A method to evaluate the impact of user training from the perspective of information literacy

Fernanda Gomes Almeida[1] and Beatriz Valadares Cendón[2]

[1] Doctoral Student at the Graduate Program in Information Science, School of Information Science, Federal University of Minas Gerais, Brazil
[2] Full Professor, Graduate Program in Information Science, School of Information Science, Federal University of Minas Gerais, Brazil

Abstract. This paper reports on a qualitative research study that aimed at determining the impact of user training on the information literacy level of users of the Capes Portal of E-Journals, focusing mainly on the methodological aspects of the study. Initially, the paper presents the Capes Portal of E-Journals, a digital library of scientific journals, and the actions promoted by the UFMG University Library to promote access to and use of the Portal's information resources. A brief presentation of fundamental concepts for the study follows. The methodology was mostly qualitative and used tests, interviews and observation. Data collection was conducted in two stages: pre-instruction and post-instruction. 14 students who enrolled voluntarily in a training program offered by the university library to the UFMG community formed the sample, in the first stage - pre-instruction. After the pre-instruction test, the students went through a training session. In the second stage of the research, post-instruction test and interviews, seven of the 14 students present at the initial stage participated. Data was collected through tests and observation with computer screen recording in the pre-instruction stage and, two weeks after, in the post-instruction stage. In the post-instruction stage interviews were also used. Data was obtained and analyzed based on the second standard of the ACRL Information Literacy Competency Standards for Higher Education. Results led to the conclusion that participation in training sessions can positively influence the development and achievement of information literacy competencies related to the second standard of the Information Literacy Competency Standards for Higher Education (ACRL, 2000).
Keywords: Capes Portal of E-Journals; information literacy, assessment; higher education; qualitative methods; objective assessment; subjective assessment

1. Introduction

This article presents the methodology used in a research study that aimed at determining the impact of participation in training sessions on the information literacy level of users of the Capes Portal of E-Journals at the Federal University of Minas Gerais (UFMG), Brazil. The Capes Portal of E-Journals stands out in

the scenario of Brazilian university libraries as an important information resource for providing access to current and high quality sources of information. Since 2001, UFMG is one of its consortium institutions.

The research, conducted within the Graduate Program in Information Science at UFMG, sought to determine whether there is a positive relationship between student participation in the training sessions on the use of the Portal and the acquisition and development of information competencies related to the second standard of the Information Literacy Competency Standards for Higher Education (ACRL, 2000). According to the American Library Association (ALA, 1989) a person who is literate in information knows how to recognize when information is needed and have the ability to locate, evaluate and effectively use this information.

2.   The research object: Portal Capes of E-Journals

With almost 15 years of existence, the CAPES Portal of E-Journals, launched in November 2000, is perhaps the largest digital library of scientific journals in Brazil (Cendon, Ribeiro and Souza, 2011), and in Latin America. Financed entirely by the Brazilian government, it is a unique model of consortium of its kind (CAPES, 2015).

Created with the mission of promoting the development of science, technology and innovation in Brazil through the democratization of access to international scientific information, the Capes Portal has, at the time of writing, 423 participating institutions, distributed throughout the national territory. Currently, the Portal provides access to about 37,000 journal titles and 126 reference databases in all areas of knowledge, as well as books, patents, technical standards and other materials.

Since its launch, the Capes Portal has changed over time, both in regards to the amount of the available content as well as in regards to the search interface. The company Ex Libris introduced a major change in 2009 with the inclusion of a federated search engine, MetaLib. In 2012, the search engine was updated to Metalib Plus, which uses a central index (Primo Central Index), a web discovery service based on cloud computing, which centralizes the index of (almost) all the resources offered by the Portal, enabling faster information retrieval around a single search interface (CAPES, 2015).

In July 2014, the Capes Portal started to present its current interface (Figure 1) where the user is offered four options of searches: subject, journals, books or databases. In each of these options the user can conduct simple or advanced searches.

In the simple search approach, the search will be conducted in the Central Index of metadata collected previously by the Primo Central Index, and, in the advanced search the search will be conducted in real time in selected databases (federated search) (Almeida and Cendon, 2014).

Figure 1: Current Interface of the Capes Portal of E-Journals, launched on July 5, 2014

Capes Portal of E-Journals Access date 07.07.2014. Available at: www.periodicos.capes.gov.br

3. Foundations of the study

Central to this research are studies on user information searching behavior, particularly on users of bibliographic databases. Undertaking a search, a process where a user interacts with a system, is not an easy or simplistic endeavor but a cyclical process where best terms are selected, an effective strategy is conceived, options are evaluated, selected, tested and reviewed constantly, so that searchers can assess the results of the search and change their routes and processes (Debowski, 2001, Almeida and Cendon, 2014).

Also fundamental to this study was the development and growing importance of the concept of information literacy. The consolidation of the understanding that students in higher education should develop skills in the use of information led to belief on the need for standards for information literacy for libraries and for library users. In the context of higher education, the *Information Literacy Competency Standards for Higher Education,* published in 2000 by ACRL (ACRL, 2000), stands out. This document has five standards, 22 performance indicators and 87 expected results. The second stand was especially important for the current research.

4. Methodology

The research adopted a qualitative approach. The study was conducted in the Pampulha campus of the Federal University of Minas Gerais - UFMG, and the research universe was made up of students belonging to graduate and

undergraduate programs at UFMG. Students enrolled voluntarily in the training sessions on searching/using the Capes Portal offered by the University Library to the UFMG community formed the non-probabilistic, accidental sample.

The sample initiated with eight participants, but was expanded to 14 voluntary students also recruited via advertisement of the training program by the UFMG University Library. The need to increase the number of participants in the training sessions was felt by the researcher to avoid the risk of not having enough participants in the second stage of the research.

4. 1 The research participants

Data collection was conducted in two stages. In the first stage, pre-instruction, the 14 students went through a test, which consisted of a search guide with tasks. Of these, 13 were undergraduates and one was a graduate student. In the second phase, post-instruction, 7 undergraduate students participated in the test also going through the search guide.

No participant of the second stage of the research had attended previous training sessions or had had any guidance on searching the Capes Portal other than the training session they received in the present study, which is important for assessing the impact of the instruction to which they were subjected.

4.2 Data collection

The research used participant and direct observation and screen recording in both phases of research as methods for data collection, as well as interview and tests.

Screen recording was performed using the free software AutoScreenRecorder that allows screen recording directly from the computer, capturing images and mouse movement. The observations and screen recording were guided by the aspects covered in the second standard and its indicators as detailed in the document Standards for Information Literacy in Higher Education - Information Literacy Competency Standards for Higher Education - developed by ACRL (Association of College and Research Libraries).

The second stage of the research also included a semi-structured interview, which was recorded, in addition to observations and screen recording of the participants while they performed the search tasks.

4.2.1 Definition of standards, indicators and outcomes for the evaluation

As mentioned previously, the study focused only on the second standard of the ACRL (2000) Information Literacy Competency Standards for Higher Education. This standard states that "The information literate student accesses needed information effectively and efficiently". This document contains five standards, 22 performance indicators and 87 expected outcomes. For the current research just a few indicators and outcomes belonging to standard two that were considered pertinent to the objectives of the study, the research object and the time available for evaluation were used. The expected outcomes and indicators selected for the study will be presented in the next section.

4.2.2 Development of research instruments

Two search guides were developed to test the participants in their use of the Portal, one for the pre-instruction test and another for the post-instruction test. The topics addressed in the guides were based first, in the second standard of the Information Literacy Competency Standards for Higher Education, its indicators and expected outcomes selected for the study (Table 1) and, second, in the search options available in the Capes Portal of E-Journals interface.

Table 1: Performance Indicators and selected Outcomes for research

Performance Indicators and selected Outcomes	Tasks in the pre-instruction test	Tasks in the post-instruction test
2.1.D – Selects efficient and effective approaches for accessing the information needed from the investigative method or information retrieval system	T1, T3, T4	T1, T2, T3
2.2.B - Identifies keywords, synonyms and related terms for the information needed	T1, T4	T1, T3
2.2.D - Constructs a search strategy using appropriate commands for the information retrieval system selected	T1, T4	T1, T3
2.3.A - Uses various search systems to retrieve information in a variety of formats	T1, T3, T4	T1, T2, T3
2.4.A - Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized	T1, T4	T1, T3
2.4.B - Identifies gaps in the information retrieved and determines if the search strategy should be revised	T1, T4	T1, T3
2.4.C - Repeats the search using the revised strategy as necessary	T1, T4	T1, T3
2.5.A - Selects among various technologies the most appropriate one for the task of extracting the needed information	T2, T3, T4	T1, T2, T3
2.2.E - Implements the search strategy in various information retrieval systems using different user interfaces and search engines, with different command languages, protocols, and search parameters	T4	T3

As students from any area of knowledge, graduate or undergraduate, at UFMG, potentially could enroll in the training session, the researcher chose to present to the participants, as the first search topic proposed in both search guides, subjects of general interest and easy acceptance such as *social networks* (in the pre-instruction search guide) and *scientific communication* (in the post-instruction search guide). The first set of tasks (Task 1) in both search guides –

corresponding to outcomes 2.1.D, 2.2.B, 2.2.D, 2.3.A, 2.4.A, 2.4.B, 2.4.C in Table 1- was to find, in the Capes Portal, information on the topic proposed. While the tasks presented in the pre and post-instruction search guides were different, the underlying concepts of information literacy remained the same.

The set of tasks 2 (Task 2) proposed in the pre-instruction search guide – corresponding to outcome 2.5.A in Table 1 - was to select and save an article using the features found in the «Search by subject» option (Task 1). In the post-instruction search guide this task was incorporated into Task 1.

In Task 3 of the pre-instruction search guide which corresponded to Task 2 in the post-instruction search guide the participant was asked to search for a specific journal and save an article of that journal on the computer. These tasks covered the performance indicators and outcomes 2.1.D, 2.3.A and 2.5.A.

Task 4 in the pre-instruction search guide which corresponded to Task 3 in the post-instruction search guide – and to outcome 2.2.E - allowed to assess whether the participants could perform a search in similar information retrieval systems with different search interfaces, applying the information literacy concepts in other databases. For that end, reference or full text databases which had search interfaces similar to that of the Portal were identified and listed in these questions.

The pre-instruction test also included questions about characteristics of the participants and their courses, their use of the Capes Portal and their participation in previous training or instruction sessions to conduct research on the Portal.

The pre- and post-instruction search guides described above aimed at identifying the benefits of the training sessions objectively, through the identification of change in behavior by comparison of performance in the tests and not through the benefits the user perceived or mentioned in the interactions with the researcher in the training session. Subjective benefits were identified through the interviews.

.

4.2.3 First stage of data collection - pre-instruction test applied before the training session

Students enrolled for the training sessions via email or phone were invited to participate voluntarily in the study, and informed of the day and place for the training.

Upon starting the pre-instruction test, participants received the search guide for pre-training test as prepared by the researcher and were again informed about the screen recording. Participants had about 30 minutes to perform the tasks indicated in the search guide and respond the other questions.

4.2.4 Training session – Searching the Capes Portal of E-Journals

The training sessions, lasting 2 hours and 30 minutes were performed in a laboratory at the UFMG Main Library. The sessions addressed the following content:

• How to access the Capes Portal (locally and remotely);
• History and evolution of the collection;

• Presentation of the interface;
• Types of search available;
• Information need and translation of the need into a query;
• Search tips (using synonyms and related words, Boolean operators - AND, OR, NOT, use of wildcards and others);
• Applicability of the tips and search skills in other systems

4.2.5 Second stage of data collection - post-instruction test applied two weeks after the training and interview session
To perform the second stage of data collection, a letter of invitation for the next meeting, which was individual, was sent via email to the 14 participants of the first stage (pre-instruction test). Those who were willing to participate responded to the e-mail message informing the best day and time for the meeting.
Among the 14 students who participated in the initial stage, only 7 took part in the second. All were undergraduate.
After completion of the post-instruction test participants were interviewed based on an interview guide previously developed. The interviews aimed to verify the perception of the students about the training session, about the use of the Capes Portal and about their search skills after participating in the training session.

4.2.6 Categories for data analysis
The categories for analysis of data collected in the video recordings were defined based on the second standard of the Standards for Information Literacy in Higher Education (ACRL, 2000), the selected indicators and the expected outcomes for the search. The definition of analytical categories to analyze the data collected in the interviews were based on the mixed model proposed by Laville, Dione and Siman (1999) whereby the construction of categories is performed a priori based on the theoretical framework and the interview guide, but which also allows the inclusion and modification of categories from the reading of the data collected.

5. Conclusions
The proposed methodology permitted the observation and evaluation of the development of the information literacy level related to the second standard of the Information Literacy Competency Standards for Higher Education (ACRL, 2000) of students participating in training sessions on the use of the Capes Portal. Results indicate progress was made in the student's information literacy level after participation in training activities on the Capes Portal promoted by the University Library.
The methodology developed for the study stands out as a positive contribution of the research, since the objective assessment of information literacy of university students is a subject that has not been much discussed and researched in Brazil. In this study the evaluation of the development of the information literacy level of the students was conducted in an objective way - through direct

and participant observation and screen recordings - and also subjectively - through interviews, based on the opinions of the participants.

Some limitations of the methodology should also be pointed out:

- **The lack of a control group** in the study makes it difficult to establish whether the effects of participation in the training session would not occur without the participation of the student in the training session. The groups could be compared allowing the verification of the effects of the variable "student participation" in the training session;

- **The awareness about the post-instruction test by the participants**, may have influenced the results;

- **The short time between the completion of the pre-instruction test and the post-instruction** (only two weeks) does not allow to determine whether the advances presented were linked only to the short-term memory of the participants or if progress was really internalized by students (to minimize the effect of the two previous limitations the study opted to use of different search guides in each test with also different search topics);

- **Acceptance or participant's familiarity with the topic** may have influenced the performance of the tasks;

- **Proposed activities unrelated to real needs for the student research**, for example, a problem or need for information arising from a course in progress, may have changed the search process developed;

- And finally, **other variables may have influenced the system utilization and the results presented** such as previous experience in research, familiarity with computer use, knowledge of other languages, the participant's motivation, the student's age, among others.

References

Almeida, Fernanda Gomes, Cendon, Beatriz Valadares (2014). Information literacy in the Capes Portal of E-Journals: the impact of user training programs. *QQML Journal*, 4:857–863.

American Library Association (1989). *Presidential Committee on Information Literacy*: Final Report. Chicago. Access date 12.10.2014. Available at: http://www.ala.org/acrl/publications/whitepapers/presidential

Association of College & Research Libraries (2000). *Information literacy competency standards for higher education*. Chicago. Access date: 12.10.2014. Available at: http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf

Cendon, Beatriz Valadares, Souza, Juliana Lopes and Ribeiro, Nádia Ameno (2011). Satisfação dos Usuários do Portal da Capes: Um Estudo sobre a Obtenção de Sucesso no Uso do Sistema. *Perspectivas em Ciência da Informação*, 16 (2):67-100.

Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (2015). Portal de Periódicos da CAPES. Access date 04.09.2015. Available at: www.periodicos.capes.gov.br

Debowski, Shelda (2001). Wrong way: Go Back! An Exploration of Novice Search Behaviours while Conducting an Information Search. *The Electronic Library*, 19(6): 371- 382.

Laville, Christian, Dionne, Jean; Siman, Lana Mara de Castro (1999). *A construção do saber*: manual de metodologia da pesquisa em ciências humanas. Artmed, Porto Alegre