusively relevant to students who are in need of such skills to complete their programs. These skills may increase in importance for other areas in the lives of students as everyday life tends to become more and more integrated with digital devices and digital sources of information. Additionally, information seeking skills have traditionally been an area of expertise dominated by librarians and information specialists, but other disciplines and cross-disciplinary fields of studies are facing a growing need for such skills as well but, unlike information professionals, do not generally have specific courses in information seeking available as a mandatory part of their programs.

The librarians agreed that learning critical evaluation skills and understanding the processes through which information is created, published, and distributed are important for students to understand, regardless of which search tool they choose to use. These skills become more crucial, not only when dealing with searches in WSDS which generally contain far more different types of information sources than a database search, but can also be useful in every step of handling any sort of information at any stage and especially achieve satisfactory results when searching for information. For example, even though a search in WSDS may be limited to peer-reviewed articles in scholarly journals, for instance, it cannot be certain that all items in the search results meet those requirements. Being able to recognise the characteristics of a scholarly publication can help students make quicker judgments about whether or not an item is appropriate or relevant. Skills such as these are useful for WSDS and database searches alike and will remain useful even with the arrival of new search technologies, reinforcing Seeber's view that librarians should focus less on teaching specific search tools and more on critically evaluating and understanding the processes involved in scholarly publication (Seeber, 2015).

It is apparent from the librarians' responses that they strongly believe that helping students develop information literacy skills is an extremely important objective in their library instruction and that some sort of guidance for the students to learn the differences between different databases and WSDS is needed. A change to library instruction can thus be seen as how the time spent on explaining how to conduct a search in the different tools, to evaluate the results and to use those in further developing their searches has increased in relation to the time spent in showing specific databases. Many of the subject specific databases are moving towards similar interfaces as WSDS (Librarian nr. 3) and several of the respondents therefore thought handling and evaluating information, skills that can be used in more places and tools, was more important to teach than how to use specific ones. This is something that was also mentioned in Buck and Mellinger's (2011) study as well as Fagan's (2011) where the impact of students' information literacy skills such as selecting, organising, citing and managing records could benefit.

6.3 How are librarians' general perceptions of WSDS and their perceptions of the impact of WSDS on student information literacy reflected in their library instruction practices?

As previously established, a recurring theme throughout the instruction librarians' responses was the importance of critical evaluation of information sources and search results, a topic to which most of the respondents devote a significant amount of instruction time. This particular library instruction practice falls in line with Seeber's assertion that critical evaluation skills have become more important than ever since the

arrival of WSDS as well as his recommendation that instruction librarians focus more on this particular aspect of information literacy (Seeber, 2015). The major reason for this increased importance, as previously mentioned, were the large lists of search results often yielded in WSDS which may include many different types of sources. As one respondent remarked, there were too many noticeable faults with WSDS to be able to completely trust that a search yield only contains certain types of information sources, even when the appropriate facets, such as peer review, have been selected. Therefore, it is imperative for students to make a thorough assessment of each item that seems to be relevant before using that item for an assignment. This aspect has thus become a crucial part of the information collection stage of the information search process, as described by Kuhlthau (2004). Even though many of the respondents claimed they try to steer students toward database searches, especially for certain subjects and assignments, it can be surmised that students often begin with a search in WSDS or return to the WSDS if unable to locate relevant material in a database. The presence of the WSDS search box as the main search function on libraries' websites puts the WSDS in a key position to be the search tool students automatically turn to, regardless of librarians' efforts to encourage database searching. With all of these points in mind, it becomes apparent why instruction librarians choose to spend so much time discussing search results and different information sources with students.

The librarians' responses show that the appropriateness of WSDS for different student populations also played a role in their instruction practices. The use of WSDS in instruction appears to vary according to the level of the student as well as the discipline or program being studied, which echoes Buck and Mellinger's findings that librarians adapted their instruction sessions to fit different student groups (Buck & Mellinger, 2011). All of the respondents indicated that WSDS was most appropriate for undergraduate students, especially first-year students. Therefore, they devoted much more time to WSDS with these student groups, focusing less on WSDS when instructing higher level students, postgraduates, and researchers. The librarians' use of WSDS in instruction also greatly depended on whether or not there were any appropriate subject-specific databases available within different programs and disciplines. For programs in the medical field, there are a few very widely used databases, such as PubMed, and students are therefore instructed much more in database use than in WSDS. However, for disciplines with fewer specific databases and cross-disciplinary programs, librarians are likely to spend much more time instructing students in WSDS.

Since all of the librarians interviewed stated that their instruction sessions are always part of a progression, regardless of how much time there was between sessions, it is clear that libraries are already moving away from the "one shot" library instruction model that Seeber asserted are no longer sustainable (Seeber, 2015). While the instruction team at one institution still primarily spend time with database searching, which has traditionally been the focus of "one shot" instruction sessions, they do hold follow-up sessions. Otherwise, for the rest of other interviewed librarians, the arrival of WSDS appears to have freed up session time so that the librarians can spend more time with students discussing source criticism, critical assessment of search results, and

processes behind scholarly publishing. This aspect reinforces previous findings that librarians were able to spend more time assessing search results since they did not need to devote as much time to databases (Buck & Steffy, 2013), as well as aligns with Seeber's idea of a more sustainable approach to library instruction (Seeber, 2015).

Librarians' perceptions of WSDS also appear to play a role in the search techniques and strategies they choose to teach in their instruction sessions. In this particular topic, the librarians addressed several disadvantages and obvious flaws that cause them to distrust searches in WSDS, presumably having an influence on which search tools they favour in their instruction sessions. Many of the respondents were critical of the confusing search results and questionable relevance rankings often experienced with WSDS. Furthermore, search results in WSDS have been observed to still include certain source types despite the fact that students had selected facets to filter those source types from their results. The opposite could also occur, with WSDS filtering out source types students had selected to be shown. Disadvantages, such as the large amount of search results and the inability to save search histories in WSDS could also be a factor in how much time librarians devote to teaching WSDS. They may spend more time explaining how to use different functions in WSDS and assess the search results, or they may simply choose to steer students toward searching in databases. However, the librarians identified several techniques and strategies, such as faceted navigation, that are particularly useful in WSDS. Other useful techniques and strategies named were "quick and dirty" searches and searching for known items harvested from reference lists. WSDS are ideal for searching for known items, as students can simply enter the titles into the WSDS search box. Once the known item is located and deemed relevant, the student can identify keywords related to the topics in the known item to initiate a new search in either WSDS or databases to find more relevant items. Additionally, students can search for items by the same author(s) or in the same journal and WSDS often give database recommendations based on the keywords related to a search.

Regarding the format of instruction sessions, the respondents almost exclusively held information seeking lectures followed by a workshop in which students searched for information on their own. A big motivation for this format was that it allowed the librarians to move around the class, observe the students' activities, answer questions, and engage the students in individual discussions about their searches. This approach gives instruction librarians the chance to actively stimulate students' thought processes with regard to making critical assessments of the information they find (Seeber, 2015). This instruction format seems to be particularly applicable considering the respondents' general perceptions of WSDS. Several of the respondents were concerned that students might feel that searches in WSDS alone are sufficient for information searching or perhaps only look at the first ten or so search results in a result list that may consist of thousands of hits. Even though this can also be the case with database searches, it is perhaps not as big of a concern, as the search results would already be limited to certain subjects and contain decidedly more results from scholarly sources. By adopting a workshop format, instruction librarians ensure that they have the chance to observe which search tools the students are using as well as how they are using them, and being aware of how students use

WSDS and other tools are vital to helping them further develop their information literacy skills. While the role of instruction librarians and their teaching is likely to continue to change, during this study we have found no indication that library instruction is becoming less important or less necessary as the information landscape and tools continuously evolve. On the contrary, it appears to continue to be a vital element in the education of future students at the universities.

7. Conclusion

In this thesis we have been able to conclude that the implementation of WSDS in the university libraries can have had an impact the practices of instruction librarians in their instruction sessions. During the interviews, the librarians asserted that WSDS has both strengths and weaknesses and that WSDS are more appropriate for some student populations than others. As well, there are situations and assignments in which WSDS may or may not be appropriate, and students need to be aware of this aspect. The general perception of the librarians is that WSDS have played an important role in students' information needs and development of their information literacy. The instruction librarians generally have a positive attitude toward WSDS, especially when it comes to functions such as the ability to search in all the libraries' resources within one search box, the possibility of accessing full-text document and articles, and the ability to export references. However, it has also been concluded that WSDS has certain limitations and as such should not be considered a replacement for source specific databases but rather function as a user-friendly complement to those resources.

The instruction librarians' perceptions of WSDS with regards to their impact on students' information literacy indicate that the students have become more self-sufficient in their information searching. Additionally, the librarians' perceive a greater need than ever for the critical assessment of information sources and search results, a topic that the librarians devote a significant amount of time in their instruction sessions. The librarians' preference for the lecture/workshop format with scheduled follow-up sessions as well as their choices of search techniques, strategies and tools used in their sessions indicate a shift from traditional library instruction practices. Students are encouraged to experiment with searching on their own while continuing to learn and develop information searching skills with the guidance of the instruction librarians. Since WSDS has enabled students to be more self-sufficient in finding information for their studies, instruction librarians in turn have more time to engage the students in discussion regarding critical thought processes, which can be beneficial for the student throughout the rest of their studies and perhaps even throughout the rest of their lives.

Understanding how and why instruction librarians approach the introduction of new search technologies is important not only for academic libraries but can have significance for other types of libraries as well, such as public and school libraries. Instruction librarians are faced with the challenge of customising their instruction sessions to meet the needs of different types of users. This challenge becomes even

greater with the arrival of new search technologies. Our study showed that instruction librarians often approached WSDS in their instruction sessions differently - even at the same institution - depending on which group of students they were instructing. WSDS was deemed more appropriate for some students than others. A similar approach to different search technologies could potentially be employed by instruction librarians working in either school or public libraries. Instruction librarians may encounter users who have little or no computer experience, and this factor would play a role in which search tools a librarian chooses to teach as well as how to teach them. Students in primary and secondary schools and users of public libraries all have varying information needs and skills, which also have an impact on how instruction librarians approach different search technologies.

We would also like to note that when we chose Kuhlthau's model, we intended to draw parallels between students' information searching processes and the way that librarians perceived and used WSDS in their instruction sessions. However, the practical application of Kuhlthau's model proved to be a bit problematic during the writing of our analysis. As Kuhlthau's model is intended as a tool to analyse information search processes, relating the model to WSDS and its impacts on library instruction and students' information literacy did not function as well as we had expected. While we were able to draw a few parallels to Kuhlthau's model in our analysis section, the model as a theoretical framework for our particular study was of limited value and as such did not have a strong presence throughout the analysis. A theoretical framework relating to either information literacy or library instruction would have been more appropriate for our analysis.

7.1 Further Research

While the results of this study have been interesting and informative, we have also identified a few areas in which further studies might be needed. The librarians' responses indicated there were clear differences in the attitudes toward and use of WSDS in their library instruction sessions, depending on which discipline or program the students were studying. Students in certain disciplines appeared to have less of a use for WSDS than students in other disciplines which did not have as many appropriate subject-specific databases. Therefore, more discipline-specific studies in relation to search tools could potentially create new or additional knowledge, which could be useful for how librarians' approach instruction in different disciplines. To examine students' use of WSDS and librarians' use of WSDS in instruction over a longer period of time is also suggested, as a longitudinal study of this kind might give a clearer overall view of the how the implementation of WSDS has impacted and continues to impact university library practices and students' information literacy. Another useful study could be the analysis of online search guides as related to WSDS and other search tools.

For conducting future studies, various types of methods could be beneficial. By using different types of observations, future researchers could more closely examine how instruction librarians and students approach WSDS in the classroom. Observations

could also be used to examine how students use WSDS on their own outside of the instruction classroom setting.

As much of the previous research concerning WSDS, library instruction, and students' information literacy has been quantitative in nature, we strongly recommend more qualitative research. For example, qualitative interviews with both librarians and students could be performed in a comparison study. Further studies, as suggested in this section, could potentially benefit instruction librarians when planning their instruction sessions to meet the needs of different student populations as well as provide guidelines for adapting library instruction practices as search technologies continue to evolve.

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Appendix 1: Interview Guide

Intervjuguide

Inledande frågor

Hur länge har du arbetat här, och vad är din nuvarande anställning?

Hur länge har du arbetat med informationssökningsundervisning?

Arbetade du med användarundervisning innan ditt bibliotek implementerade discoverytjänster?

Discoverytjänster

Hur länge har ditt bibliotek använt discoverytjänster?

Vad är skillnaderna mellan att söka information med discoverytjänster och att söka information i specifika databaser (i studiesyfte)?

Tar du upp specifika strategier för att använda discoverytjänster i användarundervisningen? I så fall, hur stor fokus är det på dessa strategier?

Finns det några särskilda/specifika verktyg/strategier studenterna behöver lära sig efter att discoverytjänster har börjat användas på som kan vara nyttiga även utanför studierna? (Vilka?)

Vad tycker du är fördelarna och nackdelarna med discoverytjänster angående studenternas informationssökning? (t ex relevans, rankning osv)

Vad baserar du dina svar på/hur har du kommit fram till det? Genom utvärdering, samtal med studenter osv?

Vilka utmaningar uppfattar du att studenterna möter när de använder discoverytjänster?

På vilka sätt tycker du att discoverytjänster har förändrat/påverkat (eller kan ha förändrat/påverkat, om respondent inte var med innan discoverytjänsten implementerades) hur studenter söker information för sina studier på universitetet? Uppfattar du förändringarna (eller påverkan) som positiva eller negativa?

Informationskompetens och behov

Hur nödvändig tycker du att undervisning i informationssökning är, och varför?

Vad tycker du är viktigt för studenterna att veta/kunna när de söker information?

Vilka aspekter av informationssökning anser du vara viktigast att täcka i din undervisning?

Hur viktigt är ett kritiskt tänkande i studenternas informationssökning?

Hur viktigt är det för studenterna att förstå processerna genom vilka information skapas och publiceras? (t ex, vem har skapat information, var har den publiceras, hur forskningen utfördes, auktoritet, peer-review processen)

Hur viktigt är det för studenterna att veta hur olika databaser respektive discoverytjänster fungerar?

Informationssökningsundervisning

För vem/vilka håller du informationssökningsundervisning?

Hur ofta utför du informationssökningsundervisning för studenter, och hur lång tid brukar ett undervisningstillfälle ta?

Håller du "one shot" undervisningstillfällen, eller finns det uppföljningstillfällen?

Tycker du att det räcker med ett "one shot" undervisningstillfälle? Varför, eller varför inte?

Är informationssökningsundervisningen ett samarbete med universitetet och dess kurser/program (eller utförs det som en extra resurs)?

Hur inleder du ett undervisningstillfälle?(eller kan du beskriva kort hur du genomför ett undervisningstillfälle?)

I vilket format undervisar du oftast? Exempelvis presentation eller workshop. Varför?

Vad för olika sökstrategier/sökverktyg/sökteknik lär du ut?

Finns det någon särskild fokus på en särskild sökstrategi/sökverktyg/sökteknik? Om så, vilken/vilka och varför?

Hur mycket tid spendera du på informationssökning i databaser i ett undervisningstillfälle respektive med discoverytjänster?

Tar du upp kritiskt tänkande i informationssökningsundervisning? Om så, hur mycket tid spendera du på kritiskt tänkande i ett undervisningstillfälle?

*Hur mycket tid spendera du på att utvärdera sökresultat i ett undervisningstillfälle?
Vilka strategier för utvärderingen av sökresultat lär du ut?*

Avrundningsfråga

Är det något du vill lägga till?

Appendix 2: E-mail sent to potential respondents

Subject:

Biblioteksstudenter söker undervisande bibliotekarier för mindre semistrukturerad intervju

Body of email:

Hej!

Jag heter Josefine Gustavsson/April Karlsson och går nu sista terminen på Bibliotekarieprogrammet vid Högskolan i Borås. Tillsammans med April Karlsson/Josfine Gustavsson skriver jag nu ett examensarbete, kandidatuppsatsen, och det är av denna anledning jag hör av mig till dig.

Ämnet för vår uppsats är **Discoveytjänster** och hur dessa har påverkat bibliotekariers undervisning i informationssökning. Vi söker därmed **bibliotekarier som arbetar med informationssökningsundervisning** och kan tänka sig ställa upp i en mindre **semistrukturerad intervju**. Några namn kommer inte att anges i uppsatsen.

Vi skulle vara oändligt tacksamma ifall du kunde vidarebefordra våra kontaktuppgifter till ett antal bibliotekarier som kan tänkas vilja och ha tid att bli intervjuade, alternativt komma med förslag på namn så vi kan kontakta dem själva.

Våra kontaktuppgifter:

aprilkarlsson@gmail.com

joss.gustavsson@gmail.com

Vänliga hälsningar,

Josefine Gustavsson/April Karlsson