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Information Use Among First-Year Students in Health Sciences: Is an Intervention Needed?

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Abstract

This study investigated what strategies first-year students in health sciences on three university colleges in Norway used when faced with a new written assignment. Questionnaires were distributed among health students on three campuses, and interviews with librarians at the campuses were held after initial data collection. The study showed that many students lack basic information skills, but are not aware of it themselves, that many first-year students are choosing familiar information sources like Google and textbooks from their reading lists, and it showed that librarians at their institutions had experienced that many first-year students could get by with these sources. This is contrary to the intentions in evidence-based practice, and the Norwegian Qualifications Framework. The study also suggests that the lack of a Norwegian framework or standard for information literacy training is making the teaching efforts seem random and based on the librarian's personal relationship with teachers.

Key Words: Information skills; first-year students; framework

1. Introduction

Teaching information skills has become an important part of most academic libraries' service and outreach programmes. While students overall have become more technology savvy, there is little evidence to support an idea

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that they have become more information literate. There are many assumptions and opinions on students' information needs and information habits, and expressions like "the Google generation" has created some stereotypes concerning young people's information consumption (Rowlands et al., 2008). Projects and studies like "Project Information Literacy (PIL)" (Head, 2014) and the "ERIAL Project" (Duke & Asher, 2012) focused on students' information habits, and they found that the picture is more complex than what meets the eye. Understanding the students' habits and needs are important factors in planning and executing information skills training.

Students in health sciences are faced with rapid changes in technology, patient care and responsibilities, and are especially influenced by new health reforms and an aging population. Evidence-based practice (EBP)[1] has been an important factor, and it is emphasised in frameworks, standards and guidelines as well as study programmes and course descriptions. Information literacy is an important part of EBP, and it is vital to introduce the students to subject-specific sources early on. This separates health sciences students from many others, as they are required to go beyond course readings much earlier, and for many health sciences students this begins in their first term in higher education.

In this study the author sought to find out how first-year students in health sciences used information sources when being given written assignments, what they thought about their own information skills, and what kind of sources they were required to use. The author also wanted to find out how librarians at the same institutions regarded the answers the students gave in questionnaires, and how to offer guidance and tutorials that suits the students' needs. The idea was that librarians needed to understand the information habits of their students, and what that meant for teaching practice and use of guidelines and frameworks.

2. Research Questions

What sources do first-year students in health sciences use when receiving a new assignment from teachers, and what does it mean for their learning processes? How can the use of a framework help librarians in giving more consistent information skills training to first-year students?

2.1. Background

Why is it important to explore how students find information for their assignments and how they perceive their own search skills? One of the key factors influencing academic writing, and thereby learning, is being able to find high quality, relevant and interesting sources. While many first-year students in other subject areas might only be required to use their text-books and other readily available items on their reading lists, science students are often required to go beyond this. With their strong emphasis on evidence-based practice (EBP) (Nordsteien, Horntvedt, & Holmen, 2013) and the ICN Code of Ethics for Nurses (International Council of Nurses, 2012), they are often required to go beyond reading lists from their first year in higher education (Jacobsen & Andenæs, 2011). If students tend to use a very limited set of sources, their learning processes could be impaired, and the goals laid down in the qualifications framework (NQF) (The Norwegian Qualifications Framework for Lifelong Learning (NQF), 2011) will not be followed up in practice. Arguably, if taken to its outmost consequence, none of the guidelines, standards or frameworks that deal with information skills will be of any use if students remain unaffected by training in information skills. Therefore, understanding how students act when they are given an assignment is the foundation for the design of teaching activities.

Through 10 years of teaching the author observed changes in students' competencies in academic writing. The author has observed that teachers in health sciences at her institution gradually have come to expect students to search databases and to use scholarly sources in most assignments. Still, whenever asked informally during a lecture how many relied on Google first for academic research, almost all students raised their hands. This gap between expectations and actual behaviour led the author to believe that there was a mismatch between what students wrote in their methodology chapters and what they actually did. The perceived mismatch formed the backdrop for this study. The author was particularly interested in how first-year students in health sciences gathered information and how they coped with their written assignments.

The "Norwegian qualifications framework for lifelong learning" (NQF) (NQF, 2011) goal was to specify learning outcomes for knowledge, skills and general competencies in all levels of education, thus setting a standard

for what students of all levels were supposed to be able to do or know. This study looked into first-year bachelor students' information needs and information habits. All students in this study had therefore at least finished upper secondary school. According to NQF (2011), students entering college or university should be able to "search for and use information from different sources to further his/her development in relation to future work and/or education" (p. 20), "analyse and assess different types of sources of relevance to his/her own work" (p. 21), and "[…] use digital tools and media to solve academic challenges in a critical and creative manner […]" (p. 47).

It is worth noting that while the three institutions that were included in this study were of similar size and had very similar library services, the health studies students did not necessarily have the same information skills training program. Some of the institutions may have had more one-shot instruction while others may have emphasized integrated instruction programmes or team-teaching approaches with other teachers. The lack of standardisation and frameworks, briefly mentioned under the next heading, meant that students got what training their individual teachers and librarians saw fit. Still, as far as the author is aware, there exists a general opinion that *subject-specific* information literacy should be introduced at an early stage (Albitz, 2007), and preferably during their first (or second) year.

2.2. The Lack of a Framework for Norway

The NQF specified learning outcomes for knowledge, skills and general competencies, but what framework could Norwegian librarians use for planning, executing and assessing information skills training use? In 2015, the Association of College & Research Libraries (ACRL) released Framework for Information Literacy for Higher Education (ACRL, 2015). It consists of six frames or lenses that describe some interconnected core subjects. It presents ideas about information literacy that are supposed to be introduced at various levels of student programmes, and be firmly integrated in learning processes. The ACRL emphasises that the framework is a set of concepts that must be adapted to fit each institution, and is therefore not a set of rules or standards that can be put directly to use (ACRL, 2015, Appendix 1). The author is aware of one university in Norway where the framework might be implemented some time in the future.

There are several other frameworks to be mentioned. Die Gemeinsame Kommission Informationskompetenz in Germany developed a set of frames (called "Referenzrahmen") (Klingenberg, 2016) and standards for students and teachers. The framework describes six main frames, regarded as "teilkompetenzen" or sets of competencies: search, evaluate, knowledge, represent and pass on/forward. Each frame is divided into individual workflows.

Sconul's Seven Pillars of Information Literacy first appeared in a position paper in 1999, and were revised in 2011 (SCONUL, 2011). The framework consists of the seven pillars: identify, scope, plan, gather, evaluate, manage and present. These are further specified by a set of skills or competencies and by attitudes or understandings.

The ICN Code of Ethics for Nurses (International Council of Nurses, 2012) lists "developing a core of research-based professional knowledge that supports evidence-based practice" (p. 3) as a main element. This is closely linked to information literacy. Information literacy appears, though not as "information literacy," in governmental frameworks for nursing education in Norway (Kunnskapsdepartementet, 2008), and in several course plans and study programme plans. This is also included in other similar governmental frameworks, e.g. Framework for Occupational Therapy Education (Utdannings- og forskningsdepartementet, 2005a) and Framework for Radiography Education (Utdannings- og forskningsdepartementet, 2005b). It should therefore be possible to find room for information skills in the course plans and study programmes within health sciences studies in Norway.

There are examples of some well-known frameworks. However, although these frameworks may be widely known in Norway, the author is not aware of any institutions in higher education in Norway that have implemented the information literacy frameworks or standards. As previously stated, the NQF specified some learning outcomes for knowledge, skills and general competencies, but information skills are rarely institutionalised in Norway, e.g. in course plans. Some librarians therefore feel that information skills training occurs in courses where the librarian has a good personal relationship with the teachers (Øvern, 2014). Consequently, the information skills training appears rather randomly.

There is little reason to suppose that a framework for Norway would solve every problem concerning information skills training, and the ACRL

Framework for Information Literacy for Higher Education has received mixed reviews so far. It is being criticised for being too philosophical, and of little practical use (Burkhardt, 2016, p. 4). It has also been criticised for focussing too much on the individual's path to information literacy, for being too library-centric and that its threshold concepts tend to oversimplify the true difficulties of the process of learning (Beilin, 2015).

Still, as the literature review performed as part of this study shows that students struggle with the transition to higher education, that they rely on Google for much of their information retrieval and tend to overrate their own information skills, it is reasonable to suppose that an intervention, either from librarians or teachers, or preferably both, could help to ease the transition, and also help the students get a more nuanced image of their true information skills. A flexible framework could be the scaffolding that librarians and teachers would need, or at least find useful, in order to create a meaningful information skills programme with a good progression over the first, second and third years.

2.3. Theoretical Backdrop

If learning information skills is more than a generic skill, and rather a way of dealing with information in different contexts and different subject areas and being able to shift that focus as they occur, then both teachers and librarians have to make sure that students experience situations where this happens. The theoretical backdrop for this study is therefore based on the understanding that if students are to move beyond the realms of Google and the safety net that is their reading lists, then situated learning is essential. The philosophy behind situated learning is that learning must have its basis in everyday actions, that learning is linked to situations and can only be transferred to similar situations, that learning is a result of a process of knowledge, thinking and problem-solving, and that learning is a part of everyday challenges in situations (Lave & Wenger, 1991).

3. Method

This study consists of results from two surveys (questionnaires), informal interviews and a literature review.

A questionnaire was distributed among first-year students enrolled at XX University College, XY University College (campus xy) and XZ University College during the spring semester of 2015. The respondents were enrolled in one of the following study programmes: nursing, radiography, occupational therapy, child welfare, social work, or social education. The university colleges were chosen because of their similar study programmes, their similar sizes and their geographical proximities.

Informal interviews with some of the library staff from the three institutions were performed the next semester. The interview format was chosen to be able to shed some light on the issues from the questionnaires. The interview format made it possible for the author to probe into some attitudes to the students' use of information. The interviews lasted approximately one hour each.

Due to an error in the initial questionnaire, some questions were not displayed to the respondents and not all questions were marked as mandatory. Therefore, a slightly updated questionnaire was distributed to students of XX University in January 2017. Due to the limited size of the samples of this study, the results should be regarded as exploratory, rather than comprehensive.

A literature review was performed to form the basis of the questionnaire and the interviews, but also to shed some light on the findings. This was done because of the limited size of the study. The literature review should therefore be regarded as part of the findings in the study, and is also featured in the discussion. The search terms used for the literature review were: information needs, information strategies, information behaviour, information literacy, information seeking, research strategies, research behaviour, research needs, self-efficacy, students, first-year students, college freshmen, higher education, college, university. Searches were performed in: Academic search elite, Emerald, ERIC, Sage journals online and ScienceDirect. Google Scholar was used for citation purposes.

Peer-reviewed articles and reports from the past 15 years, in English and Scandinavian languages, were included.

3.1. Ethics

The author applied for, and received, permission from the faculties to distribute the initial questionnaire. The application described the purpose of the

study and how the data was to be collected and analysed, including information that the data from the questionnaires was to be discussed in interviews with librarians. However, the information about the data being discussed in interviews was not included in the information given to the respondents. Responding to the questionnaire was completely optional. A link to the questionnaire was distributed on their LMS, and explanatory text informed respondents that the data would be used for research and service improvement.

3.2. Literature Review

Many have experienced that students are using Google for almost all initial searches (Dahlstrom & Bichel, 2014; Griffiths & Brophy, 2005; Head, 2013), and several studies show that students rely on their peers and instructors, and even family and friends, for help with their information needs more than librarians (Head & Eisenberg, 2010; Miller & Murillo, 2012). First-year students in colleges and universities struggle with the transition from secondary to tertiary education writing, and keeping to the academic genres (Head, 2013). Head (2013) found that first-year students learn many information strategies during their freshman year, and that by the end of their first year of college their information strategies resembled those of the second and third year college students much more than high school students. Consequently, the first year in college and university is very important when it comes to acquiring suitable information strategies. Generic information sources are not enough anymore, and offering training in subject-specific sources from their freshman year is important (Callinan, 2005; Jacobsen & Andenæs, 2011). Interestingly though, a study from Østfold University College in Norway showed that even information skills training with subject-specific sources had only a minor impact on first-year student habits (Boger, Dybvik, Eng, & Norheim, 2015). The students still relied on Google (p. 44). More research on the effect of teaching students how to use subject-specific sources early in their studies, particularly research done on larger sets of students, would be very interesting.

3.2.1. Recurring Subjects

Major subjects that reappear in many sources are that students rely (too much) on Google, that students overestimate their own abilities to find information, that students do not ask librarians for help, that students think

that information is free, that they know little or nothing about the research and publication system, that most students are not able to do critical evaluations of sources, and that librarians are not marketing the library and its resources properly (Boger et al., 2015; Emmons, 2013; Griffiths and Brophy, 2005; Lupien & Oldham, 2012). Some of these issues will be discussed in the following chapters and are also highlighted in the literature review.

3.2.2. Written Assignments in Higher Education

Armstrong (2012) found that faculty staff had noticed that students often had insufficient knowledge on the research process. Faculty described that students did not know how to use the library, they did not perform well in assessing the quality and reliability of information, they had difficulty in "finding appropriate research tools beyond Google and Wikipedia" (p. 34), finding good keywords, and citing sources (p. 34). This is also supported by Blikstad-Balas and Hvistendahl (2013) who found that Norwegian students rely heavily on Wikipedia and textbooks. Convenience seems to be a defining factor when it comes to information sources (Connaway, Dickey, & Radford, 2011), and people like seamless access to e-resources that simulate familiar interfaces (p. 187), like Google. While incoming students have acquired some information skills, these skills need to be "harnessed and extended to embrace scholarly literacy" (Salisbury & Karasmanis, 2011, p. 44).

Flaspohler (2011) found that required written assignments were regarded as pure academic tasks by students, and not as part of a larger learning process. Still, Head (2013) found that students had mixed feelings about writing, and that they used word pairs like "overwhelming and exciting, overwhelming and amazing, scary and exciting, and stressful and competitive" (p. 11) to describe the process of information retrieval and use.

In her study on how college freshmen conduct research, Alison Head (2013) found four factors that make college research different from high school research:

- *The academic library collection increases in size and digital resources proliferate*
- *The research approach involves combining and using new and different sources*

- *Research calls for selecting quality research sources, evaluated for their credibility*
- *Assignments require independent choices and encourage intellectual exploration (Head, 2013, p. 12)*

Since the teachers spend the most time with their students, and know the subject area best, it would be seen as natural that the teachers should bear the weight of information skills training. However, their time is often limited (Bury, 2011) and spending valuable class time to teach information skills, can be seen as a nuisance (Albitz, 2007). Some teachers also seem to think that information skills should be learned by osmosis (McGuinness, 2006), rather than something that needs to be part of the curricula (p. 580).

3.2.3. Using Google and (not) using the Library

Several studies (Head, 2013; Head & Eisenberg, 2010; Herrera, 2011; Salisbury & Karasmanis, 2011; Vondracek, 2007) have shown that students prefer Google (and Google Scholar) to searching traditional databases, like Academic search elite or ScienceDirect. The simple user-interface and perceived relevant content ranking has been deemed the main reasons for this success for Google Scholar. Project Information Literacy (PIL) (Head & Eisenberg, 2010) and the ERIAL project (Asher & Duke, 2012) both found that students use the same, few information sources for all information gathering. Students underestimate the time it takes to read, evaluate, reflect, compare and efficiently use information (Flaspohler, 2011, p. 3), and they seem reluctant to learn new information strategies. Students who stick with the information strategies they learned in high school, like Googling and looking for a few sources in simple databases, are the ones who found the transition to college the easiest, according to Head (2013). Sticking to their already learned strategies is not laziness, said Emmons (2013), it is a practical and pragmatic attitude (p. 35). Still, according to evidence-based practice (EBP) principles, one key element is to be able to find and use research materials (Nortvedt, Jamtvedt, Graverholt, Nordheim, & Reinar, 2012, p. 17). Students in health sciences are taught to work in an evidence-based way and must arguably therefore develop more evolved information skills than other students.

The PIL project showed that the students in the study were more likely to use instructors, classmates and friends as sources than librarians when they

had a particular information need related to course work (Head & Eisenberg, 2010). Students involved in the ERIAL project at Illinois Weselyan University showed no interest in asking the librarians for help with their search strategies (Asher & Duke, 2012, p. 84). The Internet has fundamentally changed students' attitudes to the research process, Flaspohler (2011) claimed, as students now expect to access information "quickly and without effort and where choice of topic is guided by an estimate of easy availability" (p. 49). Flaspohler (2011), citing Burton and Chadwick, found that students assess information by three criteria: that the source is easily understood, that the source is easy to find and that the source is available (p. 49).

There have been some attempts to explain why the students don't use the library or ask librarians when they are writing academic papers. Some suggest that the reason may be that librarians seem less approachable (Armstrong, 2012), that the students feel overwhelmed by the number of documents available (both in the stacks and online), or that the students simply don't know that they can ask librarians questions about anything else than locating sources (Miller & Murillo, 2012) or that students feel that teachers are obliged to help them, whereas librarians do not have that same obligation (Miller & Murillo, 2012, p. 57). Armstrong (2012) found that the threshold for contacting "authority figures" is high, especially when these figures are seemingly busy on the phone or typing on a keyboard. Teaching faculty who were interviewed stated that librarians too often project off-putting public images when presenting students with too much information or nothing at all, both of which are leaving the students discouraged and overpowered (p. 38).

Armstrong (2012) claims that there is, in general, little support for the librarian-student relationship from management. Librarians are thus absolutely reliant on forming relationships with teachers, and if a teacher is not a library user herself, it can be harder to form well-integrated information skills programmes because scheduling information skills sessions are almost always initiated by teachers (Smith & Dailey, 2013). It is seen as arbitrary which student will develop a connection with the library and who will not. According to Stone, Pattern and Ramsden (2012), and Stone and Ramsden (2012) there is a statistically significant correlation between library use and student success (grade point average), but that other factors also influence this success. While there is little reason to suppose that information skills must be learned by library interventions, there is some evidence to support that students benefit from collaborations between librarians and teachers (Junisbai, Lowe, & Tagge, 2016).

3.2.4. Overconfidence in Skills

Studies show that many students believe that they have above-average information skills when they in reality have below-average information skills (Gross & Latham, 2012) or that many at least show an overconfidence in their own skills (Jacobsen & Andenæs, 2011; Molteni & Chan, 2015). Miller and Murillo (2012) found that this overestimation of their own skills leads students to spending much time on inefficient searching (p. 64). Dunlosky and Rowson (2012) found that this also can undermine their learning and retention. Nierenberg and Fjeldbu (2015) found that only 10% of the students in their study rated their searching abilities as poor or very poor. The rest answered that they were average (45%) or good or very good (42%) (p. 19). Overconfidence poses a problem for students as they are less likely to seek help to improve skills they believe they already possess (Molteni & Chan, 2015). Many also use self-handicapping strategies and therefore are stuck in an unproductive, inefficient way of searching for and using information (Armstrong, 2012).

Students are searching for the perfect source (Head, 2013); the one source to rule them all (to semi-quote Tolkien), and they are finding it hard to figure out the right keywords and combination to find what they are looking for (Head, 2013, p. 16).

According to a study performed by Emmons (2013), less than half of the 6400 high school students tested managed to formulate a productive research question, narrow down a broad search, and critically evaluate a website. The students were also not considering the reader's needs when writing papers and believed that all information found online was free (Anderson, 2011; Emmons, 2013, p. 36).

4. Results

The results from the literature review showed, among other things, that students relied on Google and other previously learned information sources over and over again. They also showed a tendency to overestimate their information skills. This formed the backdrop of the questionnaire that was distributed. The results from the questionnaire were, in turn, discussed in informal interviews with librarians.

4.1. Findings from the Questionnaires[2]

In the initial survey, 74 respondents from the three university colleges answered a questionnaire; 43 respondents from XX University College, 8 respondents from XY University College and 23 respondents from XZ University College. While the potential number of respondents was approximately 740, approximately 230 students were absent from campus at the time. The response rate was therefore either 10 percent or 14.5 percent depending on whether or not to count those students who were absent.

Some of the questions were mandatory, but not all, and the response rate varied a little on some of the questions. The questionnaire was distributed through the LMS, and the questionnaire was open from January to March in 2015. As the author later discovered, the reason for there being only 8 responses from XY University College most probably was that the nursing students at this university college were in an internship at that time. In the second survey, 51 respondents from XX University answered a slightly modified questionnaire.

The questionnaires showed that first-year students relied on text-books/ course readings, Google and their lecture notes when they received a new assignment. The students were also much more likely to ask a fellow student or friend, or even family members, for help with the assignment than to ask a librarian.

When asked what strategy they would use if they could only use one, an overwhelming majority chose "looking through my textbooks."

Ninety eight percentage of students in the initial survey and 94% of students in the second survey answered "yes" to having been given assignments that required them to use and cite sources, but less than half answered that they had e-books or e-articles or websites on their reading lists (48% in the initial survey and 35% in the second survey). Most of those who elaborated on what kind of e-resources they were required to use said that they were using websites or web resources connected to their textbooks. Some also answered that they were required to solve tasks in these resources online.

When asked how they would rate their own search skills on the Internet, generally speaking, 26 respondents chose the "good" option, while 12 chose "very

good" and 12 chose "medium." They were a little less confident when asked to rate their search skills in databases, generally speaking. Here 10 respondents chose "very good," 16 chose "good" and 23 respondents chose "medium." So, when asked about databases, their confidence dropped one level.

Students in both the 2015 and 2017 surveys were given open fields to elaborate on questions or to express opinions on improvement potential. Issues that were emphasised were that the students wanted more individual feedback on written assignments, better access to teachers and assistants, access to more interactive learning materials, and more active training in study techniques.

4.2. Interviews

Three librarians at XX University College, XY University College and XZ University College were interviewed in November 2015. Results from the questionnaire were by that time ready, and the interviewees were asked to comment on some of the findings. The interviews were informal, but were based on some of the answers from the questionnaire. The responses from the questionnaire thus were used as an informal "interview guide." The purpose was to further illuminate the findings from the questionnaire, seen from the librarians. Responses concerning what sources the students used, critical evaluation strategies and overconfidence in skills were emphasised in the interviews. The answers from the interviews were transcribed from audio, and manually coded by using questions from the survey as category labels. The findings have been presented mainly as quotes to ensure an authentic presentation of the conversation. The interviews were held in Norwegian, and all excerpts have been translated into English.

4.2.1. Findings from the Interviews

The librarians had experienced that students use the information they had gained through lectures. PowerPoint presentations and the students' own lecture notes were popular information sources for papers.

> Librarian 1: *[Students] are very textbook-oriented, and the teachers will often suggest other books as supplements. It is all about the books […].*

> Librarian 2: *They use things they have learned in the classroom, [and handouts] like PowerPoint. The teachers here use a lot of text in their PowerPoint presentations because they know that students will use them afterwards. And [they use regular] Google. When I teach first-year students, and I ask if anyone has heard of Google Scholar, there is usually only one or two that raise their hands.*

The students' use of textbooks was completely understandable, Librarian 2 said. It was the rational choice since the students know what kind of questions or cases is likely to appear on an exam. Librarian 1 had also experienced that the students were not interested in using international databases and reading in English.

> Librarian 1: *While we had Bibsys [traditional library OPAC], students had trouble finding what they were looking for, and many of the books they wanted to have a look at were checked out, but when we got Oria [discovery system giving access to all kinds of documents both in print and electronic formats] it nearly replaced Google as a first search strategy.*

> Librarian 2: *When [the students] start searching for information, they look for books and they google. They ask [librarians] for help finding books on their subjects. They do not ask us about journals or journal articles. Journal articles are probably a little alien to them. First-year students do not know what a database is, but when they search Oria [discovery system] they retrieve books and articles etc. without having to relate to the term "databases." This makes it much easier.*

The librarians had seen that students used critical evaluation strategies to a certain degree when choosing sources for a paper.

> Librarian 2: *My impression is that they are.. relatively good at [critically evaluating sources]. They try to locate the origin of the source, they look at the content and they try to assess it. Most students try. But they do not have a lot of tools in their toolbox, so they learn a lot when they participate in our course.*

> Librarian 3: *Generally speaking, students do not use particularly advanced methods when it comes to critical analysis of academic sources. Talking to [teachers and librarians] about what can be considered safe or approved in a general way can be counterproductive. This can give [the students] the impression that formal criteria for assessment are preferred over a critical close reading of academic texts.*

The librarians were not surprised about the fact that the students used familiar sources such as books, Google and lecture notes, since the students had been rarely subjected to other sources, such as journal articles or e-books, previous to college.

> Librarian 1: *Experience suggests that students rarely know what journals are, and almost none knew that there are different kinds of journals. […] They use books, and they search online, and of course, they can find articles or reports, but they do not understand that this was what they found.*

Many of the sources the students suddenly faced in college seemed less intuitive and harder to understand. All three librarians commented on this in some form. The quote below, from librarian 3, said it most clearly.

> Librarian 3: *We should have come much further in making the information sources, such as databases and library catalogues, more intuitive for example through a graphical presentation of retrieved documents that show the link between search terms. The information sources are text heavy and based on tacit knowledge on how the systems work.*

Students also tended to overrate their own search abilities, according to one librarian, who continued, "They do not know that they do not know." One librarian also noted that students who had experienced that they could "get by" with Google tended to think higher of their search skills than students who had received some training.

> Librarian 2: *[Students] are required to use a minimum of sources to support their statements in their papers, but I don't think that the lack of information skills, like searching, compromise, their writing processes.*

> Librarian 3: *Information search and retrieval is probably more random than we could wish. I don't know what effect the information retrieval is for the end results [i.e. student papers].*

The students who had received training had more often discovered the vast resources available, and they were more humble towards their own information skills. "Why haven't I learned this before" was a phrase often heard by librarian 3. Librarian 2 put it like this: "The higher opinion they have of their own skills, the less critical they are."

The librarians largely agreed in their views on students' information strategies and information skills, and they did not express any particular concern for the students or suggest interventions, other than the ones already mentioned, to improve students' information skills. Poor access to students, not being invited into classrooms and lack of library resources were mentioned several times as major obstacles to a higher degree of involvement.

5. Discussion

Traditionally, students in Norwegian secondary education have been required to write papers where they were expected to use readily available information, like statistics or general facts, and to reproduce knowledge, and to give their sources. Students therefore rely on Wikipedia instead of more in-depth, peer-review sources (Blikstad-Balas & Hvistendahl, 2013). Students have expressed that they felt unprepared (Arum & Roksa, 2011) for writing academic papers as freshmen in college even though they, in Norway, according to NQF (2011) should be able to "search for and use information from different sources to further his/her development in relation to future work and/or education" (p. 20), "analyse and assess different types of sources of relevance to his/her own work" (p. 21), and"[…] use digital tools and media to solve academic challenges in a critical and creative manner […]" (p. 47). The level of critical thinking required, as well as the formal requirements, such as following a particular citation style and using scholarly sources, felt new and overwhelming to them (Head, 2013). Head suggests that not only the level of academic writing, but also the amount of sources available were leaving college freshmen feeling overwhelmed, but also excited when starting a new paper.

In an experiment performed on third-year radiography students, Øvern (2011) found that most of the students rated their search abilities as "average" in databases, but mostly "good" overall online. In the post-test, after giving lectures to half the class on information searching, the overall results went up in confidence, i.e. more students answered "good" on their skill level, but the students in the test group were less confident than in the control group. This coincided with the librarians' experiences, as expressed in the interviews. Griffiths and Brophy (2005, p. 542) found that students were satisfied with insufficient or even wrong answers as long as they found documents that

matched their search terms. In the survey for this study, students answered the question on confidence before a library intervention. 38 respondents of 51 total said they were "very good" or "good" at searching for information on the Internet, while the number fell to 26 of the 51 when asked about their searching skills in databases, which is just over half of the respondents. In Øvern's (2011) study, the students who had participated in the training program, showed less confidence in searching than those in the control group, who had only received the introductory lecture. This may suggest that only the students subjected to real search training realised their shortcomings when it came to information skills. Two librarians in the interviews for this study also supported this.

Head's (2013) research showed that Google searching was the most used information resource for high school seniors and college students, followed by library databases (e.g. JSTOR) followed by course readings as the third most used resource (p. 25). This study showed that students used course readings first, 94% used this as one of the first resources in information gathering, 54% used lecture notes and 45% used Google. When asked to choose just one resource, 72% percent answered that they would use their course readings, and 11% would choose Google first. Still, the trends were the same; course readings and Google searching were among the highest ranked information resources for first-year students. Head's (2013) study showed that many first-year students learn, or tried to learn, new information strategies during their first year, and that by the end of the year, the first-year students' research was more similar to other college students' than to high school students' (p. 27). These findings also, to a certain degree, match the general experiences of the librarians in the interviews. Still, the librarians expressed some concern in the overall abilities of the students, and they reported that it was sometimes difficult to get access to students to help them develop information skills. Academic librarians should perhaps be more aware of students' previous knowledge and skills, and to introduce subject-specific skills as soon as possible to help students with their motivation. Students enter higher education with some information skills, and librarians should understand that they only need to expand and build on the information skills the students already possess (Salisbury & Karasmanis, 2011, p. 44). This, according to Salisbury and Karasmanis (2011), "opens up possibilities to improve learning activities so that they are more relevant to students' existing skill set […]" (p. 44). Still, the bottom line is that if the students are not met with the academic demands that will put them to the test, they will not discover that their skills

are insufficient and therefore not be motivated to learn new ones. If teachers want their students to learn how to write well in an academic sense, they have to express what this entails in their assignments and to be prepared to spend more time on assessment and follow-ups with the students.

The Norwegian Qualifications Framework (NQF, 2011) gives the directions and overall learning goals for information skills, and each higher education institution in the country has a quality assurance system that, among other things, should back up the NQF within the organisation. However, the NQF's broad definitions are not always easy to integrate into each study programme, and there is a largely unorganised and "under-debated" issue of who has the overall responsibility to teach academic writing skills within the organisation. The students in the survey for this article were, perhaps surprisingly, in accordance with the librarians in the interviews when they expressed what sources they used. The use of textbooks, lecture notes and Google for written assignments, as expressed by so many, not only poses a practical problem, but also a larger issue. What does this mean for the quality of the assignments? The NQF clearly states that students who have finished their bachelor's studies should be able to "apply academic knowledge and relevant results of research and development work to practical and theoretical problems […]" and "can find, evaluate and refer to information and scholarly subject matter […]" (NQF, 2011, p. 47), but what does it mean if this is not followed up in study programmes, evaluations and the quality assurance systems? In this study, an overwhelming majority (98% in the 2015 survey and 94% in the 2017 survey) of the students reported that they had been given assignments that required them to use and cite sources, but as they were not asked about whether they were required to use sources that were not on their reading lists, it is hard to know how the requirements affected their behaviour. Students must face demands that ensure a wider set of sources and methods through their academic writing processes, particularly the students in health science because they will later be included in professions that emphasises evidence-based practice.

The question that remains important here is whether the seemingly random information retrieval methods that students use during their first year in higher education adversely affects their learning? In a study done at Illinois Wesleyan University, Asher and Duke (2012) found that students applied Google-like searches in subject databases, and that they most likely change database in stead of applying more advanced search techniques. They also

showed great willingness to change topic to fit easily found information (p. 78). This implied that the lack of searching skills and/or willingness to adapt to new sources (i.e. databases) could have a great impact on what they learned. Brabazon (2008) referred to an Australian study done by Squires and FitzGerald. The study showed that information scaffolding was necessary to help students go beyond Google (p. 20), and that students rarely read learning outcomes and marking criteria. Brabazon also explained how her own first year students demonstrated "[…] superficial research and comprehension skills and awkward writing modalities. They do not seek out diverse views to construct an argument" (p. 20–21). The students in this study relied heavily on textbooks, Google and their own lecture notes. It would have been interesting to see what kind of impact that had on their written assignments compared to what it could have been if they had used a wider selection of refereed research. The librarians that were interviewed for this study were unsure what kind of effect it would have.

Having access to teachers, teaching assistants and peers were emphasised by students in this study, and it is natural to assume that this is of particular use to students who are new to HE, and presumably lack some of the information skills that they need to get their academic work done. However, each teacher is responsible for a large number of students, and having time and resources to give each student the necessary individual training and attention is almost impossible. Some teachers are experimenting with different methods to improve learning, like group study, peer mentoring etc., but the teachers' time remains a challenge. This is also a factor for librarians. The librarians in the interviews stated that they neither had the time nor the competence to help students develop their academic writing skills. Others (Loertscher & Woolls, 2012; Oakleaf, Hoover, Woodard, & Corbin, 2012) called for a role-expansion for librarians. "Librarians are uniquely positioned to play a special role" Oakleaf et al. (2012, p. 22) stated, and they continued: "Librarians participate (or should) in the development of the learning outcomes for the campus—especially those related to information literacy—and ensure that outcomes are embedded in the beginning, middle and end of the curriculum" (p. 22). If this is to become a reality on college and university campuses, one could argue that librarians need to either remove some services or work more efficiently to make time on the schedule to address these issues. As Elmborg (2006) said, "moving from service provider to active educator challenges librarians and library educators to develop new guiding philosophies."

6. Conclusion and Implications for Practice

The study showed that students rely heavily on their textbooks, notes from lectures and Google to find information for their academic work. They only occasionally seek help from librarians or use the traditional library resources, like searching databases, likely because they tend to overestimate the level of their own skills, and that they have experienced that they can get by with Google and course readings only. This is in contrast to what the Norwegian Qualifications Framework (NQF, 2011) and the ICN Code of Ethics (International Council of Nurses, 2012) has suggested. The librarians interviewed for the study did not see an immediate solution to help the students use a wider set of information sources, other than the sessions the librarians were already involved in.

It is the responsibility of the institution to improve students' information skills, but few teachers want to accept sole responsibility for training their students in these skills. Time is a scarce resource, and taking precious class time to help students search for literature and help them with critical analysis is not a prioritised task. Teachers also tend to overestimate the level of students' information skills. Experiencing that their information skills are not what they thought is probably the only way to get students interested in learning more. Giving students assignments that require them to do more research will therefore be essential, particularly for students in health sciences, since they will be met with higher demands for information skills both in their next years of study and in their future careers (International Council of Nurses, 2012).

Students learn their information skills and coping skills during their first year of college. It is therefore vitally important to get it right straight away, and to introduce them to subject-specific sources as soon as possible. Early, and well-directed interventions could make a difference when it comes to changing the students' habits and drawing them out of the comfort zone that is Google and their textbooks.

The Norwegian Qualifications Framework (NQF) needs to be properly embedded in study programmes, and librarians should initiate teaching efforts that can emphasise learning to comply with NQF's overall goals. Implementing an information literacy framework could also give the librarians a more systematic approach to teaching and a much-needed *gravitas* as

teachers, something that would also be significant in collaboration with faculty teachers.

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Appendix 1: Findings from the questionnaires

Findings from the questionnaires are presented in tabular format to compare the results from the 2015 survey and the 2017 survey.

A) What do you do when you get a new assignment? (Multiple answers possible)

	2015 (74 respondents)	2017 (51 respondents)
Use Google to get the big picture	23	22
Use Wikipedia to get the big picture	2	5
Use a reference work, e.g. dictonary or encyclopedia, to get the big picture	6	18
Look through my lecture notes	29	40
Look through my textbooks	48	46
Search the library databases	14	10
Ask my teacher for help or advice	8	15
Ask a librarian to help me find information	2	2
Ask a friend or fellow student for help or advice	27	35
Ask a family member for help or advice	9	16
Other	3	1

B) What would you do if you could choose only one strategy?

	2015 (51 respondents)	2017 (51 respondents)
Use Google to get the big picture	6	5
Use Wikipedia to get the big picture	0	0
Use a reference work, e.g. dictonary or encyclopedia, to get the big picture	0	0
Look through my lecture notes	2	4
Look through my textbooks	37	37
Search the library databases	2	0
Ask my teacher for help or advice	2	3
Ask a librarian to help me find information	2	0
Ask a friend or fellow student for help or advice	0	2
Ask a family member for help or advice	0	0
Other	0	0

C) Do you have e-books or other e-sources (e.g. electronic journal articles or websites) on the reading lists in any of your cources?

	2015 (58 respondents)	2017 (51 respondents)
Yes	28	18
No	27	24
I don't know	3	9

In the 2017 survey, students were asked to rate their own confidence in search skills.[3]

D) How would you rate your own ability to search for information on the Internet, generally speaking?

	2017
Very good	12
Good	26
Medium	12
Poor	1
Very poor	0

E) How would you rate your own ability to search for information in library databases, generally speaking?

	2017
Very good	10
Good	16
Medium	23
Poor	2
Very poor	0

Notes

[1] Evidence-based practice, or evidence-based medicine, "requires the integration of the best research evidence with our clinical expertise and our patient's unique values and circumstances" (Straus, 2011, p. 1) and these principles are emphasized in many health sciences study programmes right from the start.

[2] The data from the questionnaires were arranged in a tabular format and given in full in Appendix 1.

[3] This was one of the questions that fell out from the initial survey, and therefore there are no comparison here.