

# Making a Difference? Assessment of Information Literacy at Linköping University Library.

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## ABSTRACT

Information literacy, the ability to identify, assess, retrieve, evaluate, adapt, organize and communicate information within an iterative context of review and reflection, has been recognized as a critical competency both at universities and in professional work. In higher education information literacy instruction is now being integrated into the academic curriculum and is also now being assessed like other subjects. This paper summarize and discuss how information literacy skills are assessed by librarians and faculty together in two different educational programs at Linköping University and the outcomes of such efforts.

The similarities between the two programs, although different approaches, is the importance of tying information literacy assessment methods to leaning outcomes and to prepare students for future professional life.

**Keywords:** information literacy, assessment, librarian – faculty collaboration, learning outcomes

## INTRODUCTION

The core purpose of any assessment model in most educational settings is to find out how an individual or a group is progressing in a particular area and also to determine if there is a way that the quality aspects of learning can be improved. It is of vital significance which assessment model to use since it has such an important impact on both instruction and learning [1; 2]. In the last decades we have seen a shift from teaching to learning, from faculty to students and from instructional development to learning development. These trends have produced changes in our conception and methods of assessment procedures.

Today's students will face a world that will demand new knowledge and new abilities. They will for instance need critical reflective thinking skills meaning an ability to gather, analyze and evaluate information, to make informed judgments and to make inferences. Helping students to develop these skills will require changes in the assessment procedures and we need to re-conceptualize both learning outcomes and processes. We also need to re-conceptualize changes in the skills and knowledge needed for success and also how to equip the students for the real and complex world outside of the university. Furthermore we have to acknowledge that the relationship between assessment and instruction is most likely

going to change our learning goals. Consequently, we must change our strategies to tie assessment design and content to new outcomes and purposes for assessment and to make learning and instruction more in congruence with assessment [3].

## ASSESSING INFORMATION LITERACY

Information literacy is a fundamental component of the educational process since it enables individuals to engage in all kinds of learning situations using information resources critically in optimal ways. It is important that curricula is developed in such a way that the students throughout their studies at the university get appropriate training on all processes of learning needed to be information literate. Since information now is available from a wide variety of sources it is important that students understand how to interrogate the different resources in order to learn from them [4].

In order to become accepted as a valid outcome of higher education we think information literacy must be assessed. Webber and Johnston in 2003 stressed the importance of assessment as it grants credibility and indicates importance, and consequently improves the status of information literacy as a subject. They also stated that a combination of expert, self and peer assessment that support reflection and critical awareness was desirable. Furthermore they stressed the necessity of using a variety of methods in order to ensure its relevance of information literacy being learnt and linked to real-world applications [5].

Quite often, at least in the past, librarians have attempted to assess student information seeking skills by using multiple choice, fill-in-the-blank, matching questions and similar standardized tests. Such tests generally measure concrete knowledge and only a few of the important cognitive skills and knowledge students should learn [6]. Therefore these tests don't assess the effectiveness of students search skills especially in views of the variability of real life situations.

Authentic assessment, on the other hand, is any type of assessment that requires students to demonstrate complex cognitive skills and competencies that realistically represent problems and situations likely to be encountered in daily life. These real-world challenges require the use of relevant skills and knowledge to practical problems meaning to produce ideas, to integrate knowledge, and to complete tasks that have real-world applications. The emphasis on such meta-cognitive skills promoted by an information literacy approach points to a

synergism between the ability to manage information and the complex thinking processes involved in doing research. [7]. Students need coaching, not just with identifying and locating information, but also with internalizing and making sense of the information gathered. We must foster their focus on the process and help them learn from the content. It is also important to provide time and encouragement for reflection and meta-cognition to occur [8].

Authentic assessment forms a contrast to any traditional testing and evaluation method, which focus on reproducing information such as memorized dates, terms, or formulas and that provide limited information about performance. Just testing an isolated skill or a retained fact does not effectively measure a student's capabilities and could, in the worst scenario, lead to passive learning. To accurately evaluate what a person has learned, an assessment method must examine his or her collective abilities [9]. Some educators believe that alternative assessments motivate students to show their best performance, a performance that may have been masked in the past by standardized fixed-response tests and by un-motivating content. However, not all authors are in favour of authentic assessment and some of them argue that these kinds of alternative assessments can create concern, confusion and frustration among students [e.g. 10; 11].

Authentic assessment used in the context of students working on real-world problems, projects, or products that genuinely engage and motivate them to do well is most likely to be a learning experience. If students are not fully engaged in the assessment, it is not likely that any resulting inference will be valid. Furthermore, authentic assessment values the thinking behind work, the learning process, as much as the finished product as stated by e.g. Pearson and Valencia, 1987; Wiggins, 1989; Wolf, 1989 [12; 13; 14]. It focuses on student's analytical skills and their ability to integrate what they learn and they are also given a chance to proof their written and oral expression skills.

In authentic assessment, students use remembered information in order to produce an original product and are then assessed according to specific criteria or rubrics that are known to them in advance. The performance criteria should therefore be clear, concise, and openly communicated to students. Rubrics for instance give students a clearer picture of the strengths and weaknesses of their work. Setting criteria and making them explicit and transparent to learners beforehand, is important because this guides learning.

### **LINKÖPING UNIVERSITY LIBRARY (LiUB)**

Linköping University is a two-campus university situated both in Linköping and Norrköping in the county Östergötland. The university offers postgraduate studies and research in more than 100 scientific areas within 17 multidisciplinary departments and around 26 000 students. The library is divided into four different sections; Humanities and Social Sciences Library, Science and Technology Library, Health Sciences Library and Campus Norrköping Library.

The instructional programs of LiUB have a long and evolving history. Librarians have taught formal instruction sessions since the 70's. The programs have evolved over the years from library orientation, to bibliographic instruction and since the mid 90's they have developed into information literacy

provision. The library has successfully adopted information literacy as an organising principle that informs all of our work and commitment in order to play an active role in the preparation of students for a lifetime of purposeful learning. LiUB has a strategic plan wherein it is stated that 'the library should contribute to integration of information literacy in all undergraduate programs [15]. We also have adopted general learning outcomes for information literacy education according to the Bologna process. These outcomes are the backbone when we plan our teaching and they are adjusted to the disciplines and contexts wherein we librarians work.

### **ASSESSMENT OF INFORMATION LITERACY SKILLS AT THE DEPARTMENT OF WATER AND ENVIRONMENTAL STUDIES**

The Department of water and environmental studies is a centre for multi- and interdisciplinary postgraduate training and research. Research is focused on water and environmental problems relevant to society. Basic research issues spring from every-day life and ideas are born in contacts with society.

#### **Master's program in Science for Sustainable Development**

The master's program in Science for Sustainable Development is interdisciplinary in character and consists of theoretical and empirical studies in the natural, social and technological sciences and to some extent the humanities and health sciences that relate to current societal and environmental problems. Students can specialize within one of three areas: Climate, energy and recycling; Water and food security and Geoinformatics.

The program is problem-driven with the goal of creating and applying knowledge to support informed and responsible decision-making. The program provides students with research skills and practical know how in contributing to a society that is more ecologically, socially and economically sustainable. At the moment students from 23 different countries are enrolled.

When the first international students started their study at our master's program we noticed that they had poor search skills such as that they often used under-evaluated and even dubious web sites for their research. We also noticed that a number of them didn't know how to discern the quality of the information sources they found. Furthermore we noticed that they found it difficult to come to terms with the learn-how-to-learn approach (to develop learning strategies suitable for different situations), and that this was compounded by their lack of familiarity with research theory and practice. 'Bad writing', including grammar and spelling mistakes, lack of clarity, poor organization of the text and not being able to formulate a good research question was also something that we noticed. Last but not least we found that there sometimes was a cultural clash regarding academic styles which led to several cases of severe plagiarism

In 2007 a university professor, a program director and a senior librarian at the department began a collaboration which focused on how to increase scholarly reading, information literacy and academic writing skills. As a first step we integrated information literacy more strongly into the course, and we all agreed that it was essential to communicate the importance of information literacy to the students in the syllabus. So under the new learning objectives for the course, the students were informed that there would be an emphasis on information literacy.

Students were also told that their completed papers would be given a score for information literacy competency. It was further explained in the syllabus that the librarian would provide instruction in information literacy.

We also discussed how to assess the student's information literacy skills. By skimming through the literature we decided not to use standardized rubrics although it was well spoken of in the literature. Instead we set up some criteria according to the library's learning outcomes; criteria such as the student's ability to define an information need, to identify key concepts and terms, to identify different types of information sources and to develop (and refine) a search strategy. We also took into consideration the student's ability to manage information, their ability to critically evaluate the information retrieved and their ability to communicate information to an audience. A very strong emphasis was put on the student's ability to analyze and synthesize in the meaning of creating something new by combining different ideas. For this, they need to understand what scholarly investigation and writing are all about. They need to formulate the issues in a structured manner, identify the problem, formulate the hypothesis, collect data and facts regarding these issues, and to analyze them and come up with multiple solutions to an issue and to choose the best suited one.

We also discussed how we could help the students to find a place in this new context by familiarizing themselves with new values and customs, while making sure they meet the requirements their studies ask of them. We talked about an interdisciplinary enculturation in order to make an outsider into an insider in the academic community. One central point here was the writing of an academic text and writing into a professional discourse since we had noticed that they struggled with the complexity of the academic discourse. So we decided to concentrate on writing strategies such as how to develop a good research question; making an outline, paragraph structure; conventions regarding referencing into a consistent stylistic approach just to mention a few.

We began with an instruction of a few basic search skills where students at the end of that session were required to clearly define an information need and to show their ability to locate books and articles in a scholarly manner, still on a basic level though.

The second time we moved on to more advanced search skills like how to analyze search results and how to evaluate their significance and validity and how to think critically about the information found. Realizing that these students now had this basic core, (and in a way, advanced knowledge) of resources and searching skills, we continued the sessions on how to correctly document the usage and synthesis of information. The aim here was to make the students learn how to effectively integrate outside information resources ethically and correctly into their work.

The third time we moved on to anti-plagiarism instruction. Establishing the consequences of plagiarism early is probably the best way to go. There are many reasons why students plagiarize; some of these are deliberate and others are inadvertent but it is always considered a serious misdemeanour and penalties are therefore very harsh. And students need to know this.

Understanding and participating in the academic process is an important part of university study, and because the cycle of

knowledge creation is the same even outside of the university, understanding this process is also a key to opening the doors to professional work beyond the university, hence the fourth and last session about academic writing. The aim here was to teach students to do independent research and writing and to instil an academic attitude that will serve well in their graduate studies.

Both at the end of the semester, with the final paper, and at the end of a specific module the students are required to produce a quality paper to demonstrate their learning on an approved topic or issue of their interest. A paper similar to what they can be asked to produce in real life. They should also present their work to other people, both orally and in a written form, because it is important that they defend and share their work to ensure that their apparent mastery is genuine. This characteristic serves another goal as well. It signals to students that their work is important to other people, which increase the perception of relevance and meaningfulness.

In the Climate, Energy and Recycling Module, just to give an example, the students were presented with some information problems related to IPCC and society. Each student had to prepare and present a list of valuable information resources useful to analyse the problem assigned. They had to annotate their list and justify their different choices of information resources used. Furthermore they had to explain and discuss their research strategy and to comment on the reliability of the information retrieved and also its suitability for the analysis of their information problem. This assignment was assessed by the professor and the librarian collaboratively.

In other cases the librarian assesses the information seeking process in the student's papers or essays according to specific criteria mentioned before and then report the grades to the university professor who finally decides if the students pass or fail taking the librarians judgments into consideration. The librarian also attends the seminars when the students present and defend their papers.

According to Curzon in 2004 skills and knowledge of librarians and teachers respectively are complementary and together they form a good breeding ground for successful partnership in information literacy programs. We think this is the case with our partnership [16].

#### **ASSESSMENT OF INFORMATION LITERACY SKILLS AT THE HEALTH SCIENCES LIBRARY**

For many years the Health Sciences Library, has been working successfully together with teachers as well as the student union to promote information literacy in order to obtain optimal learning outcomes thus ensuring that the students are information literate in their future professional life.

Problem-based learning, PBL, and interprofessional learning, IPL, were introduced in all undergraduate programs in 1986 and the faculty is constantly developing and improving the educational profile. According to Barrows (1996) there are six core characteristics of PBL. 1. learning needs to be student-centered, 2. learning has to occur in small student groups under the guidance of a tutor, 3. the tutor is to be seen as a facilitator or guide, 4. authentic problems are primarily encountered in the learning sequence, before any preparation or study has occurred, 5. the problems encountered are used as a tool to achieve the required knowledge and the problem-solving skills necessary to eventually solve the problem, 6. new information

needs to be acquired through self-directed learning. So PBL focuses on the students own ability to seek relevant information and “the main actor is the self-supporting, information-seeking student not the lecturing teacher” [17].

Examinations of the medical students’ ability to solve various information problems have taken place for more than 20 years. The initiative to the collaboration between teachers and librarians came from the curriculum group that, among other things, introduced a stronger emphasis on a scientific and evidence-based approach in the curriculum. Although the examination procedures have changed over time, the collaboration with and the role of the library in this process has never been questioned [18].

During the first ten years the examination was held in the fourth semester and was based on real patient cases. The students met patients at health care centers. After thoroughly interviewing a patient the student formulated a clinical case concerning the patient’s problem. Then the student had to “run” to the library to seek information (at that time few resources were online) and the examination took place the following day (!). This moment with the real life connection at the health care centers has now ended because it was considered to be too time- and staff consuming.

Today the examination, which is compulsory for all medical students, takes place during the second semester. A few weeks prior to the examination the students attend an information literacy class for half a day embedded in the ordinary curriculum. A few weeks after this session, the students are provided with a list of 120 cases to choose from. These cases originate from the real-world cases mentioned above. The term coordinator, who also is the examiner, compiles the cases and makes them relevant according to the context and knowledge that the students have at this time. The students work individually for about one week with their case before the examination takes place. The administrator of the program compiles the schedule, which students to assess when and what cases they have picked, and send this to the librarians and teachers in advance. About 80 students, 10-15 professors/senior lecturers and 6 librarians carry out the examination which takes place in the library twice a year. Each session lasts 25-30 minutes.

In order to pass the student has to prove his/her capability to make the case “his/her own” by translating or interpreting it in order to make a sound search strategy and choosing relevant sources. Last but not least the student also has to show a reflective and critical attitude towards the search process itself and to the information found. During the exam both the librarian and the teacher will comment and ask for explanations, especially if they suspect that there is a lack of understanding and/or poor information seeking abilities.

Furthermore the student has to have a well-reasoned strategy, an ability to find basic information, know how to make a relevant subject search, have an understanding of the difference between text words and subject words, know how to sift information in a relevant way, know how to use several resources and several search paths, know how to critically evaluate the search results and to deliver an answer as to how the case could be solved.

Immediate feedback and response is given directly after the examination but not the score. The result is officially listed after two days. Weak students will be offered complementary

training and a new examination after a couple of weeks. About 5-10% of the students fail and the main reasons are a lack of a serious approach to the search process itself and a lack of a creative and reflective way of thinking. The student normally doesn’t have any problems finding information but the difficulties lie in finding qualitative information with scientific value. We believe that the main purpose of the examination is to transfer this kind of knowledge and approach. This problem-based approach was designed to engage students in a verbal demonstration and explanation of how they would solve a real-world problem.

## LEARNING OUTCOMES

The outcome of our efforts became evident when we evaluated and compared the reference list in 23 student’s papers or theses [19]. The main purpose of this study was to shed light on student’s information-seeking behaviours. We found that students who had been taught information literacy competencies, at the Health Sciences Library and in the master’s program, used scholarly resources to a much higher degree than students without training. In a study conducted during the fall of 2007 we interviewed 700 undergraduate students and found differences in the use of information sources depending on how long the students had been studying. We also found that stringent course requirements, including assessment procedures, from faculty and staff, like the two cases above, affected the student’s information behaviour [20; 21].

The teachers in the master’s program reported a higher critical thinking ability in papers written by information literate students that had been assessed. The teachers also noticed an increased use of academic sources as well as a better grasp of academic writing, the research process itself and of the information seeking process. The number of plagiarism cases dealt with by the disciplinary board at the university decreased for the master’s program after the implementation of the extended information literacy skills training.

## CONCLUSIONS

We strongly believe that new forms of assessment are powerful tools for understanding student performance, particularly in areas that require critical thinking and complex problem solving in real world settings.

We believe that authentic assessment is a promising method for the evaluation of information literacy learning outcomes, as it measures not only what students learn through library instruction, but also how the learning is subsequently incorporated into their academic work.

Furthermore we believe that information literacy is about creating a change in attitude, less the learning of skills and more the development of a mind set. We believe that student’s abilities to manage their own work hinges to a great extent on their capacity of associative and complex thinking.

We also strongly believe that the time has come for us teaching librarians to expand the content of our instructional offerings and to infuse information literacy activities throughout the curriculum. An expansion in our repertoire will help us be valued as educators with expertise in the many areas of the complexity involved in teaching the skills surrounding critical thinking about information documentation in conjunction with information retrieval. Through assessment of information literacy activities, libraries have the opportunity to measure

their contribution to the educational missions of their institutions.

The love of research and knowledge comes when the information literate student has the confidence and know-how to explore readings and when the student has the ability to identify legitimate primary information which enables him/her to develop and articulate his/her own ideas and positions. It comes when they more prominently can demonstrate their information literacy competency. Something we all, librarians and faculty, have to continue to work towards and something we believe that we have successfully achieved in the two cases described above.

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