

DEMAND FOR AND PRACTICE OF DEVELOPING INFORMATION COMPETENCIES AMONG RESEARCHERS

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Abstract

The scope of scientific journals, books and Open Access resources placed on the internet has been continuously growing. The searching tools for this information are being speedily upgraded. To keep pace with innovations of information technologies and to search for information by employing all possible searching tools and methods, it is necessary to develop skills in scientific information search and to be aware of the most recent developments.

Lithuanian Research Library Consortium established in 2001 coordinates the activities of libraries, licenses and ensures access to research information resources, is involved in the development of competencies of librarians and library users. The Consortium is one of the key initiators of Open Access and advocates of Open Access ideas in Lithuania. This paper is assigned for the analysis of experience gained by Lithuanian Research Library Consortium in implementing the Project *eMoDB.LT: Opening of Research Databases for Lithuania* co-financed by the European Union structural funds and the Government of Lithuania. In the course of the Project implementation, the research has been carried out with an aim to analyze and access the existing shortcomings in the competencies of scholars and other researchers in using the online resources of scientific information and to provide the recommendations on the training content, scope, intensity and method. With regard to the findings of the study, the recommendations for training of librarians – specialists of databases were provided. The training courses for researchers and students studying for master's or doctoral degrees were arranged in October 2010 - January 2011. During the training, theoretical lectures were matched up with practical training and with delivered online self-study materials. To embed or update the knowledge gained during the training courses, the readily available training materials can be used that have been placed on the website and now are freely accessible.

Keywords: academic library, e-resources, information competence, researchers' competence, training courses, online learning, Lithuania

Introduction

The rapidly developing forms of information acquisition and dissemination along with the newly emerging methods of information search are increasing the demand for the enhancement of information competencies and their update. Information available on the internet, online resources and services become more and more frequently used both for studies and research purposes. Therefore nowadays it is especially important to focus attention on the applied

information technologies in the areas of information search and its management, and to have sufficient skills for its application usage in various situations and spheres of activity (Eisenberg, 2008). According to Lloyd (2003), a person who has acquired information competence is well aware how to conduct the search for information, how it should be managed and efficiently used in new situations while solving problems and gaining new knowledge, therefore information competence for researchers is considered to be one of the key competencies.

The issues of information competence that are most frequently analyzed in scientific literature are related to the development of information searching and retrieval skills and the efficient and ethical usage of information by students. Meanwhile considerably less attention is given to the enhancement of information competence among lecturers, scholars and other researchers as well as to the continuous update of these skills. Such situation can be explained by the fact that quite often researchers are considered to be experienced users of information, who have already acquired information searching and usage skills, hence less attention is given to their development. Nevertheless, the scientists (Bruce, 1994, 1997; Duobinienė, Tautkevičienė, 2001; Lloyd, 2003; Glosienė, 2006; Leigh, 2008) agree that the capability to search, retrieve and efficiently use various information resources is an important part of general and scholarly competencies enabling to efficiently work and live in the contemporary society.

The objective of this paper is to present the survey of demand for the enhancement of information competencies among researchers and the experience gained in developing the researchers' information competence in Lithuania.

The structure of the paper consists of 2 parts. In the first part, the results of the survey *Scope and Content of Training of Scientists and Other Researchers in Using Online Research Information Resources* are presented that reflect the researchers' information competence. In the second part, the assessment and experience from training on the enhancement of information competencies conducted by the Lithuanian Research Library Consortium is provided.

The survey (Tautkevičienė, et al., 2010) and training of researchers were conducted in 2009-2011 during the implementation of the project *eMoDB.LT: Opening of Research Databases for Lithuania* co-financed from the European Social Fund and the state budget of Lithuania in accordance with the 2007-2013 Operational Program *Human Resources Development, Priority 3 Research Capability Strengthening, Measure Improvement of the Qualifications and Competencies of Scientists and Researchers (research databases, e-documents)*.

Demand for development of the researchers' information competence

Students (Tautkevičienė, 2004, Leigh, 2008) as well as scholars or lecturers (Saunders, Monty, Tajalli, 2003; Tautkevičienė, Jucevičienė, Markevičienė, 2004) often give priority to the quickly and easily accessible online resources. If the information is obtained only from free online resources, the possibility of getting comprehensive, reliable and substantiated knowledge decreases and in most of the cases only a small part of the information related to a particular subject is researched. Those who use no more than the online resources, usually not only obtain incomplete knowledge on a given subject, but they also are not aware how it would be possible to get more information on the issue which they are interested in. In most of the cases such situation occurs due to insufficient knowledge about the research information resources available in the library, data bases, on the internet.

Scholars, as experts in a specific field, correlate the search of research information with the knowledge which they have already acquired and the by now known or readily available references. In most of the cases they closely investigate a certain referenced area, or search for a known author or his works (Green, 2000). They also know the keywords or the subject of their research area and use them in searching for the needed information resources. Most scholars (Booth, 2007) usually rely on the already known information about authors and their works, searching tools and resources; hence they do not focus their efforts on obtaining new knowledge about the alternative information resources. New, more sophisticated searching tools and information resources are continuously emerging, e.g. search for cited resources nowadays can be done not only in the *ISI Web of Science* databases, but also in *Scopus*, *Google Scholar* and open access resources. This facilitates the search for the related

resources. It is also possible to search for cited resources in most e-articles, and, if the full-text articles are available on the internet or in the databases, they can be retrieved immediately.

While planning the training courses on information search and management, the stereotype thinking of researchers that they are aware about all information resources attributable to their research area should be taken into account, and the attempts should be made to change this situation. With regard to the speedily growing volumes of information and new means of access to this information, additional skills, new information become of outstanding importance. When a more complex search is undertaken, e.g. by variations of the abbreviated words that are used for search, more exhaustive and accurate searching results can be expected.

The enhancement of the researchers' information competence should be based on the assumption that scholars and university lecturers have already acquired the basics of information literacy. Therefore major attention should be given to the improvement of the complex information searching skills, information assessment and management capabilities, legitimate and ethical usage of the resources and introduction of the latest developments in information search. During the planning stage of the training, the existing information literacy of the students of a given institution should be assessed (Henning, Van Vuren, 1998), which in its own turn impacts the information competence of scholars and lecturers and determines the possibilities of further capacity building in this area.

According to Booth (2007), in the training programs for researchers, various information searching and management skills should be developed: planning of information searching strategy, awareness about scholarly communication processes, assessment of information resources, legitimate and ethical use of information resources, reference management tools, use of content services and automated e-messages (pop-ups), publishing rights and copyrights in e-journals, search for highly-rated journals, knowledge about the rating indicators of journal citation and research subjects, capability to identify the required high quality information related to a specific field, etc.

During preparation of the training courses, it should be assured that the training program compiled for the information competence enhancement complies with the activity undertaken by the researchers. Moreover, it is important to take into account different information needs by the researchers in different fields of science, and, if possible, to deliver the respective specialized courses for the researchers. The varying initial level of information competence among the participants of the training courses should also be taken into consideration, and, if necessary, assistance in learning the basics of information searching skills should be provided.

1. Survey of information competence among researchers

1.1. Methods of survey

Prior to commencing the training courses for the information competence enhancement among researchers, it was attempted to assess their existing competence in using the online information resources. On the basis of the results of this survey, the training courses complying with the established level of the researchers' competencies and their needs were drawn up. A written inquiry method was chosen for the survey. A questionnaire consisting of closed and open questions was used for data collection. The questionnaire of the survey was compiled with regard to the structure of information competence. The inquiry was carried out in the state science and study institutions of Lithuania. The data collection questionnaire in an electronic format was placed on the internet; information about the survey was sent via e-mail to all science and study institutions of Lithuania. The scope of the survey enabled to assess the status of information competence of the researchers of all science and study institutions and the need for training. Upon completion of the inquiry, 647 questionnaires filled in by the researchers were received.

The analysis of the respondents by the type of institution shows that the questionnaires were filled in by the researchers from all universities (83.7 %) and from various research institutes (16.3 %) representing various fields and directions of research that in fact correspond to the general distribution of the researchers at the institutions of Lithuania. The researchers who took part in the survey represent all fields of science: technological sciences – 26 %, social sciences – 25 %, biomedical sciences – 20 %, physical sciences – 16 %, humanities – 13 %.

Such allocation of the researchers enables to assess the specific needs in various fields of science.

The questionnaires were actively filled in by the researchers having varying experience in research: professors – 11.7 %, associated professors – 27 %, scientists – 20.4 %, lecturers – 16.1 %, assistants – 10.7 %, students of doctoral studies – 25.8 %. (Note: some researchers are allocated to more than one group). Due to the fact that the survey was targeted at the researchers with more advanced experience in scientific research, the least represented group were the students of master studies – 5.3 %.

By analyzing allocation of the respondents by age groups it was noticed that the researchers under 40 are the most active users of databases and other online information resources.

1.2. Results of the researchers' information competence survey

The researchers' comprehension of the information searching strategy

The analysis of the searching tools that are used by the researchers revealed clear priorities among the used tools. To search for scientific information, the researchers most often use some universal searching systems (e.g. Google): 86.9 % of the respondents indicated that such systems are often used, 11.3 % – are sometimes used by them. Databases of foreign publishers (e.g. *ScienceDirect*, *Emerald*, *IEEE*, etc.) are ranked as the second according to the frequency of usage. They are often used by 70 % of the researchers, sometimes – by 21.4 %. Library catalogues according to the frequency of their choice are in the third position; they are continuously used by more than one third of the researchers – 35.4 %, sometimes – by 48 %. Specialized searching systems (e.g. Google Books) are frequently used only by one third of the researchers (34.9 %), sometimes – by 31.7 %. The searching systems of scientific information (e.g. Scirus, Scitopia) are frequently used by 14.6 % of the researchers, sometimes – by 26.5 %. The academic databases of Lithuania for information search are often used by 15.3 % of the researchers, sometimes – by 44.9 %.

In searching for the latest information, the researchers most often review the subscribed journals in their researched area (28.1 %), go to the library (24.3 %). A part of the researchers subscribe to the news by e-mail (24.4 %). Only a small part uses the RSS technologies for getting the latest information (15.6 %). Other quite popular methods for acquiring new information are communicating with colleagues in Lithuania and abroad either directly or by e-mail, participating in the conferences, seminars, in-service trainings, requesting authors to send the needed information, communicating through the e-nets of academic community. The most popular methods for getting full-text documents are the universal searching systems (81.5 %) and subscribed databases (75.3 %). For getting access to the full-text documents, the researchers also use the specialized information searching systems (42.7 %), ask the colleagues to send them from abroad (41.7 %), or apply to the library professionals (30.8 %). Less often the researchers conduct the search by means of the scientific information searching systems (20.4 %), by using the inter-library loan services (17,3 %) or by searching in the open access resources (12.2 %). Only a small part of the respondents indicated that they do not know how the full-text documents could be obtained (7.3 %).

Such responses given by the researchers reveal that they use the universal tools of information search for the purposes of searching for scientific information resources in all stages of the search (searching for bibliographical information, obtaining full-text documents, logging into subscribed resources). This evidences that they are lacking knowledge how the efficient and reliable strategy for scientific information search should be worked out, assuring high quality and reliable access to the resources of scientific information. Therefore the attention should be focused on the development of these skills.

Researchers' knowledge about the key science ranking indicators

The analysis of the researchers' responses about the search and use of the science ranking indicators showed that the majority of them have never attempted to search even for the most popular science ranking indicators. The researchers seldom search for the country citation

ratings by the categories of science, the authors' h- index, the assessment indicators of the most quoted authors worldwide. Most of the researchers are aware how the citation indexes of the journals should be searched for.

By analyzing the researchers' knowledge where the respective indicators should be searched for, it was revealed that the researchers know little about the search for science ranking indicators: only 21.1 % of the researchers know where to look for the journal citation indexes, 13.2 % – how to find the authors' h- index, 11.9 % – how to find the assessment indicators of the most quoted authors, 4.2 % are capable of looking for the country's citation ratings.

Competence in using and managing information resources

The analysis of the researchers' responses as to their knowledge on the issues of copyright showed that one fourth of the researchers (23.5 %) categorized themselves as not being aware whether it is allowed to publicly place on the internet the articles, conference proceedings, books or their extracts, which are necessary for the students, in an electronic format. Only a small part of all researchers (5.0 %) thought that it is permitted to place on the internet the works by other authors for public access. A part of the researchers (11.7 %) were of the opinion that the works of other authors can be uploaded to the institution's network. The major part of the researchers (59.8 %) thought that it is not allowed to make the works of other authors accessible online in any format. Such responses evidenced that the researchers have scanty knowledge about the Law on Copyright and Related Rights, therefore they not always exercise the rights prescribed by the Law, or sometimes they use the works by other authors by infringing the requirements set forth by the Law. The researchers' responses showed that some authors are not familiar with the requirements of the copyright (25.7 %), the remaining ones face the problems of copyright while obtaining or using information resources (12.6 %) or preparing scientific publications (13.4%).

From the analysis of the researchers' responses about the use of citation style, it turned out that most of the researchers (62 %) do not know about the citation standards and styles. Most often the researchers provide bibliographic descriptions in line with the requirements of the specific journal.

By preparing their scientific publications, most researchers do not use any reference management tools, and manually process their publications (70.9 %). Quite often the researchers are not aware about the existence of the references management tools and do not know how the tools should be used. On the other hand, the software that the researchers are aware of in most cases is fee-paying and is not subscribed at their institutions. Even at those institutions (Kaunas University of Technology and Vilnius University) where the reference management tool (*EndNote Web*) is available, it is used quite seldom (12.7 %).

Demand for training for the development of the information resources usage skills

Most researchers are wishing to improve the information management skills related to the assessment of information resources, ranking of science, use of information resources, advanced methods of information search. The researchers would like to participate in the training courses where the science ranking indicators would be presented (62.4 %), the latest information resources and the interactive Web 2.0 technologies would be introduced (57.5 %), where they would acquire skills needed for drawing up the information searching strategy (56.4 %). Training in the use of the reference management tools is equally relevant (55.8 %), as well as the improvement of knowledge about the prevention of plagiarism (49.9 %). Meanwhile the demand for acquiring skills in the use of technical information research databases is lower. Most of the respondents would like to participate in the training courses where theoretical lectures would be arranged side by side with the computer-based practical training (61.5 %). Nearly the same popularity was gained by the training materials placed on the web (58.7 %). Other forms of training were preferred less. The remote training courses in the virtual learning environment were requested by 38.8% of the respondents. The researchers also would like to get individual tuition – consultations. This request was expressed by 36 % of the respondents. The least popular form of training were theoretical lectures, it was favoured only by 11.6 % of the respondents.

The researchers indicated that the optimum duration of the training courses, depending on the type of the delivered subject, could be 2–10 academic hours. These preferences, which were indicated by the researchers, fully comply with the recommendations provided in the scientific literature as well as with the practice of foreign institutions.

1.3. Summary of the survey results

The completed survey enables to draw the conclusion that to the researchers it is important to build capacity both in simple and in advanced search for research information resources. The attention should be focused on providing knowledge about the new research information resources, interactive technologies, planning of information search and working out the strategy, developments in the scientific information communication processes, assessment of information resources, management and issues of its legitimate and ethical use. The researchers, depending on their individual demands, would like to have a possibility to choose training of diverse complexity, training subjects, scope and interactivity. For the upgrading and enhancement of the information competencies, most often the short-term training courses, workshops, presentations, individual tuitions and consultations are requested. These training methods should be adapted to individual demands of the researchers and related to the specific subjects, which the researchers are trained in.

2. Development of the researchers' competence in using online research information resources

The courses for the enhancement of the researchers' competence in using the online research information resources were planned with regard to the results of the survey on the demands for information competence among the researchers. Prior to commencing the courses, the training materials were prepared, which can be used both as a supplementary material to the courses as well as for self-study purposes.

2.1. Preparation of modules for training in using the online research information resources

The self-study material for the enhancement of information competence consists of 10 subjects. Each subject is delivered as a separate self-study module. On the basis of the modules, the training courses were arranged during the project implementation.

In the course of preparation of the modules, the results of the *Survey on the Scope and Content of Training of Scientists and Other Researchers in Using Online Research Information Resources*, performed in implementing the project, as well as the shortcomings that were clarified during the survey were taken into consideration. The training materials consist of 10 modules for training in the use of the online research information resources (databases); each module can be studied as a separate independent subject. Each module contains the training materials, practical tasks, references to the information resources, summarizing notes and the list of references (for additional reading). During the study of the training materials, it is recommended to simultaneously perform the practical tasks which will be of assistance in acquiring practical skills on the use of the online research information resources. The training modules have been prepared on the following subjects:

- Module 1: Strategy for information search and its efficient use;
- Module 2: Online research information resources and interactive technologies;
- Module 3: Information search in Lithuanian academic (scientific) information databases;
- Module 4: Search for information resources in the field of Humanities;
- Module 5: Search for information resources in the field of Arts;
- Module 6: Search for information resources in the field of Social Sciences;
- Module 7: Search for information resources in the field of Physical Sciences;
- Module 8: Search for information resources in the field of Technological Sciences.
- Module 9: Search for information resources in the field of Biomedical Sciences.
- Module 10: Licensing, administration of databases and their presentation to users.

The first three modules are designated for the development of the general skills of information search and management. The materials provided in these modules are necessary to all scientists performing scientific research regardless of their researched field, to the lecturers and post-graduate students of master or doctoral studies. The modules from the fourth to the ninth are designated for the researchers of the specific field of science. Depending on the field of their research and scientific interests, the researchers can freely choose which module they are willing to study. The last module (the tenth) is designated for library professionals responsible for licensing and administration of the online resources, assurance of access to the licensed resources, information dissemination and promotion.

2.2. Organization of training

Prior to starting the researchers' training courses at various science and study institutions, the training for librarians was arranged to enable them to arrange and conduct the training courses for researchers at their respective institutions. The courses for librarians – training trainers were arranged in June-July months of 2010. During the courses, the training in all 10 modules was conducted so that they would be able to use the acquired knowledge in the training courses delivered to the researchers and later provide consultations to the users at their institutions. The training courses for the enhancement of the librarians' professional competence were attended and successfully finished by 84 librarians from all science and study institutions in Lithuania.

The training courses for the enhancement of the researchers' competence were delivered at the end of 2010 – the beginning of 2011. With regard to the researchers' requests, the courses lasted for 8 academic hours, by combining the theoretical lectures with practical tasks. The training was arranged in the classrooms equipped with computers with access to the internet, therefore the researchers were able to simultaneously perform the practical tasks. The courses were delivered by 22 library professionals from various academic libraries.

The training courses were organized in the cities where the science and study institutions are located: in Vilnius, Kaunas, Klaipėda, Šiauliai. The researchers had an opportunity to choose one of the training programs by the fields of science: search for information resources in social, biomedical, physical, technological sciences, humanities and arts.

Information about the courses was sent to all higher education establishments and science institutes. The request to take part in the training courses was provided by the bigger number of the researchers than it was envisaged in the project, therefore not everybody who wished to participate in the training courses were able to do so. To increase the number of the participants, the courses were organized by forming rather sizeable groups containing some 20-22 persons. Moreover, it is projected to continue the training in the autumn of 2011.

The training courses were attended by 1046 participants from 33 institutions: 760 of them were lecturers and researchers, 286 - students.

Women were more active participants and accounted for 76 %, 24 % were men. The analysis of the participants by age groups showed that more than one half of them range between 25-44 years of age (Table 1).

Table 1. Distribution of researchers by age groups

Age	15-24	25-44	45-54	55-64 m.	over 65 m.
Percent	12 %	57 %	20 %	9 %	2 %

More than one half of the researchers – participants of the training courses have got a scientific degree: 18 of them have a degree of the doctor habilitus, 399 – of the doctor degree. From the analysis of the job positions held by the researchers it can be seen that the majority of them are the researchers with a considerable experience (Table 2). Among 286 students – participants of the courses, 197 are the students of doctoral studies.

Table 2. Distribution of researchers by job position

Positions held by researchers	Number	Percent
Professors	45	5.9
Associated professors	219	28.8
Lecturers	195	25.7

Assistants	119	15.7
Researchers	92	12.1
Administration staff (general managers of institutes, centers, clinic, deans and assistant deans), et al.	90	11.8

2.3. The researchers' feedback on the training courses

After the completion of the training, their participants gave their assessment of the courses. The feedback questionnaires were filled by 965 researchers. The analysis of the feedback revealed that the courses were up to the expectations of most researchers, and it is desirable that such training would be arranged at science and study institutions on a continuous basis.

The training program was evaluated as follows: as very relevant – by 676 participants or 70.1 %, as relevant – by 29.4 %, as more irrelevant than relevant – by 0.2 %. A part of the researchers took part in the training in this subject for the first time therefore they considered this to be a good opportunity to learn about the research information searching tools and databases.

In the assessment of the usefulness of the courses, 546 participants or 56.6 % ranked the courses as very useful, 43.4 % – as useful, 0.7 % – as more useless than useful. Unfavorable assessments were related to the expectations of the researchers to get readily available searching instructions and a few searching tools which would enable them to quickly and simply obtain the required information, therefore they felt at a loss when they learned about very extensive search possibilities and numerous tools and databases.

The training materials that were specially drawn up for the courses and which were uploaded on the internet received positive evaluation by the absolute majority of the researchers: 562 respondents or 58.2 % ranked the material as very useful, 41.2 %, – as useful, 0.4 % – as more useless than useful. No critical comments were received on the training materials.

In their feedback on the training and training materials, the participants provided comments and remarks in their responses to the open questions. Their analysis enables to assess the shortcomings in organizing the courses and to project their upgrading possibilities.

Lessons learned:

- The participants of the courses expressed a request that the courses on the enhancement of information competence would be arranged continuously by introducing technological novelties and new information resources, updating knowledge about the information searching possibilities.
- In the opinion of the trainers, such courses would be very expedient for all students of master and doctoral studies; therefore they have to be compulsory and delivered at all higher education schools.
- The trainees and the trainers noticed that it is difficult to properly deliver the training when the initial competence in information search differs greatly among the trainees in one group. Therefore in arranging the courses their participants should be distributed not only by the field of science but by the level of information competence as well.
- The subjects of training and the materials are very wide-ranging, a lot of searching tools and recourses are presented, and therefore it is complicated to properly present them during 8 academic hours. A part of the researchers requested for the training of longer duration and more specialized, more profoundly delivered courses.
- Specialized courses of shorter duration and on specific subjects would be expedient for the advanced users, e.g. on the use of the reference management tools, citation, open access resources, interactive technologies, etc.
- The less experienced researchers feel at a loss when they face a very big volume of new information, hence the beginners should be trained in information search only by presenting the key information searching tools and databases.
- A part of the trainees wished to spend more time on practical tasks by performing them with the assistance and consultations of the trainers. It was also requested that the training should be arranged in smaller groups.

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