

The Impact of Online Searching Training on Information Behavior

Mariza Talim, Beatriz Cendón, Sérgio Talim

Federal University of Minas Gerais, Brazil

Abstract: The objective of this study was to evaluate the impact of training sessions on bibliographic searching of the Medline database and of the Virtual Health Library Portal on the information seeking behavior of graduate students and residents of the Health Sciences Campus at the Federal University of Minas Gerais, Brazil. This was a descriptive research with a case study approach using both quantitative and qualitative data collection. The research used a non-random sample consisting of the masters students and residents who agreed to participate in the training. The study collected data in order to verify the changes in the first three levels of the Kirkpatrick's model for evaluation of training. To assess changes in levels one and two of the model, one questionnaire was administered at the beginning of the training and another applied at the end, using the same questions about the information seeking behavior of students. The research also employed two tests, applied at the beginning and at the end of the training, that evaluated student performance in conducting a search. A third questionnaire, which is the focus of the present article, based on the critical incident technique, was answered by students between four and five months after the end of the training to assess if students were using the knowledge and skills acquired during training in their professional and educational activities. This questionnaire assessed the impact of training in the professional and educational activities of students and residents, level three of the model. The research results indicate a significant positive impact, verified by the reaction of the participants of the training sessions and the demonstration of new knowledge and research skills. The knowledge and skills demonstrated by students at the end of training were being used in their professional and educational activities. Contributions of the research include the use of the Kirkpatrick model for evaluation of bibliographic training sessions and the questionnaire developed.

Keywords: Information seeking behavior; Training impact; Research skills; Databases, Kirkpatrick model of evaluation

1. Introduction

Health professionals form a group with specific information needs and information-seeking behavior (CASE 2007). There are a number of reasons for

Received: 27.6.2016 Accepted: 21.7.2016
© ISAST

ISSN 2241-1925



this. In many parts of the world, there was an increase in quality of life since last century. This prosperity had beneficial consequences but also brought new health problems. Medical research continues to develop drugs and procedures to address these health problems and to prolong life and have produced an enormous amount of information that requires an ongoing effort from the health professional to keep up to date. The result is an information overload that, along with the shortage of time and unfamiliarity of these professionals with the databases hamper the process of searching for information necessary for making decisions based on scientific evidence. Therefore, the help of a librarian is required in the process of efficiently searching for information.

The librarian can be seen as a mediator between the users and the sources of information and, as such, is responsible to keep up-to-date with the sources and their use in the course of his/her work (BARRETO, 1994; CRESTANA, 2003; MARTÍNEZ - SILVEIRA; ODDONE 2007; LOPES, 2002; CUENCA, 2008). This professional also has a responsibility to empower users in the search process and information retrieval. In Brazil, this training has been carried out through short or long term training sessions (CUENCA, 1999; VICENT, 2011).

The context described above raises the question of assessment of such training and its impact on the information behavior of the users. It also demonstrates the relevance and importance of research on the impact of online searching training sessions on the information seeking behavior of health professionals (SANTOS and CASARIN, 2014). Nevertheless, few studies on the impact of online searching courses and training on information behavior were found either in Brazilian literature (CUENCA et al, 1999a, 1999b; CUENCA, NORONHA, ALVAREZ, 2008; VICENT, 2011) or internationally (BRETTLE, 2007; RAYNOR, CRAVEN, 2015; ADDISON, GLOVER, THORNTON, 2010; SPRING, 2010; GRUPPEN et al, 2005; AYRE et al, 2014; BRETTLE, HULME, ORMANDY, 2006; BRETTLE, HULME, ORMANDY, 2007). This shortage of research on this important topic is another motivation for more works on the subject.

This study contributed to this topic of research by evaluating the impact of training sessions about searching the Medline database via PubMed and the VHL Research Portal databases on the information seeking behavior of graduate students and medical residents of the Health Campus at the Federal University of Minas Gerais.

2. 2 Literature review

When evaluating, an important issue is to define the model to be used in the assessment. Stevenson (2012) proposes three models of evaluation of training, one of them being the Kirkpatrick model. According to Stevenson, in the evaluation of health care training, this is the most widely used model.

The Kirkpatrick model (1967), one of the pioneers in the evaluation of training, features four levels of evaluation as shown in Table 1.

Table 1 – Levels of evaluation in the Kirkpatrick model

Level 1	Reaction	Evaluates whether participants liked the training.
Level 2	Learning	Evaluates the knowledge acquired by the participants at the end of training.
Level 3	Behavior	Evaluates differences in participant behavior before and after the training.
Level 4	Results	Assesses the impact in the organization caused by changes in participant behavior after training.

Although the research addressed the first three levels, for reasons of space, in this article the focus will be on the results for Level 3 of the model, which evaluates changes in behavior caused by participation in training. The description of behavior specifies how and when the new attitudes, knowledge and/ or skills are used at work. In other words, this level assesses whether participants use at work what they have learned in training and if this produces a better performance at work.

3. Methodology

The descriptive basic research was performed using a quantitative/qualitative approach. The research used a non-random sample consisting of master students and residents who agreed to participate in the training sessions on online searching of medical databases.

A librarian of the Health Campus Library at UFMG, first author of this article, provided the training for master students and residents of that campus. The training sessions followed the same basic planning: the contents and activities were distributed in eight modules offered once a week, totaling 15 hours of training. The contents were: conducting literature searches; development of search strategies; identification of search concepts; interfaces of health databases and its application; use of the Virtual Health Library (VHL) databases - and the MEDLINE database via PubMed.

The teaching strategy used expository presentations and practical activities in which students had the opportunity to perform literature searches with the guidance of a teacher.

A total number of 82 students, 71 female and 11 male, participated in the training sessions. The most frequent age group was 26 to 30 (34.1% of the students) while 67.1 % of them were between 20 and 40 years old.

To assess change in behavior (level 3 of the Kirkpatrick model) data collection was conducted through a questionnaire using the critical incident technique, which was responded by the students between four and five months after the end

of training. The essence of the critical incident technique is asking the subjects simple judgements or reports of facts and situations (FLANAGAN, 1973; RIBEIRO ET AL, 2012). The two basic principles are: the report of data related to a behavior is preferable to interpretations, evaluations and opinions based on general impressions, and b) reports should be limited to behavior that contribute to the activity (FLANAGAN, 1973). This connection with a specific situation where the subject reports an action makes the technique useful to show changes in behavior. The objective of using this technique in this study was to verify the transfer of learning to the professional or training activities of students

The questionnaire was sent to all students between four and five months after the end of the course. Twenty-eight students replied but only twenty-one responded reporting a search experience before training and another after training. These were the questionnaires used to obtain the qualitative data presented in the next session.

The questionnaire requested that students provided the description of a specific search for information before and after training, a detailed account and specification of the search experience as well as the results of the search to characterize it as a critical incident. This questionnaire was in electronic form using Google Drive and was sent to students around four to five months after the end of the training. Data obtained was both qualitative and quantitative. Quantitative data were stored in spreadsheets. SPSS (Statistical Package for Social Science) was used to perform quantitative analyzes which are presented in the next section.

Quantitative data for the answers to the question «What was the result of the search?» were tabulated by means of an ordinal scale ranging from value «1» for the alternative “I could not get any information” to the value “4” to the alternative “I could get all the information desired”. The study utilized the paired Wilcoxon test (DANCEY e REIDY, 2006) to identify significant changes in the results presented before and after the search.

A careful reading of all the answers given by the students to issues related to the use of information sources and the actions taken to find such information (search strategies) allowed the identification of a few categories in these responses and their grouping into sets of similar responses. Thus, it was possible to compare the answers given by the students in the two critical incidents and evaluate the changes occurred.

To analyze more thoroughly the changes reported, the study used the description of the incidents before and after training for 03 students. The criteria for selection of these students was the presentation, by these students, of a more detailed description of the information seeking process. This allowed better analysis of changes in their information seeking behavior in the workplace or training. These students are also representative of the group who answered the

questionnaire, because the changes reported by them occurred in similar fashion with all the other students.

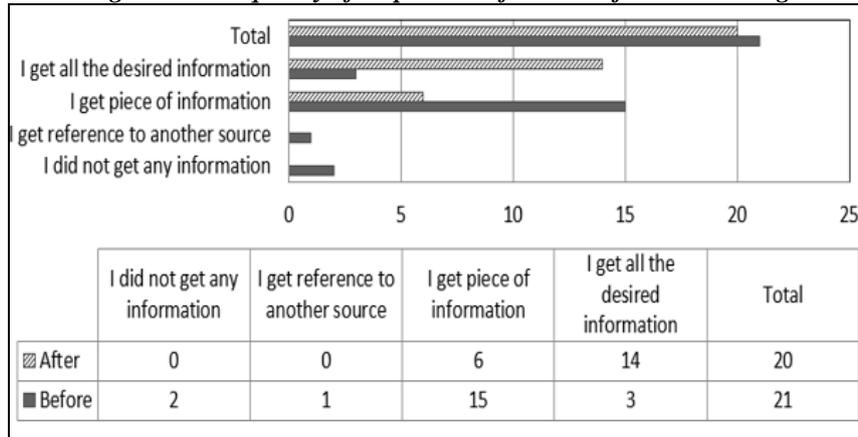
The third level of evaluation in the Kirkpatrick model checks whether the learning was used in the work environment. This verification was done, first, through a quantitative analysis of all the third questionnaire answers, comparing the changes in the reports of critical incidents that occurred before and after training. Next, we conducted a qualitative analysis of answers to three questions about differences in information behavior of students in the critical incidents they reported.

4. Presentation and analysis of results

This section presents the results for the quantitative and qualitative analysis of question in the third questionnaire.

The students responded to the question: "What was the result of the search performed?" The response was tabulated by means of an ordinal scale ranging from "There was no information" to "I got all the desired information." Figure 1 shows the distribution of responses to the incident before and after training.

Figure 1 – Frequency of responses before and after the training



Results show a large difference in the responses of students before and after the training sessions. There was an increase in the percentage of students who obtained all the information desired in the experience reported after the course. This was confirmed by the Wilcoxon test (Dancey and Reidy, 2006) with significance level of $p = 0.003$. Thus, the search was considerably more efficient in the incident after training.

Data also allowed the identification of which were the sources consulted and which were the actions taken before and after training. Figure 2 shows the results obtained. The change in the use of sources was evidenced by the less frequent use of Google and the increased use of health care bases.

Figure 2 – Sources used during the search

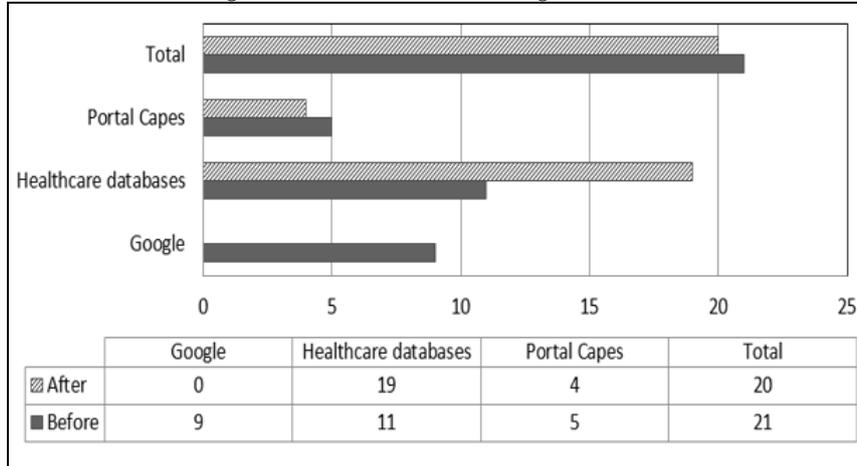
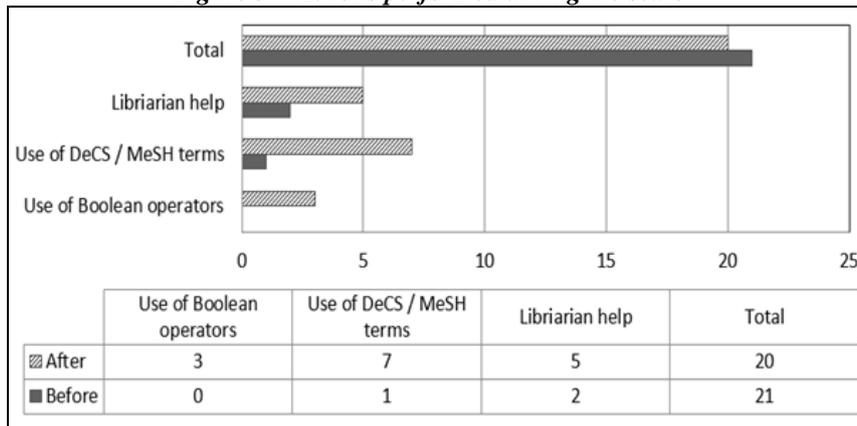


Figure 3 shows the results for the actions taken during the search. There were positive changes in the use of DeCS/ MeSH and use of Boolean operators. An interesting result was the increased demand for help from a librarian when searching for information. This finding is consistent with the work of Addison, Glover and Thornton (2010) wherein the authors speculated that the higher amount of training, the more aware users are of the complexity of the literature, making them less confident in their ability to perform alone these activities.

Figure 3 – Actions performed during the search



Next there is a brief summary of the three students answers to the question that asked for a description in writing of the processes carried out during the bibliographic research.

Student 1 reported an information search before training to carry out a monograph of specialization. She used only SciELO as a source of information and the search strategy was just to write a keyword. As a result, she obtained many items not related to the desired topic. After training, the student reported another search for information to prepare her master's qualification article. The information sources used were SciELO, already used before, as well as PubMed and BVS. The search strategy was further elaborated using Boolean operators and a larger and more elaborate structure of keywords. As a result, the student got all the desired information more completely and quickly.

Student 2 was one of the few who had a professional problem as the object of the search question. The sources of information used by the student were PubMed and Endocrinology journals. The search strategy was to type the subject key words, in the text box available at the bottom of the page. This student reported obtaining only part of the desired information and that the search process took several months. In the incident reported after training, student 2 reported a situation with very different outcome. The major difference was in the search strategy. The student registered at the database to create his personal space, used MeSH terms, refined the search for the last 5 years, saved the search strategy on his personal space and consulted this space weekly to check for new references.

Student 3 performed his prior to training search, with the goal of building a master's project. He used the database PubMed/Medline and the search strategy consisted of typing the subject directly in the search field of the main page. Thus, the results were not specific with many irrelevant items that did not contribute to obtain the information desired. After the training, student 3 reported a much more efficient search experience. He used the same sources of information, but now the search strategy was further elaborated using MeSH terms and combining them with Boolean operators. The search was more refined and the items found were related to the topic.

In the three examples described above the information seeking behavior changed substantially after the completion of training. More databases were used, search strategies were more elaborate and search results were more efficient in the incident after training. The results presented in this section show that the knowledge and skills acquired during the training were transferred to professional activities and training at least for the students who answered the questionnaire critical incident.

5. Summary and conclusions

The knowledge and skills demonstrated by students at the end of training have been transferred to their professional and training activities. This was verified by a search evaluation episode reported by students a few months after training using the technique of critical incident. It is expected that the successful use of this technique for effective assessment of the impact of training in professional

activities of the participants will encourage its use in other research work.

An important implication of the research is related to the need felt by the students to have help to perform their searches. Course participants reported that when conducting a search after the training, they still asked the help of a librarian. The work of Addison, Glover and Thornton (2010) presents an interesting argument that explains this behavior. Even the professional who participated in training will still need the help of an expert in literature for the following reasons: the loss of search skills by the users because of little practice; these users, even if they search regularly, are not as familiar with searching as the professional librarians; limited availability of time by those users and frequent changes in the database interfaces.

The works of Brettle, Hulme, Ormandy (2006, 2007) show similar conclusions. Health professionals evaluated that both the training as well as the searching with the assistance of professional librarians are important for them to perform their activities in an efficient way

References

- ADDISON, J. et al. The impact of information skills training on independent literature searching activity and requests for mediated literature searches. *Health Information and Libraries Journal*, v.27, n.3, p.191-197, 2010.
- AYRE, S. et al. Measuring the impact of information skills training: a survey of health libraries in England. *Health Information and Libraries Journal*, Oxford, v.32, n.1, p.50-60, 2015.
- BARRETO, A. A. *A questão da informação*. São Paulo em Perspectiva, São Paulo, v.8, n.4, p.3-8, 1994.
- BRETTLE, Alison. Information skills training: a systematic review of the literature. *Health Information and Libraries Journal*, v. 20, p.3-9, 2003. Supplementum 1.
- BRETTLE, A. et al. Effectiveness of information skills training and mediated searching: qualitative results from the EMPIRIC project. *Health Information and Libraries Journal*, v.24, n.1, p.24-33, 2007.
- CASE, Donald O. *Research by occupation*. In: CASE, Donald O. Looking for information: a survey of research on information seeking, needs, and behavior. 2. ed. Amsterdam: Elsevier, 2007. p. 265-271.
- CRESTANA, M.F. *Bibliotecários da área médica: o discurso a respeito da profissão*. *Perspectiva em Ciência da Informação*, Belo Horizonte, v.8, n.2, p.134-149, 2003.
- CUENCA, Angela Maria Belloni et al. Capacitação no uso das bases Medline e Lilacs: avaliação de conteúdo, estrutura e metodologia. *Ciência da Informação*, Brasília, v. 28, n. 3, p.340-346, 1999.
- CUENCA, A.M.B; NORANHA, D.P; ALVAREZ, M.C.A. Avaliação da capacitação de usuários para a recuperação da informação: o caso de uma biblioteca acadêmica. *Revista Brasileira de Biblioteconomia e Documentação*, São Paulo, v.4, n.1, p. 46-58, jan./jun. 2008. Disponível em: <<http://rbbd.febab.org.br/rbbd/article/view/60/75>>. Acesso em: 27 jan. 2015.
- DANCEY, C.P.; REIDY, J. *Estatística sem matemática para psicologia: usando SPSS para Windows*. 3.ed. Porto Alegre: Artmed, 2006. 608p.
- FLANAGAN, J.C. *A técnica do incidente crítico*. *Arquivos Brasileiros de Psicologia Aplicada*, Rio de Janeiro, v.25, n.2, p.99-141, 1973. Disponível em:

<<http://bibliotecadigital.fgv.br/ojs/index.php/abpa/article/viewFile/16975/15786>>.

Acesso em: 01 maio 2015.

GRUPPEN, L.D.; RANA, G.K.; ARNDT, T.S. A controlled comparison study of the efficacy of training medical students in evidence-based medicine literature searching skills. *Academic Medicine, Philadelphia*, v.80, n.10, p.940-944, 2005.

KIRKPATRICK, D. L. *Evaluation of training*. In: Craig, R. L., Bittel, L. R. (eds.) *Training & Development Handbook*. New York: McGraw-Hill, 1967: 87–112.

LOPES, I.L. Estratégia de busca na recuperação da informação: revisão da literatura. *Ciência da Informação*, Brasília, v.31, n.2, p.60-71, 2002.

MARTÍNEZ-SILVEIRA, M.S. *A informação científica na prática médica: estudo do comportamento do médico-residente*. 2005. 184f. Dissertação (Mestrado em Ciência da Informação) – Instituto de Ciência da Informação, Universidade Federal da Bahia, Salvador, 2005.

MARTÍNEZ-SILVEIRA, M.; ODDONE, N. Necessidades e comportamento informacional: conceituação e modelos. *Ciência da Informação*, Brasília, v.36, n.1, p.118-127, 2007.

RAYNOR, M.; Craven, J. Looking beyond satisfaction: evaluating the value and impact of information skills training. *Health Information and Libraries Journal*, v.32, n.1, p.73-79, 2015.

RIBEIRO, L.C.M.R. et al. Técnica de incidente crítico e seu uso na enfermagem: revisão integrativa da literatura. *Revista Brasileira de Enfermagem*, Brasília, v.65, n.1, p.162-171, 2012.

SANTOS, Camila Araújo dos; CASARIN, Helen Castro Silva. Habilidades informacionais abordadas em instrumentos de avaliação de competência informacional. *Inf. & Soc.:Est.*, João Pessoa, v.24, n.3, p. 135-144, set./dez. 2014

SPRING, H. Health professionals of the future: teaching information skills to the Google generation. *Health Information and Libraries Journal*, Oxford, v.27, n.4, p.327-333, 2010.

STEVENSON, P. Evaluating educational interventions for information literacy. *Health Information and Libraries Journal*, Oxford, v.29, n.1, p.81-86, 2012.

VINCENT, Beatriz Rodrigues Lopes. *Competência em Informação de Alunos de Pós-Graduação em Saúde Pública*. 2011. 166f. Tese (Doutorado em Saúde Pública). Escola Nacional de Saúde Pública Sergio Arouca, Rio de Janeiro, 2011