DO WE KNOW HOW TO VERIFY EFFECTS OF E-LEARNING IN LIFELONG LEARNING? CASE STUDY OF THE NATIONAL MEDICAL LIBRARY OF PRAGUE.

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Abstract
In this paper we introduce an electronic course „Modern procedures in medical libraries", which is a part of the continuing professional education organized by the National Medical Library in Prague (NML), and its evaluation. The course was carried out in two phases, the first – for a pilot group of students – at the end of 2010, the second during March and April 2011.
The course is designed for a lifelong learning of medical librarians that work in smaller hospitals and other types of healthcare institutions and do not have either proper education or sufficient experience. It is composed of three lessons: library system in the Czech Republic and public library and information services in healthcare, medical ontologies and terminology and specialized medical information resources and retrieval techniques.
For the creation of learning objects, the authors used principles of constructivism, namely assimilation and accomodation, that can initiate changes in students behaviour. The results of such a learning process, whose principle is the incorporation of the new experience into an already existing framework, should be a change in librarians' professional competencies and workflow and an extension of their knowledge.
We tested the evaluation and assessment of the effectivity and usefullness of this e-learning course with the help of Kirkpatrick's scale. New valuable experience for further development of e-learning courses were obtained by both authors and tutors from comparison of test results and results of evaluation questionnaire from both groups of students.

Keywords
Education, continuing professional development, electronic education, medical libraries, e-learning evaluation and assessment

Introduction
The National Medical Library, department of education and methodology, prepares, organizes and carries out seminars and courses of continuing professional education for medical librarians and also seminars for end-users. So far it has been accomplished in a traditional way, i.e. the participants should attend the courses personally.
E-learning is a suitable alternative of lifelong learning that allows the development of professional competencies and ability to update and deepen professional skills of medical librarians, mainly in the regional libraries, and at the same time it supports fixing of study habits in the form of managed self-study.
The work with digital information in virtual environment, above all retrieval and usage of electronic information resources, composes the everyday reality of library and information

work of several tens of Czech medical libraries. Our e-learning course was intended for those librarians that work in hospitals and specialized therapeutic institutes (41 libraries, i.e. 60% of all medical libraries in the Czech republic) or other types of health establishments and that do not have either proper education or sufficient, at least five-year experience.

Methods of course construction

A connection between e-learning and libraries has been emerging in European healthcare librarianship since the nineties, mainly in the field of digital learning objects management and metadata creation and use for building digital repositories [1]. It is substantial that the continuing professional development of library and information professionals facilitates the access to the opportunities to gain knowledge of such new methods of library and information work [2]. The foundations of e-learning are a proper content created with the knowledge of pedagogical principles (composition of learning objects, sorting of chapters from simpler to more complex, references) together with the use of various e-learning platforms and tools (presentations, text documents, hypertext links and digital objects).

The course „Modern procedures in medical libraries" was scheduled into three lessons, aimed at library system in the Czech Republic with the focus on medical libraries, medical terminology and the MeSH thesaurus and specialized medical information resources, i.e. catalogues, databases etc. Together with study texts it comprised also both preliminary and final test, assignments for each lesson, an evaluation questionnaire at the end of the course and discussion forum for each of the lessons. The course was created using LMS Moodle, hosted by Charles University in Prague, and it was accessible for six weaks for each study group. Estimated time needed for reading up the texts and submitting the assingments was approximately 24 hours. The authors preffered the course to be tutored, as the tutor can make clear possible unclarities in the text and can help to overcome problems with self-study. Constructivist methods, assimilation and accomodation, based on changes of students' behaviour patterns were used for creation of learning objects. The results of such a process of learning, whose principle is the incorporation of the new experience into an already existing framework, should be a change in librarians' professional competencies and workflow and an extension of their knowledge.

The course was carried out in two phases, the first – for a pilot group of students – at the end of 2010, the second during March and April 2011. The curriculum for the second course was slightly modified, the changes were partly based on assessment of the first course and partly due to changes in NML's services (a new interface for NML's catalogues and the Bibliografia medica czechoslovaca database was introduced during March 2011).

Methods of course evaluation and assesment

The course evaluation and assessment was based on Donald L. Kirkpatricks's model, that comprises four levels [3].

- Level 1 – Reaction - to what degree participants react favorably to the training
- Level 2 – Learning - to what degree participants acquire the intended knowledge, skills, attitudes, confidence, and commitment based on their participation in a training event
- Level 3 – Behavior - To what degree participants apply what they learned during training when they are back on the job
- Level 4 – Results - To what degree targeted outcomes occur as a result of the training event and subsequent reinforcement

Results

15 students formed the first – pilot group, from which all the participants completed the course, the second group was comprised of 39 students with 92% (i.e. 36 students) completion

rate. The only greater differences between the groups were greater percent of participants with library/information education (either secondary school or univesity degree) in the first group (73% compared to 59%) and longer average library experience (25,5 years compared to 19,8 years) also in the first group.

Reaction

The first level of the Kirpatrick's model was assessed with the means of an evaluation questionnaire at the end of the course. The questionnaire contained ten questions, both open and closed. The authors planned to use also students' contributions to the discussion forums for the assessment of this level, but the forums were used sparsely.

 The main points from the questionnaire assessment are:
- reaction of participants to the e-learning form of the course were positive, such a course was acceptable for all the students from both groups with the exception of only one person and they would participate in another e-learning course,
- each lesson was graded from 1 (excellent) to 4 (unsatisfactory) from the point of recency, scholarly level, level of tutoring and contribution to the practical work. The average ranking of each lesson varied from 1 to 1.5. In the first group some of the students commented on the uneven scope of the lessons regarding the time assigned for them, which resulted in some modifications in the course structure. On the other hand, the second group, where the deadlines for each lessons were not so strictly set, had problems with the indetermined timeline,
- 78% of participants were entirely satisfied with the course, 22% partially,
- the students also suggested other themes they would like to study, e.g. searching the NML's catalogues, the Bibliografia medica czechoslovaca database, union catalogues, citation analysis, bibliographic references, Czech online resources and copyright,
- using MeSH headings, overview of medical databases and searching via the new NML interface for catalogues (only available for the second group) were rated as the most valuable for librarians' every day work.

Learning

The evaluation of the second level was carried out both by comparison of the results of the preliminary and final tests, that comprised 17 questions covering the main course themes, and by assessment of each lesson's assignments.
- The average results of the tests were improved in both groups, namely from 13.7 points (preliminary test) to 15.3 points (final test) in the first group and from 13.7 points to 15.9 points in the second group, whereas totally 78% of participants had improved their test results,
- the differences between the groups could be due to differences in education (see above),
- the assignments were graded with 98-99 points from 100 possible on the average, the lowest grade being 70 points

Behavior

The participants of the first course were asked three months after the course completion to fill in a questionnaire, that was aimed at using the newly acquired knowledge in everyday work, i.e. changes in behavior (the second group will be asked as well). The results really showed some potential changes in the students' practices.

Some of the examples how the students use their new knowledge and skills are:
- 50% of participants made some changes in their library services in comparison with the pre-course stage,
- 36% newly began to use MeSH headings for searching,
- 13% added a link to NML's services to their own services portfolio,
- 57% of participants began to advise their users of possibilities to search scientific information via the Internet, 25% of EBM resources,

- all the participants inform their users to some degree of the new pieces of knowledge from the course, namely 93% by personal communication, 43% via e-mail, 21% via web pages and 14% by organizing seminars

Results

This level is usually measured above all in commercial segment, where it is possible to apply various financial indicators, in the library environment it is possible when some form of benchmarking is applied. As it is not our case, we abandoned the evaluation of this level.

Discussion

The various means of course assessment and evaluation that we used confirmed some widely known characteristics of e-learning.

Electronic education brings new dimensions into medical librarians' lifelong education, a system based on self-study combined with interaction with the course tutors and hyperlinked study materials structured into thematic blocks. Compared to classic methods, e-learning means development in usability, portability, expandability, cost-effectivity and accessibility of learning objects. From this point of view it is desirable to continue to amplify the offer of e-learning courses for medical librarians.

On the other hand, e-learning has its drawbacks, e.g. students' feeling of isolation, lack of motivation due to absence of personal communication with the tutor etc. Those should be overcome by access to alternative communication means such as discussion forums and by improving the communication between students and tutors. In our case the forums were used minimally, from which fact we drew some recommendations for the next courses. It is necessary to more emphasise the role of the tutor as a facilitator of discussion, that should be aimed at support of the critical thinking. That's why the tutors should deepen their knowledge of communication theory, especially behavioral theory, and of methods of the question construction.

The authors of learning objects develop new pedagogical and technological approaches, in which technology, content, learning and self-study intersect. As for the learning objects creation, in the next courses we plan to enhance the courses with multimedia components, such as Flash movies.

Conclusions

The results from two courses demonstrated, that the e-learning is a suitable alternative form of continuing professional development and helps to incorporate the newly acquired experience into an already existing framework

NML plans to incorporate this form of education also in the future, during Autumn of this year will carry out a course for end-users as a part of Mefanet (Medical Faculties Educational Network) project and in the next year an advanced course for medical librarians.

The authors of learning objects has been developing new pedagogical and technological approaches.

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