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How to Fit Teaching of Information Literacy in with Students' Needs: an on-line Credit Course Model from the University of Tartu Library

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Abstract

E-learning is widely acknowledged as a possible methodology to teach information literacy. Nevertheless, studies reveal that information literacy courses as separate credit-bearing courses taught entirely in the form of e-learning, and using methods of active learning, are rare. This study analyzes the performance of a model for an e-learning course in information literacy in which learners with various backgrounds can participate, and where assignments can be completed according to personal information needs. Although the course does not provide face-to-face contact, learner-centred personal guidance is applied, as every student has an instructor — a subject librarian familiar with information sources in her field. The course is based on a constructivist learning approach: active learning techniques are used and

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critical thinking is developed through reflection and analysis of fellow students' assignments. The preliminary qualitative content analysis of feedback and reflections from graduates indicates that students value knowledge and skills obtained from the course. Moreover, information literacy as a course is considered necessary and guided e-learning is quite suitable for gaining information literacy. We conclude that, in order to be beneficial and valuable for students, information literacy does not necessarily have to be integrated into the teaching process of another subject. However, it should be connected with these studies, enabling students to obtain skills for information searching and learning necessary for successful graduation. At the same time, e-learning as a tool helps to promote information literacy in the academic environment in all segments of the university, integrating it with curricula.

Key Words: information literacy; e-learning; teaching library, teaching methods

Introduction

Information literacy is a key competence necessary for active participation in contemporary society. According to the American Library Association's definition, 'to be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information' (American Library Association, 1989). Information literacy as a transferable skill enhances the labour market competitiveness of university graduates and increases their future ability to engage in lifelong learning. In the two-level model of graduate attributes created by Barrie, information literacy is related to lifelong learning, enabling university graduates 'to use information effectively in a range of contexts' (Barrie, 2004, p. 270). Therefore, information literacy plays an important role in the learning process and libraries should assist in developing this skill. One of the ways for libraries to do this is to offer a web-based information literacy course as a free elective.

This article examines an information literacy e-course, applied at the University of Tartu, that fosters participation of students from different disciplinary areas, and which is adapted to their different levels of information needs. The article will focus on students' experiences of the course and offer a brief introduction into the role of course instructors — a general overview

of the course has already been published elsewhere (Seiler and Miil, 2009). To assess the impact and effectiveness of the e-course we posed three questions.

1. Is a stand-alone e-course, without face-to-face support, suitable for teaching information literacy?
2. Is the course attractive and feasible for the students?
3. Are the knowledge and skills learned in the course valuable for the students?

E-learning is widely used in teaching information literacy, and its effectiveness has been studied quite often, but there are very few studies that analyze the teaching of information literacy as a stand-alone e-course using active learning methods. This article adds to the growing literature in the area by describing a web-based format of teaching information literacy without face-to-face contact while retaining personal supervision.

After a short overview of the development of the e-course 'Basics of Information Literacy' this article presents the initial results of the content analysis of feedback and reflections from participants in four information literacy e-courses. Results show that learners place a high value on the knowledge and skills learned in the e-course and that they consider information literacy as a necessary skill to acquire.

Different Models for Teaching Information Literacy in Academic Education

Several studies show the necessity of teaching information literacy and indicate that while students frequently use search engines for finding information, they do not critically evaluate the information they find and they do not understand how information is organized. They utilize new information technologies but overestimate their information search skills (Heinze, 2008; Klatt, Gavriilidis, Kleinsimlinghaus and Feldmann, 2001).

Libraries have made a great effort to foster information literacy among students, as indicated by a growing number of articles published in international librarianship and information sciences journals. Aharony and Pinto, Cordon and Diaz provide an overview of this research (Aharony, 2010; Pinto, Cordon and Diaz, 2010). Important findings from this research indicate that teaching

information literacy should be integrated or embedded into different disciplines, requiring cooperation between libraries and faculties (Hepworth, 2000; Cochrane, 2006; Stubley, 2006). Unfortunately, most lecturers do not realize the importance of information literacy and feel that learning it within their courses would take too much time and practice. They would be happy if students used more information sources than Google, but do not want to use their valuable lecture time for teaching them how to do so.

Some authors argue that information literacy can be a separate discipline and that it can be taught in stand-alone courses (Johnston and Webber, 2003; Owusu-Ansah, 2004). Johnston and Webber, however, argue that it is problematic that information literacy is often taught by librarians, whose training and opportunities for teaching are limited. Librarians have to get involved because faculties fail to include information literacy topics in their teaching and curricula.

The library can fill this gap by offering a web-based information literacy course as a free elective. The University of Tartu has leveraged the flexibility provided by distance learning technology to include modules of an information literacy course into different disciplines.

E-learning is widely used in information literacy teaching, and web-based tutorials are the most widespread e-learning tools for information literacy (Malliari and Nitsos, 2008; Tronstad, Phillips, Garcia and Harlow, 2009). Joint has found that e-learning in a virtual learning environment without a tutor's supervision is comparable with traditional learning in teaching basic information skills: 'there is a gradual falling away in reported levels of learning attainment, the greater the reliance on educational technology' (Joint, 2003, p. 328).

Therefore, when planning an online information literacy course, attention must be paid to compensating for the lack of face-to-face student-instructor contact. To make sure that the web-based information literacy tools will support learning it is important to include opportunities for using the new knowledge in solving real-life problems and for getting feedback. As Bruce points out, 'Successful information literacy programs do not only focus on teaching information skills, they focus on designing learning experiences that require the use of information skills' (Bruce, 2002). Incorporating learner-centred active learning approaches into the courses can allow this to happen. Active learning engages students, 'it contributes to learner motivation by

encouraging and maintaining the student's interest in the material, providing an opportunity for the student to practice skills, and allowing for assessment, by the student and/or the instructor, of the student's degree of understanding' (Dewald, Scholz-Crane, Booth and Levine, 2000, p. 39).

The Context of the Study

A web-based information literacy course was developed by two subject librarians in the spring semester of 2006 and the pilot course was taught in the autumn semester of 2006. The inclusion of a free elective course into the university curriculum was not complicated, because problems of scheduling and finding locations are solved by e-learning and students have to get 6–18 ECTS credit points (depending on the curriculum they have chosen) through free electives during their studies. Students can register for the eight-week-long course via the University of Tartu (UT) study information system, and they get three ECTS credit points for the course. Up to now the course has been offered six times. The present analysis focuses on four courses held in 2006–2009.

Fifteen students participated in the pilot course and were supervised by the course developers; for the next courses, the number of participants was between 50 and 80, and 233 students passed the course in the years under observation. All ten subject librarians working at the UT Library participated as course instructors.

The goals of the course were to introduce the range of quality information resources accessible in the university network and those offered free over the Internet, to provide knowledge and practical skills for scholarly information searches, and to teach students to find credible information sources that give an overview of all the existing information on a given theme, thus creating conditions for improving the quality of student research.

Content of the Course

The content of the course is, in general, based on the information literacy standards for higher education developed by the Association of College and Research Libraries (Association of College and Research Libraries, 2000). At UT, all faculties have established their own rules for referencing and

guidelines for avoiding plagiarism; these rules and guidelines are accessible over the faculty web pages and they are taught in courses on research methods or other similar subjects. Several courses on academic writing are also offered at the university. Our course focuses on effective information search and evaluation of search results.

Course materials are divided into modules dealing with types of information sources, principles of information search applicable in different databases, types and structures of databases (and in more detail, the search principles in the most widely used information environments accessible for the members of UT), opportunities for searching research information over the Internet, evaluation of information sources, and avoidance of plagiarism.

Course materials are compiled so that they could be applicable for all specialties and academic disciplines. General content is customized by relating learning with library subject area portals and by individual supervision of each learner by a subject librarian who is familiar with information sources in a given subject area. Because there is individual supervision, both beginning and advanced information searchers can successfully participate in the course and their activities are supported by structured course materials which enable learners to choose what they would need to read as course assignments.

Course Activities and Assessment

The course pays attention to flexible self-directed and collaborative learning, interaction between instructor and learners, the use of activating methods, reflection, and development of critical thinking (Seiler, 2009).

The courses analyzed in this study were taught using the Blackboard learning environment (since then, however, UT has replaced Blackboard with Moodle and we have transferred our courses to that environment). The learning environment contains course materials and provides interaction activities. It also provides for submission of assignments and opportunities for subsequent instructor feedback. All interaction takes place in asynchronous forums: both general forums for forwarding course-related information and communicating learners' problems, and exercise forums for individual home assignments. Learners are divided into subject-based groups and these are supervised by subject librarians.

The course is based on a constructivist approach to learning according to which the learners 'use their own activity to construct their knowledge or other outcome' (Biggs and Tang, 2007, p. 52). According to Biggs's principle of constructive alignment, intended learning outcomes, learning and teaching activities, and assessment tasks all have to be aligned (Biggs and Tang, 2007, p. 53): students learn to search for necessary information, and through learning activities they focus on obtaining, developing, and exercising information search skills.

Learners choose a research topic and search for information on this topic for the whole duration of the course. They read learning materials, take tests, and do exercises according to the plan of activities; learning materials support students during the whole search process. At first, the learners get familiar with the principles of building a search query. Their theoretical knowledge is checked by automatic feedback tests which, however, are somewhat limited for measuring knowledge, and are more suitable for checking the recognition of facts. The course focuses more on the application of knowledge in practice and on gaining experience in the information search process. By using library subject area portals compiled to meet the needs of the faculties, students independently find the databases relevant for their search, describe their searches in detail (adding screen shots of their inquiries), and analyze the productivity of their searches. For example, in one of the exercises learners find the databases relevant to their theme on the EBSCO and CSA platforms, get familiar with them, describe them in detail, analyze their search strategies for both the keyword and subject heading search, and compare the suitability of both ways of searching with respect to their theme. Subsequent exercises cover other subject databases on other platforms and by the end of the course learners have developed an overview of all these databases, and have collected relevant records.

The instructions for each exercise describe the criteria students have to meet and the maximum number of points the learner could earn. All exercises are compulsory, and in order to pass the learner has to get at least 51% of possible points. Exercises are submitted in their respective forums, where each group of students has its own folder. The instructor performs the same searches as the learners do, and gives feedback in the forum as well. The exercise analyzed by the instructor alternates with those analyzed by fellow learners — each learner has to submit two analyses of exercises done by their fellow learners. The advisory feedback during the learning process encourages

learning and helps to achieve better results. 'So important is formative feedback that the effectiveness of any particular teaching/learning activity can be judged by how well it provides feedback to students as they learn' (Biggs and Tang, 2007, p. 97).

The exercises as well as the feedback are visible for everyone; reading them and following the trains of thought of one's fellow learners, together with the tutor's feedback, gives important additional value to learning. In such a way, all learners create new content accessible for fellow learners. Learners who are not self-confident in showing descriptions of their searches to everybody at the beginning find guidance in others' work and in the feedback other students have already received. At the same time, cheating is minimized as each learner has his own theme and respective searches.

Subject Librarians' Role

All subject librarians participated as course instructors, and their activity during the course was visible for all, as was the students' activity. Similarly, course instructors gained new knowledge from other course instructors' comments and students' exercises. By following each others' comments in forums librarians were enabled to set common requirements for students' assignments and to develop more specific feedback. Potential problems were discussed between librarians and assisted each to decide what kind of feedback to give to the student. It was therefore possible to support and involve those course instructors who felt insecure about giving feedback and who would be reluctant to start a future course of their own.

Initially, subject librarians felt hesitant about teaching information literacy, but the common teaching process helped minimize these restraints. While some diversity of opinions continues to exists, the ability to compromise developed through open discussions of viewpoints. Ideas from course instructors and their students continuously enable the course instructors to improve and update the course.

Experience gained while teaching this e-course facilitated the introduction of improvements: the number of home assignments was reduced in order to enable students to concentrate more on single tasks; students are required to add screenshots to their information search assignments to enable teachers to give better feedback about their information search behaviour; and

analysis of fellow students' assignments was added as a new type of assignment. In the final assignment students were initially supposed to describe all their information searches performed in various information resources during the entire course, but since 2008, students are asked to analyze and reflect on the learning process and to analyze their successes.

Methodology

The statistics in this article are derived from course feedback posts and reflections provided by graduates of four courses from 2006–2009 (N=143; the total number of students who passed the course was 233, as mentioned before). Since 'Basics of Information Literacy' is a free elective subject, our sample includes students from various fields (*realia*, *humaniora*, *medicina and socialia*), and from two levels (bachelor and master studies). As 'Basics of Information Literacy' is an elective subject, the sample is quite random: there is no pressure for anybody to choose this course and the only common feature is an interest (personal or academic) in the subject. Taking into account the previously mentioned time-span and resources, we can consider the sample of our study representative as it includes opinions from 61.37% of all course participants.

The data were collected from opinions from posts in an anonymous feedback forum (2006–2007) and from final home assignments (2008–2009). By doing so we attempted to collect as much material as possible, and also to avoid usage of overlapping texts (entered by the same student both in the feedback forum and in the home assignment). In the forum, students were asked to express their opinion about the course materials, tasks and schedule, and the performance of the instructor. Since 2008 a final home assignment was added to the course where students had to evaluate their search results and reflect on whether they could use the information found during the course in their graduation theses. The format of the final assignments was not specified, but even so, many students also included self-reflections, evaluations of the course and its benefits, and more general ideas about the necessity of teaching information literacy.

The research method used for the analysis and interpretation of the data was qualitative content analysis. This approach was chosen because of the relative heterogeneity of texts: different texts often contain answers to different questions and for some issues there can be very few corresponding

texts. This study is exploratory to some extent because in some cases students paid attention to issues that the authors had initially not thought about (i.e. the emotional aspects of information literacy). Inductive category application (Mayring, 2000) was applied during the analysis, as the preliminary careful reading of texts provided us with a framework of inductive categories.

The units of analysis were defined according to the principle that they should be 'the smallest components of texts in which the occurrence and the characterisation of variables (properties, categories) are examined' (Titscher, Meyer, Wodak and Vetter, 2000, p. 58). Thus, every particular feedback or reflection is handled as a separate unit of analysis. As is always the case in qualitative studies, the study focuses on meaning rather than numbers (Stokes, 2003). Therefore, the student quotations in this article are selected as being most representative of a particular topic, or to demonstrate how students thoroughly explain their standpoints. However, we also bring in a quantitative dimension by presenting the occurrence of particular topics in units of analysis to present the importance of the issue in students' anonymous feedback posts and final home assignments.

As the texts were already collected in the e-learning environment, our research group was provided with a digitally-born corpus of texts that only needed to be transferred into Atlas.ti. This programme has been a great help in coding the texts, discussing questionable ideas (via memos), and setting up a clear network of related ideas with handy examples. In order to achieve intra- and inter-coder reliability (Titscher et al., 2000, p. 60) on recurring code practicing, code-book revisions and discussions, pilot coding was conducted to detect possible bottlenecks in the code-book and to assure common perceptions of the code system.

Our code-book was developed by formulating analysis categories and codes out of the material as is suggested in case of inductive category application (Mayring, 2000), and gained more precision during pilot coding. This allowed us to remove unnecessary categories, learn about possible misunderstandings, and write down explanations of particular codes. For example, the category 'organization of the course' included references to the valuation of the schedule, tasks, reading comments written by course instructors, reading and analyzing other students' assignments, the grading system, individual approach, and the work of the course instructor — which all contribute to the learning process. We looked for positive, neutral and negative valuations of

the organization of the course and each valuation was supplied with a quote from the data, so that after the pilot coding we could obtain a common understanding of the codes. One category also allowed multiple answers: when we analyzed 'obtained knowledge' (during the course) we had to consider that even inside one unit of analysis the student can write either about entirely new information about databases, additional knowledge about databases, new knowledge about formulating a search query (which includes choosing proper keywords, search techniques, logic operators, truncating, etc.), knowledge about selecting and valuating information, etc. Usually, however, the categories allowed just one code from which to pick: for example, the category of 'possibility to choose the course' included codes such as 'I needed the course earlier' (includes: 'pity I didn't take this course earlier'), a suggestion to make the course compulsory, 'not mentioned' and 'miscellaneous'. In fact, these last two codes reflected the previously mentioned heterogeneity of texts as we did expect that all units of analysis would not respond to all categories and we were open to potential new findings in the data.

After conducting pilot coding, we calculated inter-coder reliability. Within our analysis team of three researchers, we calculated the 'average reliability coefficients across all pairs of coders' (Neuendorf, 2002, p. 161), considering percent agreement (PAO = A/n). In this formula, 'PAO stands for 'proportion agreement, observed', A is the number of agreements between two coders, and n is the total number of units the two coders have coded for the test' (Neuendorf, 2002, p. 149). Our percent agreements were: 1–2: 95%, 2–3: 75.71%, 1–3: 90.71%. The average inter-coder agreement is 87.14%, which is acceptable in most situations (Neuendorf, 2002, p. 143).

Results and Discussion

The results of the study are divided into three groups:

- The first group contains evaluations of the e-course organization and learning process, as well as evaluations of the assignments and feedback from the course instructors.
- The second group contains learner-centred assessments including students' comments on their course-related expectations, course ease or difficulty, and what surprised them. (Most of these opinions related to prior expectations of the course, but sometimes we spotted

surprise moments for the students. These surprise moments are extremely beneficial as they help to analyze students' perceptions of information literacy and the course from the time when they were not yet familiar with it, and provide the course organizers with knowledge about possible course participants and their prior knowledge of information literacy. Therefore, these surprise moments are presented in an extra section.)

- The third group contains opinions about the usefulness of the course and about the role of information literacy in the context of university studies.

E-course Organization and Learning Process

Of 143 units of analysis, 42 mentioned the structure and general organization of the course.

Feedback about the structure and performance reveals the course's suitability for independent learning, its organization, its ability to keep up motivation during the course, and the simplicity and logic of the structure.

Various respondents listed a clear and disciplining schedule and well-defined tasks as the positive features of the course:

> X *[---] having already passed a number of web-based courses I can tell that this course has been organized in an almost ideal way.*
> X *The structure of the course was very good, as all the home assignments added new skills. The structure and organization of the course is very suitable for independent learning.*

Some people were happy about the fact that the schedule was not followed too rigidly and that no points were deducted for late submission of work. This gave learners the freedom to dig in deeply and the opportunity to postpone turning in their work. This was described by some as the possibility of '*enjoying the course. (For example, we could dive into databases for hours and forget about the fact that later on we had to describe our searches.)*'

When planning our course, we made sure that requirements for participants' computers were not set too high in consideration of the fact that much individual learning is done at home where the Internet connection may not be

good. We did not include complex interactive features or audio or video clips. Our aim was to create clearly structured, supportive learning materials that would help students concentrate on the process of effective database searches.

> X *When I started the course, it seemed impossible to study such complicated matters over the web, but the course structure was good and clear, all materials were very concrete and they were good to work with.*
> X *I personally like the structural simplicity of the course. ... I think that it would be good if several other subjects were taught like this course of Basics of Information Literacy.*

Home assignments were mentioned in the feedback or final home assignment by 31 students. With regard to the exercises, the student considered it important that search skills improved gradually and that better results were achieved for their own research themes. Good results often compensated for the complexity and time-consuming nature of the exercises.

> X *[---] home assignments always gave us new skills despite the fact that they took a huge amount of time.*

Interesting results motivated the learners to devote more time to the exercises than required. Finding good materials was often more important for the students than completing the exercises and they often had to choose between spending time in finding necessary materials or in completing the exercises in time. Students thought that both learning materials and exercises are worth keeping, as they would come in handy when planning and conducting further searches.

> X *[...] when doing the exercises, the real objective was to master the search system. Therefore, there was not much time left for working with individual databases for my research. I could not say that I am satisfied now because I have not found everything that is important for my own work.*

For many students, the task of evaluating fellow learners' work posed a real challenge. The novice information searchers found it difficult to analyze confidently and, when necessary, criticize the work of their fellows. They mentioned that analyzing other people's exercises was an interesting and new experience, one that also helped to reveal one's own mistakes. The

analyses written by fellow learners about one's own work were also considered useful.

> X *I would wish to draw special attention to the home assignments, where we had to analyze the works of other learners – this was a very interesting and useful approach within the teaching process.*
> X *The experience of analyzing the works of our fellow students forms a good basis for evaluating the expediency of our own searches.*

Expectations of the Participants and the Feasibility of the Course

Feedback from 30 students allowed us to draw conclusions about the reason why some students chose the information literacy course. The assessment of the complexity of the course and of how much time it would consume was related to taking the course or not. If students expected the course to be a relatively easy way to earn credit points they were more likely to choose the interdisciplinary free elective course. However, if the course demanded more time and devotion than students initially expected, it was assessed as difficult. If the participants hoped to get by with previously mastered search methods, the course could have been assessed as time-consuming, especially if the tutor made them redo superficially completed exercises. We found a positive outcome, however, in that during the course, several participants changed their attitudes and, in general, were convinced that the newly learned knowledge was useful, even if it was more difficult to learn than previously expected.

> X *While at the beginning I only thought that it was an easy way of earning the credits for a free elective, comfortably sitting at home with my computer, now I think differently. I do not regret that I chose this course, because it gave me much more than I had initially expected.*

Students with little previous information search experience and weak computer skills had to work harder. For some, course difficulty was increased by theme complexity or their poor knowledge of foreign languages. We had feared that the quality of the learning materials and a too tightly structured course schedule or insufficient feedback would be causes of student learning difficulties, but no such opinions were stated:

X *At first the course seemed to be difficult, too many exercises and too tight a schedule, but during the course I changed my opinion. The instructions were clear and easy, and the schedule was put together in just such a way that I simply had to make some effort.*

Even those learners for whom the course was easy still appreciated the knowledge they had gained:

X *With regard to the difficulty level: the course was not too difficult, but in terms of its usefulness, it was a super good experience.*

Usefulness of the Course for the Learners' Research

Over half of the students (87) mentioned the benefits of the course for conducting their research. Additionally, they hoped that the course would be useful in their future career. About one-third of the students (45) merely mentioned that the course was useful. Some students also acknowledged that as a result of what they learned, they were able to help their friends and fellow students search for information. Many students mentioned several benefits from the course in one sentence, for example, that the course enabled them to become a wiser and more knowledgeable information user.

X *Right now, before writing my graduation thesis, I cannot imagine knowing as little about information search as I did before.*
X *I found the main part of my resources thanks to this course.*
X *I believe that because of my new skills, my master's thesis will be of better quality. I took great pains to find resources for my bachelor's thesis.*

The usefulness of the new knowledge was also noted in a wider context. Participants reported that search skills and knowledge of databases help save valuable time and considerably widen their outlook. They believed that the new knowledge would be of help in their future jobs as well as in everyday life.

X *Now I can combine the phrases and truncate them, and use the advanced search; this way I spend much less time in searching.*
X *I realized that this is an extremely interesting subject and it will be useful [---] in later life as well, as people working in medicine have the obligation to keep up*

with new information all the time, which means that they have to read and analyze scientific literature.
X *I can now find my way even in unfamiliar databases and my acquaintances have already started to use me for this ☺.*

Students also indicated that courses like these should be included in the compulsory curricula as they cover skills necessary for all students when writing their bachelor's theses. Feedback also revealed that good information search skills are rather rare among the students. One student said that passing the information search course would give her some advantage over her fellow students in writing her bachelor's thesis. Students also indicated that search skills and familiarity with databases would make finding resources easier, help save time and, in general, improve the research quality.

X *All bachelor's students should be required to pass this course; it would make the writing of bachelor's/master's/doctoral theses much easier.*
X *This course should, actually, be compulsory, because many people are in deep trouble when searching for their resources.*
X *I will surely recommend this course to everybody, but especially for third-year students.*

The Eureka Effect

Participants reported three benefits from taking this course: the experience of information searching, knowledge of new information sources, and finding materials necessary for research. All three were also listed in the expected learning outcomes of the course. Thus, we can conclude that the course fulfilled its objectives. In addition, the new knowledge gained from the course sometimes included surprises for the participants, causing them to re-evaluate their former knowledge and attitudes.

X *For me, the most useful and surprising subject was information search over the Internet, where I had believed myself to be quite at home.*
X *In this course, I was happiest about finding the subject headings dictionary; earlier, it had been very hard to find the most suitable search terms.*
X *Although I had believed that I knew almost all that there was about skiing, I was very pleasantly surprised to learn during this course that I knew almost*

> *nothing. I even could not imagine how many very useful and interesting writings exist in this field.*

From the library's viewpoint, it is good to know that students learned to use and appreciate the subject area portals of the library and the many databases offered through these portals.

> X *For me, it was a true 'Eureka' moment to discover the many opportunities the UT Library offers and the variety of scientific databases that all offer necessary resources for research work.*

Students also noted that the course provided new ideas for planning their research, and, as a result, their vague search goals became more precise, the terminology became clear, and their English language skills improved. Several respondents mentioned that they had already applied their new skills and started to dig deeper into their research subject. For these students, the information search had become more fun:

> X *Performing searches is addictive, especially if you are searching on a subject that is very exciting for you.*
> X *This course clarified a number of terms and notions for me (both in Estonian and English) and kindled a great interest in searching for and reading literature (including professional and simply interesting literature and materials necessary for writing my graduation thesis).*

The most far-reaching benefit of the course is that that some students became more familiar with the wider notion of research work, its methods and objectives:

> X *For me, the most important result was that I realised that passing through different stages of research is not simply a 'waste of time', but it very definitely helps to create better and more focused research work.*
> X *Actually, the quality of a research work increases with hard work that has gone into it on the grassroots level. This means that the time spent in defining the research questions or finding related subject headings will considerably shorten the time spent in the actual completion of the work.*

As the majority of the study is based on final home assignments where students focus on benefits of the course, they also tend to express positive

attitude towards the course. Therefore only 11 comments can be interpreted as negative. Besides negative comments on technical issues, students complained that they tended to forget the deadlines of a web-based course in the context of the rest of their study, and that there were too many databases in which they had to conduct searches. Comments concerning broken links and erroneous numeration of chapters in reading materials were also expressed. Some negative comments addressing student study skills (efficient time management) or general learning skills (improving English language skills) were also mentioned.

Conclusions

Based on the preliminary qualitative content analysis of feedback from participants, we conclude that the e-course model developed at the University of Tartu Library for teaching information literacy as a free elective subject is effective. Students appreciate such a course structure where a fixed yet flexible schedule and learning exercises helps them gain systematic knowledge about information search processes and improve their search skills. This approach allows them to spend more time developing deeper information searches and better enables them to enjoy the subject being investigated.

Integrating course assignments with the students' own research themes has proven beneficial, as it allows them to accumulate materials necessary for their research and keeps them motivated during the whole course. Students find that the knowledge gained in the course is useful for their learning and research activities, as well as for finding interesting information in their everyday life and in their work setting. The e-course is suitable for teaching information literacy to students from different academic specialties and for learners at different levels of preliminary knowledge because there is close individual contact between teachers and learners. Each participant gets more attention from the instructor than would be possible during face-to-face teaching. As e-communication is a habitual means of communication for most of students today, it is not difficult to achieve and maintain contact with them in the web environment. Additionally, e-teaching is suitable for subject librarians teaching the course as it allows for flexibility, so that the course can be taught in addition to their other work requirements.

One advantage of the e-course is that it is voluntary and does not belong to any special subject or academic unit. Students of different specialties and different levels can participate in the course. The most important factor is the students' motivation, for when learners have a firm goal in mind which requires well-developed information search skills, they have a much better connection with the content of the subject than when they just have to pass the information literacy module integrated into compulsory courses. Although this is a stand-alone information literacy course, its aim is not to teach it as a separate discipline but to relate it to the particular students' search objectives. In this way students place more value on information search theory and the information search process.

Student feedback indicates that many of them had heard about the course only accidentally. However, if the course was not a free elective, but part of the curricula as an elective, it would be easier to find in the study information system, and reaching the target groups would become easier.

Our study confirms that in order to make teaching information literacy effective and valuable, it does not have to be integrated into the teaching of some other subject. It should however be related to the students' academic specialty as that would enable them to gain necessary information search skills and experience while dealing with their own research theme. By improving the research skills of students in an information literacy course, it is possible to make the university recognize the necessity of information literacy, to teach it all over the university, and to relate it to various curricula. Usage of e-learning helps in removing several physical and organizational barriers, thus making the access to information literacy courses even easier.

In summary, in order to improve the success of a generic information literacy e-course among students we recommend that:

1. Students should be divided into groups according to their subject so that they would be instructed by subject librarians who are aware of information resources and information search hints specific to this subject;
2. Home assignments should be related to the information needs of the course participants as this increases their motivation;
3. Students should be encouraged to practice information searching in various search environments most relevant to them as it helps

to experience success and increases proficiency in information searching;
4. Screenshots from search processes should be added to home assignments as they help the course instructor to provide adequate and constructive feedback to the students;
5. Course instructors should give feedback quickly and work with each student individually, taking into account the needs of students with varying pre-knowledge and experiences. This feedback should be supportive, advisory, and motivating;
6. E-courses should include a reflective component in information search assignments (in which students analyze their various information searches and results), and in the final home assignment in which they reflect upon the entire learning process.

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