
Information Use for Learning Purposes

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BACKGROUND AND AIM OF PAPER

A research study has been conducted with the aim of studying the interaction between information use and learning outcome, when high school students work at an assignment implying independent use of information. The results of the study will be presented in a dissertation.

The aim of this paper is to present a few preliminary results from the research project and to discuss some aspects of information use related to the contextual aspects of group interaction and students' understanding of assignment goals.

RESEARCH PROBLEM - THEORETICAL BACKGROUND

Information seeking behaviour and user studies are well known themes in LIS. Studies on information needs and uses have a long history. According to Wilson (1994) the early studies were library or system oriented, i. e. they mainly focussed on the use of libraries or information services. In the early 1980's there was a shift of perspective and a number of researchers – Belkin, Dervin, Wilson – initiated person-centered user studies (Wilson 1994, 30). This shift also entailed more frequent use of qualitative instead of quantitative research methods.

Studies of information seeking behaviour have given rise to models of information seeking processes (e.g., Wilson 1981; Höglund & Persson 1980 a and 1980 b; Höglund 1985; Kuhlthau 1983, 1991; Wilson 1994; Ingwersen 1990). Kuhlthau's studies explored information seeking among high school and college students, that is in an educational context. A survey of trends in school library media research pointed out a need for studies investigating "the teaching/learning process" and "studies of users' perspectives and preferences for various information resources" (Grover & Fowler 1992, 9).

Different views exist on what components constitute an information seeking process. According to Ingwersen, the process is concluded when the use of information starts (1990, 26). Kuhlthau, on the other hand, views the *use* of information as an issue of growing concern in LIS (1993, 1). Wilson (1981) presented a model of the information-seeking process including contextual factors affecting the information needs which in turn influence search behaviour. He related this model to that of Ellis who is concerned strictly with the search process (Wilson 1994, 33).

These models have one trait in common, they are general. The object is to describe information seeking as a general process, sometimes including contextual and situational factors that may influence the specific process. In his comprehensive survey of user studies Wilson draws the conclusion that "there is a need for an integrative model of information need, information-seeking behaviour and information use. That integrative model is already almost complete" (Wilson 1994, 42).

Educational settings create a specific context for information seeking behaviour. Information needs are imposed upon students by their teachers with learning assignments. Kuhlthau showed that teachers' requirements on students' as to time schedule, the use of certain specific sources and various ways of examination or presentation influenced students' relevance judgements and their shaping of topics (Kuhlthau 1989; 1993). Further investigations are needed to better understand the interaction between information seeking and learning. Research findings about information seeking processes might contribute to a better understanding of variation in outcomes of learning. In educational contexts learning theory might contribute to a better understanding of information seeking and use.

While LIS models of information seeking claim to be general, learning theorists have abandoned such conceptions of learning during the last twenty years or so (e.g., Entwistle 1976; Marton 1981; Marton et al. 1977, 1984). These researchers and others claim that learning cannot be considered or studied as a general process separated from the content of what is being learnt. "Process and content are two different aspects constituting a logical unity; there can be no process without a content and there can be no content except in terms of a mental activity" (Marton 1981, 184).

This difference between the two fields as to a general process or a subject specific process can be recognized in practice in high school and college librarianship. When students seek information for learning assignments librarians' main interest is focussed on the process of information seeking. Librarians rarely know what students actually learn subject-wise as a result of the information they gather. On the other hand, teachers focus their main interest on what students learn in the subject or discipline but often underestimate the complexity of the information search process that their students have to go through. These different perspectives may cause problems for students engaged in information seeking and learning processes.

LIS conceptions of information seeking understood in general terms and learning theory claiming that there is no learning process *per se*, that learning process and content form a unity, might shed light on our understanding of both processes. A research proposal was presented to study the interaction between information use and learning outcome, when high school students work at an assignment implying independent use of information (Limberg & Seldén 1993).

Questions to be explored are: What do students learn content-wise from the assignment? What information sources did they use? How did they retrieve information? What help or advice did they get during the work process? What difficulties did they encounter? How is it possible to link aspects of learning and aspects of information use in the work of these students? Answers to these questions would lead to a better understanding of how students approach this type of learning assignment, how they understand the assignment including goal, subject content, procedures like information retrieval, requirements for presentation, and the learning outcome. These types of questions led me toward using qualitative method, which is consistent with earlier research in LIS. There is a parallel development between person-centered user studies and qualitative research (Fidel 1993, 233; Wilson 1994).

METHODOLOGY

Since the aim of the research study is to understand how students experience the assignment it seems appropriate to choose their perspective of the matter through interviews. The decision also was made to observe the students from the beginning to the end of the assignment, that is to study the whole information seeking and learning process.

So in designing the research study the task was to find a qualitative method allowing for a perspective of the persons being studied and for observing the whole process.

In designing a process study, inspiration was found in Kuhlthau's studies (1983, 1989, 1991, 1993). She studied high school and college students during information seeking for learning assignments and presented a model divided into six phases. The model describes the information seeking process from the students' perspective including affective, cognitive and action-oriented aspects. Kuhlthau's work is an excellent example of qualitative, holistic research according to Fidel (1993, 224). The context of information seeking in Kuhlthau's studies is learning purposes in educational settings, which resembles the study I had in mind, and this helped me shape my method for investigation.

Phenomenography is a methodology for the purpose of studying learning outcome. This methodology was developed during the last two decades through empirical research of learning at Göteborg University (Marton 1981; 1986; Säljö 1981; Dahlgren 1984; Larsson 1986). The object of phenomenography is to describe people's conceptions about phenomena in the world. This means that it is not phenomena in the world as such that are the objects of interest but instead people's conceptions, understanding, thinking about phenomena. This distinction between two types of questions like "What are the reasons for starvation in the world?" and "What do people think about the reasons for starvation in the world?" is fundamental to phenomenography. Phenomenographers ask the second type of question and call this a *second-order perspective* (Marton 1981).

Relating to information search processes this would implicate an ambition not to describe such processes as they actually exist but as people conceptualize them or think about them.

One of the important results of phenomenographic research is that differences in outcomes of learning are closely linked to differences in students' understanding of their tasks and of their approaches to learning. The ways in which students experience their assignment and the learning situation – that is their approaches – formed the most fundamental differences in learning (Marton 1992, 29). Phenomenography appeared to me to be an appropriate method for my research study.

The predominating method for finding out about people's conceptions of phenomena is interviewing. Interviews may vary from very open to more structured. They are transcribed in extenso and analysis is being conducted with the aim of understanding underlying patterns and ideas. Phenomenographic analysis focuses on the manifest content of the interviews aiming at finding implications, meaning and coherence in investigated persons' reasoning about phenomena. The analysis seeks to find qualitative differences between people's conceptions of phenomena. The result of analysis is a description of a limited number of categories of conceptions.

DESIGN AND IMPLEMENTATION OF EMPIRICAL STUDY

Description of case

My empirical study investigated a group of 25 high school seniors doing an assignment in social studies implying independent use of information. The topic of the assignment was 'What will be the positive or negative consequences of a possible Swedish EU membership?'. The study took place in the academic year of 1993/94, i.e. before the Swedish referendum on EU membership.

The students worked cooperatively in five groups, each group choosing a subtopic. Examination of the assignment was both oral and written. Each group had to submit a report of about 20 pages. The students worked at the assignment for four months, starting in early December and concluding in mid-April.

The assignment was introduced by the teacher during a couple of lessons devoted to a short presentation of the EU, historical background and organisation. The introductory lessons also gave the framework including time plan, requirements as to content, assessment and organisation of work. After the introduction, subtopics were formed through brainstorming and the class divided into five smaller groups, each working in-depth at one subtopic. Each group was required to formulate four or five research questions. Once these research questions were approved by the teacher, the students launched into comprehensive information seeking.

An integral and important part of the assignment was a study trip for the whole class to Stockholm to get information through interviews with a lot of

experts in various fields. The students had to find such experts or specialists, representing government, politics, industry, science, authorities etc. and they devoted a lot of time and energy trying to contact the right persons and book time for interviews. The teacher also emphasized that the students had to prepare these interviews so as to become experts themselves in order to achieve good results in Stockholm.

Three weeks after Stockholm, written reports were to be submitted, one from each group. The oral examination included first a short presentation from each group, then a debate where students as individuals were required to argue over possible advantages or drawbacks of Swedish EU membership.

Investigative methods

In order to follow the whole work process the students were interviewed three times: 1) at the beginning of their work, 2) in a phase of intense information seeking, 3) after presentation and conclusion of the assignment. In order to hit these three phases of the work process the 25 high school students were to be interviewed as simultaneously as possible, which made it necessary to find assistant interviewers. Three library school students participated as assistants. It was essential that all interviewers well understood the object of the study. They made pilot interviews, listened to these together and discussed how to arrive at a common understanding and procedure for questioning.

Interviews were semi-structured and contained questions on goal of the assignment, subject content about the EU, information seeking tools, information sources, use of different materials, interventions by teacher and librarian, cooperative interaction, experiences from Stockholm, writing procedures, feelings in various situations, etc. After one series of interviews was completed all interviews were listened to and the questions for the next series were formulated on the basis of what was said on the previous occasion. The core questions were the same for all interviewees, but follow-up questions varied according to what students answered.

The teacher was interviewed before and after the assignment and the high school librarian was interviewed three times: 1) before the start of the assignment, 2) during the phase of intense information seeking, 3) after conclusion of the assignment.

Besides interviews the empirical study also used observational sessions in the classroom and in the library. Observation in the classroom took place primarily at the beginning of the assignment during introduction and at presentation and conclusion. Observation in the library took place during the phase of intense information seeking.

Moreover the empirical material includes students' written reports, students' journals with short notes about their work and the teacher's comments on these notes, and the teacher's detailed written assessment to every final report.

A large part of the student interviews have been transcribed and analysed. The analysis has been conducted step by step, focussing on different aspects or dimensions in each step. In the analysis a double focus of information use on the one hand and learning content on the other hand has been maintained. At this moment rather an exhaustive analysis of information seeking and use has been concluded as well as analysis of group interaction among the students. Analysis of learning is in the process.

GROUP INTERACTION

The cooperative character of the assignment plays a vital part in students' experiences of their work. In the interviews the students often referred to group interaction, division of responsibility between group members, importance of working with 'the right' partners, pleasure or frustration over group interaction etc.

The overall topic of assignment was 'What will be the positive or negative consequences of a possible Swedish EU membership?'. Through brain-storming the whole class of 25 students and the teacher decided on five subtopics to be studied: consequences for 1) industrial competition, 2) labour-market, 3) defense and national security, 4) environment and 5) education and research. The students divided evenly with five students in each group.

Analysis of group interaction has used four aspects, which grew out of comparing differences between individual interview answers: 1) Subject interest or 'right partner'? How was the group set up? 2) Organisation of cooperative work, division of responsibility between group members. 3) Intensity of work. How often, when and where did the group meet? Progress of work in time. 4) Students' views of cooperative learning – implications, importance. Students were interviewed individually, and every individual interview has been considered but the result of this analysis is tied to the frame of the group.

My effort in the analysis is concentrated on understanding the students' experiences of group interaction, not my observation of their actual behaviour, thus a second-order perspective is applied.

Each group has its own pattern as to the four aspects used. Three groups, "Industry", "Defense", "Education", were set up out of a wish to work with the *right partners*. To the group "Environment" the *topic* was definitely the uniting force, although three of the five students would have accepted another topic. The group "Labour-market" was not constituted either out of subject interest or a wish to work with the right partner. Conditions in the situation brought these students together.

Three groups, "Industry", "Defense" and "Environment" organised their work in *close cooperation* as to sharing information, discussing, planning, assuming responsibility both for individual efforts and for the whole group. They met very frequently and spent a lot of time together outside class. The

group "Education" met less frequently and divided tasks between them more, but did not lose touch with their joint project. The group "Labour-market" *divided responsibility* for most tasks including the editing of the final report, and never met outside class.

In two groups, "Defense" and "Education", all students preferred *cooperative* study to individual assignments. In the group "Industry" there were persons who definitely preferred *individual* study, although this time the students were extremely pleased with the composition of their group. In the group "Environment" a number of persons were very worried at the beginning, but relieved and pleased at the end, since group interaction had been more successful than they had anticipated. The group "Labour-market" had mixed views on individual versus cooperative study. They were frustrated over group interaction.

We will later compare these group patterns with variations regarding some aspects of information use.

USE OF INFORMATION

Analysis of information seeking and use started with comparisons between concrete differences regarding what libraries students used, what types of sources, periodical articles, books, propaganda material, non-print material etc., what search paths or bibliographical tools did they use?

This first step of analysis showed that the students were all rather skilled information seekers. They were used to independent study, particularly in social studies, and they frequently talked about previous experiences of search paths, types of material, recommendations from the teacher concerning the framing of research questions, etc. They were experienced users of periodicals' databases available in their high school library. It was natural for these students to think that if they were unable to find what they needed in the high school library media centre, they would go on searching in public libraries or in academic libraries. They all sent for propaganda material from organisations campaigning for Yes or No to Swedish EU membership as well as from the Swedish government secretariat for EU information.

Although students were interviewed individually differences regarding these concrete search patterns are tied not primarily to individual students but to the groups. Students belonging to the same group have largely used the same libraries, the same source material and the same search tools.

The group "Labour-market" restricted library use to the high school media centre. They mainly used periodical articles, organisational material and government booklets as types of sources. Three groups used their high school library and other libraries in the vicinity. Types of sources used were articles, books, informational materials from organisations and government institutions. The group "Environment" hardly used their school library media centre at all, but were frequent users of several public libraries. This group also used a wide

variety of sources from other Swedish and Danish institutions. They used journal articles less frequently than other students and preferred books, which none of the other groups did. All students in all groups used interview material, since interviews with experts in Stockholm were an integral and required part of the assignment.

Since group pattern prevailed over individual variation the next question for analysis was "What directs or influences group patterns?" Is it group interaction, is it students' previous knowledge of the subtopic, is it their ambition for top grades, information-seeking skills, or anything else?

Further analysis of interviews showed interesting differences between the students as to what they considered as particularly useful material and why so. Other significant differences appeared with regard to how students treated biased sources. Successive comparisons between students' conceptions of information use resulted in a number of categories of students' understanding of various phenomena such as *relevance*, *information overload*, *biased sources* and *cognitive authority*.

This paper will present examples from the analysis of differences concerning how students dealt with biased sources and relate these differences to differences as to students' understanding of assignment goals and cooperative interaction. It is important to keep in mind that the phenomenographic analysis uses a second-order perspective. This means that the results are grounded in what students say about using and handling various sources. No observation was undertaken to check students' actual behaviour.

HANDLING OF BIASED SOURCES

The topic of Swedish EU-membership is a controversial matter, and was so particularly since the empirical study was conducted about six months before the Swedish referendum. The assignment task as presented by the teacher was for the students to learn enough about the topic to be able to critically discuss, orally and in writing, possible consequences of Swedish membership. Among a variety of sources all the students used biased material for this task. Some of this material was sent for particularly because it was biased, it was material produced or delivered from Yes- or No-campaign organisations. Other sources were revealed by the students as being biased. They were retrieved via databases or browsing in libraries and were published in various journals, newspapers or books.

Three categories of experiencing biased sources emerged:

A. "Confusion"

Students found it extremely difficult to handle biased material. They were strongly influenced by what they were reading and swiftly changed opinions on the matter according to the standpoint taken by a particular text. Students

focussed their attention on looking for facts in all sources and they complained about a lack of facts in strongly biased texts. This caused feelings of uncertainty and vagueness. These students never scrutinized debate arguments or tried to analyze underlying values. They found it difficult to construct a coherent picture of possible advantages or drawbacks of a Swedish EU-membership, because the available material was full of contradictions. Four or five students belong to this category.

Agneta 2¹ says: I find it difficult to read all articles... there is such a lot. They all look at everything... All articles are written from somebody's point of view. It is difficult to find coherence. I mean... you read some articles and they are all in favour, those who wrote them all want to join the EEC, and then, well, it seems obvious, it sounds all right when they write that they want to join the EEC. Then you read something else, where they all say no and talk about all the drawbacks and then it is hard to know what to believe.

I: Either way may sound convincing?

Agneta: Yes, they only write about what they think is positive. They leave the rest out. It might be... perhaps I ought to write it down... all pros and cons in order to put it together. That is what I should do at the moment... to find coherence.... I think. It is somewhat messy.

I: It is, is it?

Agneta: Yes, I read and then i think... but this sounds OK, of course we should join the EEC. Then I go on to the next article, and... oh god, we do not want this do we, I do not want to join the EEC any more, like that. No, one has to put it together somehow.

In the third interview Agneta is still confused by bias. Her difficulties remain unchanged. She never succeeded in putting things together:

Agneta 3: Well, we wanted clear evidence about what will happen on this issue of equity and about the labour market and about the trade unions... On unemployment we found pretty good information on what will happen, but the rest... it was so foggy you might say, even the books we got at the Ministry of labour... even those books were vague, we never found any clear evidence on what will happen, if we join or if we do not join. Probably they do not know for sure themselves---- there is no concrete evidence... or any facts... and it is difficult to use this, when one gets... there is like.... everything is so vague... one does not.... the result is all foggy.

As a matter of fact it was very difficult to read... articles, because they were so biased. I then tried to look for... yes I looked for... keywords... some words from every article and then... yes went on checking. Sometimes... on certain issues... they said the same thing, but still it was biased, phrased in different ways, so we tried to look for more facts, to find out how it really was or some chart... that is informative, there you find... facts.

Some articles were useful, even though they were very biased we managed to get one or two sentences out of every article.

B. "Bias is accepted"

Students in this category actively searched for both Yes- and No-campaign material. Gradually they gave up the ambition to maintain a balance between Yes and No. A number of these students found unanimous opinions among experts and texts about the consequences of Swedish EU membership and the students accepted this as a truth. They found no valid arguments against membership. Material produced by No-organisations was less reliable or credible and less well designed than that of Yes-organisations. Ten or eleven students belong to this category.

Nadja 3 says: On our topic I came to the conclusion that it is absolutely clear, you cannot be negative. --- Those of us who studied industry were to get only positive answers, we kind of knew that before we went up to Stockholm. And I cannot say... we did not look for people who were negative toward the EU... I do not know, we certainly had that ambition from the beginning that we should try to find people from both sides, but we gave that up, it was hopeless. Even the strongest environment fan does not believe that the EU is bad for economic growth. Everybody agrees that it is positive. --- Our teacher criticized us for being... that our report is too one-sided. But it is impossible to find...

We were positive already before going to Stockholm. Merely... also when you read not propaganda material but mere factual information on the EU, in this field you need not be very knowledgeable in economics to grasp that the EU is a good thing on the whole. Even a science student understands that.

In the end... maybe we should have tried better to... not to be... not to buy everything so easily... after all.

Likewise, other students in this category did not find any strong No-arguments even in material produced by organisations campaigning against Swedish membership. They found evidence that EU membership was not controversial in the domain of education and research, which was their subtopic.

These students came to accept bias during the assignment work. From the start they do not seem to have been aware of the difficulties that biased material would cause, although they were aware of the fact that they treated a controversial matter which would require sources from different parties.

C. "Critical analysis of arguments"

This category includes students who encountered lack of either Yes- or No-information among the experts of their subtopic field, but they did not accept this one-sidedness. They carefully scrutinized and compared arguments in various texts. They tried to reveal how arguments were constructed. Their critical reading pushed them further to check various sources in order to compare how Yes and No propaganda material used the same sources to

document contradictory arguments. These students drew the conclusions that there is no unbiased, objective information on the issue. There are nine or ten students in this category.

Maja 2: We had to send for some material since it was not available in any library, it is from those who say yes or no, they have their own... pamphlets and things. So we know something about what they think, because they slant it their way. They may treat the same questions, but they changed one word, ... yes, an ordinary person would not notice, 'yea, that sounds all right' like... very heavily biased in different directions. I quite enjoy reading how they... like... give totally different answers to the same question, in principle.

I: So you compared like that?

Maja: Yes. (Gives rather a long example about the treatment of nuclear wastes.) So they slanted their material heavily, they narrowed the questions as much as possible so as to fit their right answers. Yes. That is why it seems like a good idea to compare like this.

...yes I find it most interesting to see how they... the Yes-party and the No-party, how they slanted everything, I find that a little... I quite enjoy seeing how they really twist things in order to arrive at the right answer. That's what I think. Therefore I quite like reading these... these texts that are not at all neutral but those that are really "yes" and those that are really "no".

Filip 2 says: I doubt whether there is any objective information at all, except legal texts and that kind. But I have noticed that when the different... Yes- and No-parties tried... or no not Yes- and No-parties but... yes that's what it is... but parties and authors who have different opinions, when they try to describe things objectively... their personal opinion shines through. It's not difficult to follow.

Since many articles refer to the same text... only a short quotation... it is possible to check this, but I do not think that people tell lies like that, but they may have used only something that suits their aim. It is a good thing to retrieve all that and to have read it maybe, although it is not... in order to know exactly what it is that they quote.

Madeleine 3 says: It is extremely difficult to find something that presents the truth. Everything is biased, everything you get hold of. When... I probably mentioned this before... while reading, one would notice, and this really shows very clearly - who stands behind this... --- It has been hard. It has been impossible to retrieve anything... all the time I had to... as it were... reflect on what this really is... do I really approve of this or is it twisted in any way?

INTERRELATION: APPROACHES - CONCEPTIONS OF BIAS

According to phenomenographers differences in learning outcome are related to students' understanding of the task (i.a. Marton, Entwistle & Hounsell 1984; Marton 1992). Would it be possible to discern variations in students' approaches as they appear in the interview material and relate these to information use?

These brief examples show that differences in students' intentions affected their use of biased sources. Category A did not succeed in retrieving any meaning from partial information, because their approach was to *look for factual evidence* in stead of ways of argumentation or underlying values. Nor was category B successful in using biased sources. Their original intentions of trying to *hit a balance* between Yes- and No-sources were abandoned. Category C had the intention to *reveal bias* and they managed to conduct critical analysis weighing pros and cons and underpinning their statements with substantial facts.

Other aspects of analysis of information use among these students like relevance judgements, conceptions of information overload and conceptions of the cognitive authority of information sources have resulted in similar categories, which in turn seem to form a more holistic pattern of conceptions of information seeking and use. These categories may be related to students' understanding of assignment goals as expressed through their approaches. This pattern is strengthened by students' approaches to cooperative learning.

GROUP APPROACHES

Since group pattern often prevailed over individual students' understanding and experiencing of information use we have three categories of experience of bias overlapping with the five group patterns².

Categories of Bias	A. Confusion	B. Bias accepted	C. Critical analysis
Group	Labour-market	Industry; Education & research	Environment; Defense

A closer look at students' approaches to cooperative learning within the groups suggests interesting variation. All students in the group "Industry" stressed the importance of "the right partner". These students wanted to achieve top grades, this was their overall ambition. In Stockholm they were most successful managing to interview two government ministers as well as top representatives for Swedish banking and industry. They were so confident about their success that they never really had any intention to be critical. Since they were good friends they trusted each other a lot and they appreciated the harmony within the group. Their goal was success in Stockholm, not critical analysis.

The group "Education and research" started by adopting a critical approach but did not succeed very well. Their subtopic was particularly difficult, since it did not at all invite any criticism on EU membership. It was not considered controversial by any source. These students' understanding of assignment goals

was influenced by their topic interest. Education was a popular topic among all the students and they were unable to predict the difficulties linked to the lack of controversial matter. In this case the subject matter of the topic caused the main difficulty.

In the group "Labour-market", the students never agreed on any common purposeful action to be taken. These students did not engage in any real cooperative learning. They were forced by circumstances in the context to work together and divided work tasks between them.

Groups "Defence" and "Environment" both understood assignment goals as conducting critical analysis of subject content. This meant using their subtopics to discuss and analyse possible consequences of Swedish EU membership. Both these groups had a strong awareness of the cooperative aspects of learning. Many of the students in these groups underlined the value of their own differing opinions about the EU. They learned from each other and this enhanced the quality of their analysis.

There are also differences between these two groups. Whereas in the group "Defence" all students preferred cooperative learning to individual study, approaches varied among the students in the group "Environment". One person definitely preferred individual study. One or two were rather sceptical and one girl strongly emphasized the importance and implications of cooperative learning. At the beginning, these students were worried that their group might collapse. At the conclusion of the assignment they were relieved and confident because their group work had been most successful. The group members saw this as the result of good will and intentions from everybody.

CONCLUSIONS

The students were required to perform a complex task with many dimensions:

- the subject topic was large, it was a complicated task to integrate knowledge about subtopic, the EU and consistent reasoning on a controversial issue;
- it involved independent information retrieval, including interviewing authoritative experts;
- the topic entailed a situation of information overload;
- cooperative learning was a requirement.

The brief examples of analyses and results presented here show variation between the students' understanding of the phenomenon of bias. These differences can be described through a limited number of categories of conceptions of bias. The differences between these categories are closely linked to students' different approaches toward biased information.

Group patterns strongly reinforce individual variation. There is clear overlapping between group patterns and categories of conceptions of bias. Success or failure in the use of information was not related to factors that some of the

students judged as particularly important for high achievement. Neither the right partner nor the right topic led to a qualified treatment of bias. Consensus within the group on the topical issue had a negative influence on the use of biased sources. On the other hand, awareness of the importance of a critical approach and respect for differences in personal opinions between the students on the controversial subject issue were factors contributing to more qualified use of biased sources.

Another important influence on information use, only hinted at here, is the students' understanding of subject content. Students in the group "Education" particularly encountered difficulties in information retrieval that they related to their subtopic. The students of the group "Environment" worked at a subtopic which united them through a common subject knowledge and interest.

LIS models of information seeking and use often refer to individuals, i.e. people in general. The present research findings indicate that cooperative learning situations strongly influence individuals' information seeking behaviour. It still remains to discuss these results more thoroughly using relevant theory of LIS as well as learning theory with a special focus on cooperative learning. The findings also raise issues for practicing teachers and librarians relating to purposeful interventions in students' learning processes. This in turn concerns the professional roles and the interaction between librarians and teachers.

NOTES

- 1 Numbers after names mark first, second or third interview.
- 2 There are one or two exceptions to this overall picture. Due to lack of space they will have to be left out of the discussion here. For the exhaustive analysis it is interesting to follow up this individual variation.

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