New Instruments for Impact Assessment: study of an academic library*

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Abstract: This study presents a review of new instruments for the impact assessment of libraries and a case study of the evaluation impact of the Library of the Faculty of Science, University of Porto (FCUP), from the students' point of view. We conducted a mixed methods research, i.e., which includes both qualitative data, to describe characteristics, in particular human actions, and quantitative data, represented by numbers that indicate exact amounts which can be statistically manipulated. Applying *International Standard ISO16439:2014 (E) - Information and documentation - Methods and procedures for assessing the impact of libraries*, we collected, 20 opinion texts from students of different nationalities, published in «Notícias da Biblioteca», from January 2013 to December 2014 and have conducted seven interviews.

1. Introduction

Academic libraries are very important in higher education institutions as they provide and guarantee access to both scientific and technological updated information for teachers, researchers, students, employees and society in general.

Governments believe that higher education is a national resource of great importance. Adequate training of senior management is essential in the development and wealth of a country. In this context, academic communities

and higher education institutions in general could play a major role by proving to society that these goals can be fully achieved. The same is true for academic libraries that are part of the educational process and necessarily have to demonstrate their value. Librarians as well as other information managers, in addition to other tasks, should assess and report on the impact and value of the services they deliver (Melo & Pires, 2012).

Mano González (2014) states that librarians have great tradition in implementing studies on the impact of the activities and services they provide as well as in developing measures and indicators on quality and impact assessment. As far as the impact of these services on users, recent studies show it is very difficult to identify and quantify the extent of this influence and its benefits.

Laitinen (2015), who studied the challenges related to the economic impact in Finnish libraries of Higher Education and Public libraries, refers that "Studies on information behavior, urban studies, or leisure time studies as well may all provide viewpoints that can help identify the customers' needs an understanding the impact of the library."

The International Standard *ISO 16439:2014 Information and documentation - Methods procedures for assessing the impact of library,* which was published in 2014, is a very important instrument to determine the impact and value of libraries. The ISO16439:2014 –presents us with very useful definitions on the impact and use of a library and how we can assess them.

ISO 16439: 2014 has been implemented in several libraries evaluation studies of various countries in the world - Germany, University of Munich (Poll, 2012), United Kingdom, University of Huddersfield (JISC, 2015), United States of North America in academic and public libraries (RAILS, 2012, ARL, 2014; LiB-Value, 2014; Kautonen, Laitinen, Niemelä, 2014; NYSED, 2014; US Impact study 2015), etc. The evaluation practices regarding the impact and value of academic libraries are very useful to help develop the performance of these services

2. Methodological approach

The return on investment in libraries is directly related to its cultural, educational and sociological goals (Poll, 2012). In this context, the present study attempts to assess the impact of an academic library on its users, i.e., the changes that can be observed in contact with its services and activities.

The FCUP Library was inaugurated about three years ago and stands amongst a group of 15 libraries that constitute the University of Porto. It resulted from the integration of 9 departmental libraries plus the Institute of Molecular and Cellular Biology Library (IBMC). It brings together a vast bibliographical collection, over 100 000 documents, specialized in the fields of Natural and Exact Sciences and Technology. It aims to preserve, organize and provide essential documentation in support of the entire community of students, teachers, researchers and university employees. The universe of potential users of these services consists of about 3937 students and 300 staff members.

Based on *ISO16439: 2014 (E) - Information and Documentation - Methods and procedures for assessing the impact of libraries*, we used the following set of indicators of impact:

- 6 indicators of Changes in users' skills and competences (4.4.2.1);

- 6 indicators of Changes in users' attitudes and behaviour (4.4.2.2);

- 5 indicators of Higher success in research, study and career (4.4.2.3);

- 6 Impact indicators on individual well-being (4.4.2.4).

Table 1 shows the indicators of impact analyzed, taken from the international standard ISO16439: 2014.

Our sampling size consists of 20 small opinion pieces, written by students, published bimonthly, in the newsletter "Notícias da Biblioteca", and 7 interviews of students who used the library between 2013 and 2014. The percent *composition of our sample is as follows:* 48% of texts and interviews are from male students, 52% females, 74% of Portuguese nationality and 26% from other countries (Argentina, Brazil, Peru, United Kingdom, Timor and Turkey).

For the purposes of this study, we used a Mixed Method Methodology. Drawing on qualitative methods, the students' texts were analyzed according to several impact indicators previously selected and the main concepts were extracted to evaluate the impact of the library services on its users. Using a quantitative approach, we drew up contingency tables to show how the collected data relate to each other in terms of certain groups, i.e., how the relative frequencies of indicators of impact relate in terms of the gender and nationality categories.

3. Results

In order to evaluate our indicators of impact, we used the following scale:

Yes - Existence of positive information about the indicator of impact
No - Existence of negative information about the indicator of impact
NA - Lack of information about the indicator of impact

Based on this scale, we drew up some frequencies for each indicator of impact and for groups of male, female, Portuguese and foreign students. The results are shown in Table 2.

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Table 1 - Qualitative and Quantitative Analysis of Texts and Interviews

Indicators of impact	ISO16439:2014		
Changes in users', skills and competences	ISO16439:2014 -4.4.2.1		
Visit to the library	I.1		
Know how to book in open stacks	I.2		
Know how to find a book in open stacks	I.3		
Know how to search in the online catalogue	I.4		
Know how to search in for databases	I.5		
Know how to search for the information you need	I.6		
Changes in users', attitudes and behaviour	ISO16439:2014 -4.4.2.2		
Higher self-confidence and independence in information seeking and information use	I.7		
Increased motivation for learning	I.8		
Being familiar with library collections can change users', seeking practices and their choice of leisure reading	I.9		
Influenced by the contact with library services, users can learn to consult a wider range of information resources or to deal with	I.10		
subjects from an interdisciplinary point of view	I.11		
participation in events, seminars and exhibitions held by the library	I.12		
Collaboration with the library's staff for a better integration of the library use in their lives	I.15		
Higher success in research, study and career	ISO16439:2014 -4.4.2.3		
Time saved in information seeking	I.13		
Improvement of research skill and critical thinking	I.14		
Selection of relevant information for a question by targeted searching	I.15		
Up-to-dateness in user's research topic	I.16		
Better chances by improved information literacy	I.17		
Impact on individual well-being	ISO16439:2014 -4.4.2.4		
The safety of the place	I.18		
The quiet atmosphere for concentrated learning and research	I.19		
Comfortable surroundings	I.20		
Options for contact and communications	I.21		
The possibility to group activities except of identical information	I.22		
The feeling of equality for all users	I.23		

Table 2 - Relative frequencies for the 23 Indicators of Impact Evaluated according to Gender and Nationality

Indicator of impact	Answers	Male	Female	Portuguese	Foreign
I.1	Yes	100,00%	100,00%	100,00%	100,00%
	NO	0,00%	0,00%	0,00%	0,00%
	NA	0,00%	0,00%	0,00%	0,00%
I.2	Yes	100,00%	100,00%	100,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	0,00%	0,00%	0,00%	0,00%
I.3	Yes	100,00%	100,00%	100,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	0,00%	0,00%	0,00%	0,00%
I.4	Yes	7,69%	28,57%	15,00%	28,57%
	No	0,00%	0,00%	0,00%	0,00%
	NA	92,31%	71,43%	85,00%	71,43%
I.5	Yes	100,00%	100,00%	100,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	0,00%	0,00%	0,00%	0,00%
I.6	Yes	30,77%	50,00%	30,00%	71,43%
	No	0,00%	0,00%	0,00%	0,00%
	NA	69,23%	50,00%	70,00%	28,57%
I.7	Yes	100,00%	100,00%	100,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	0,00%	0,00%	0,00%	0,00%
I.8	Yes	92,31%	92,86%	90,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%

	NA	7,69%	7,14%	10,00%	0,00%
I.9	Yes	53,85%	78,57%	75,00%	42,86%
	No	0,00%	0,00%	0,00%	0,00%
	NA	46,15%	21,43%	25,00%	57,14%
I.10	Yes	69,23%	57,14%	60,00%	71,43%
	No	0,00%	7,14%	0,00%	14,29%
	NA	30,77%	35,71%	40,00%	14,29%
I.11	Yes	7,69%	35,71%	20,00%	28,57%
	No	0,00%	0,00%	0,00%	0,00%
	NA	92,31%	64,29%	80,00%	71,43%
I.12	Yes	76,92%	64,29%	70,00%	71,43%
	No	15,38%	0,00%	10,00%	0,00%
	NA	7,69%	35,71%	20,00%	28,57%
I.13	Yes	0,00%	21,43%	15,00%	0,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	100,00%	78,57%	85,00%	100,00%
I.14	Yes	53,85%	64,29%	55,00%	71,43%
	No	0,00%	0,00%	0,00%	0,00%
	NA	46,15%	35,71%	45,00%	28,57%
I.15	Yes	46,15%	64,29%	50,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	53,85%	35,71%	50,00%	0,00%
I.16	Yes	23,08%	50,00%	45,00%	14,29%
	No	0,00%	0,00%	0,00%	0,00%
	NA	76,92%	50,00%	55,00%	85,71%
I.17	Yes	61,54%	35,71%	45,00%	57,14%

	No	0,00%	0,00%	0,00%	0,00%
	NA	38,46%	64,29%	55,00%	42,86%
I.18	Yes	84,62%	85,71%	85,00%	85,71%
	No	0,00%	0,00%	0,00%	0,00%
	NA	15,38%	14,29%	15,00%	14,29%
I.19	Yes	76,92%	92,86%	85,00%	85,71%
	No	23,08%	7,14%	15,00%	14,29%
	NA	0,00%	0,00%	0,00%	0,00%
I.20	Yes	100,00%	100,00%	100,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	0,00%	0,00%	0,00%	0,00%
I.21	Yes	69,23%	50,00%	60,00%	57,14%
	No	0,00%	7,14%	0,00%	14,29%
	NA	30,77%	42,86%	40,00%	28,57%
I.22	Yes	84,62%	78,57%	80,00%	85,71%
	No	0,00%	0,00%	0,00%	0,00%
	NA	15,38%	21,43%	20,00%	14,29%
I.23	Yes	92,31%	100,00%	95,00%	100,00%
	No	0,00%	0,00%	0,00%	0,00%
	NA	7,69%	0,00%	5,00%	0,00%

4. Result Analysis
Changes in the users' skills and competences
Table 2 shows that for male, female, Portuguese and foreign students, the indicators of impact, I.1 *Visit to the library*, I.2 *Know how to find a book in open stacks* I.3 *Know how to search in the online catalog* and I.5 *Know how to search for the information you need*, the "Yes" answer means almost 100%, which means that these skills were acquired.

The indicator of impact I.4 *Know how to search in databases* displays higher frequencies in response NA (Not Applicable), respectively, 92.31%, 71.43%, 85% and 71.43%, indicating that the students were very little interested in giving any kind information on this item and demonstrating a clear lack of concern on this matter. One could conclude that these skills were not acquired.

The indicator I.6 *Know how to evaluate the results of research/recognize the importance/relevance of search results* displays for the "Yes" answer, respectively, the following values: 50.00% for female students and 71.43 % for foreign students, meaning that both female and foreign students acquired good skills at recognizing the quality of their search results.

Changes in attitudes and behavior

Table 2 shows that the indicators of impact I.7 *Higher self-confidence and independence in information seeking and information use* and I.8 *Increased motivation for learning* show greater frequency values for all categories in the "Yes" answer, respectively I.7 100% and I.8 92.31%, 92,86, 90,00% and 100%.

Regarding indicator of impact I.9 *Being familiar with library collections can change users' reading practices and their choice of leisure reading,* the values are respectively 53.85% (male) 78.57% (female), 75% (Portuguese nationality) and 42.86% (foreign nationality) for the "Yes" answer. One could say the FCUP Library doesn't play a very important role on the foreign students' leisure reading habits. It is important to say that the library has several daily and weekly newspapers in Portuguese. To improve the performance of this indicator of impact, we recommend subscribing a daily newspaper in English.

I.10 indicator of impact shows relative frequencies for the answer "Yes" in male, female, Portuguese and foreign nationality, respectively, 69.23%, 57.14%, 60% and 71.43%, confirming that *influenced by the contact with library services, users can learn to consult a wider range of information resources or to deal with subjects from an interdisciplinary point of view.*

The indicator of impact, I.11 P*articipation in events, trainings and exhibitions held by the Library*, displays higher values for NA answer, respectively, 92.31%, 64.29%, 80.00% and 71.43%, meaning that students do not seem very responsive to this kind of activities. However, the I.12 indicator *Collaboration with the library's staff for a better integration of the library use in their lives* presents very satisfactory results for the answer "Yes" and in all students' categories, respectively, 76.92% 64.29%, 70% and 71.43%.

Higher success in research, study, and career

In what concerns Indicator of Impact I.13 T*ime saved in information seeking,* NA values are respectively 100%, 78, 57%, 85% and 100%. This could mean that this item is not relevant to the students.

Regarding I.14 Indicator of Impact I*mprovement of research skills and critical thinking*, for the "Yes" answer to the various categories of male, female, Portuguese and foreign students, the values are respectively 53.85% , 64.29%, 55% and 71.43. These results show the positive impact of the library on its users skills.

When it comes to Indicator of Impact I.15 *Select of relevant information for a question by targeted searching*, the "Yes" answer displays the values 46.15%, 64.29%, 50.00% and 100% for the analyzed categories. Female and foreign students feel more confident in this matter than the rest.

Indicator of Impact I.16 *Up-to-dateness in user's research topic,* the NA percent values are 76.92%, 50.00%, 55.00% and 85.71%, which means that there are few references to this item both in texts and interviews, except for female and Portuguese students who seem more interested in keeping up to date.

Indicator of Impact I.17 *Better career chances by improved information literacy* showed the following relative frequencies regarding answer "Yes" in the various categories, 61.54%, 35.71%, 45.00% and 57.14 %. Male (61.54%) and foreign students (57.14%) expressed a positive opinion on this matter.

Impact on individual well-being

Indicators of impact related to Individual well-being I.18 *The safety of the place* I.19 T*he quiet atmosphere for concentrated learning and research*, I.20 *Comfortable surroundings*, I.21 *Options for contacts and communications* I.22*The possibility of group activities, exchange of ideas and information* and I.23 *The feeling of equality for all users* showed excellent results for the answer "Yes", as we can see in Table 3. The results demonstrate that the various categories of students (male, female, Portuguese and foreign nationalities) experience a sense of well-being when in contact with the library and its services.

Table 3 – Relative frequencies for the answer "Yes" for the
Indicators of Impact on individual well-being I.18, I.19, I.20, I.21, I.22 e I.23

Indicators of impact	Answer	Female	Male	Portuguese	Foreign
I.18 The safety of the place	yes	84,62%	85,71%	85,00%	85,71%
I.19 The quiet atmosphere for concentrated learning and research	yes	76,92%	92,86%	85,00%	85,71%
I.20 The comfortable surroundings	yes	100,00%	100,00%	100,00%	100,00%
I.21 The options for contacts and communication	yes	69,23%	50,00%	60,00%	57,14%
I.22 The possibility of group activities	yes	84,62%	78,57%	80,00%	85,71%
I.23 The feeling of equality for all visitors, the sense of belonging	yes	92,31%	100,00%	95,00%	100,00%

As we can see in Table 4, Indicators of Impact I.4 *Know how to search in databases*, I.11 *Participation in events (training sessions, exhibitions)*, I.13 *Time saved in information seeking* and I.16 U*p-to-Dateness in a user's research topic* have higher frequencies in NA answer. The results demonstrate that students did not show great interest in these indicators of impact.

To improve the impact of these indicators on users, we recommend encouraging students to participate in Library *training sessions* on the use of *electronic resources.*

***Table 4 – Relative frequencies for "NA" Answer about Indicators of Impact
I.4, I.11, I.13 e I.16***

Indicators of impact	Answer	Female	Male	Portuguese	Foreign
I.4 Know how to search in databases	NA	92,31%	71,43%	85,00%	71,43%
I.11 Participation in events (training sessions, exhibitions)	NA	92,31%	64,29%	80,00%	71,43%
I.13 Time saved in information seeking	NA	100,00%	78,57%	85,00%	100,00%
I.16 Up-to-Dateness in a user's research topic	NA	100,00%	78,57%	85,00%	100,00%

Student Testimonials published in "Notícias da Biblioteca"

" ... The library's vast bibliographic collection is now accessible to users and it's constantly being renovated with new acquisitions," - Degree Student in Chemistry (FCUP).

"... a place that met my needs, a kind of a" safe place" that helped me carrying out a research work that I have been developing." - University Student of Trás - os- Montes and Alto Douro (UTAD).

"The FCUP library is a place you do not want to leave in a hurry, and I think that is a very good sign "- Mobility Student, Faculty of Agronomy, University of Buenos Aires, Argentina.

I like the Library best in winter because despite being very cold outside, the library helped me keeping warm and motivated throughout my research and my challenges. (...). This Libray felt like home to me!" - International Undergraduate Programme, Life Sciences Course of the State University of Ceará, Brazil.

For personal reasons, I was able to find all kind of technical information on some engineering areas (for example, related to the theme of Risk Management or Industrial Ecology) - PhD Student in Engineering Design and Advanced Manufacturing under the MIT Portugal Programme.

The staff members are great and do their best to ensure a good study and work environment- Math Student, FCUP.

I think the library has very good facilities. However, simple things like ensuring a good study environment (Silence!) and good technical and human resources management should not be forgotten- Degree Student in Mathematics, FCUP.

The main negative aspect of the new FCUP Library is its opening hours, which should be extended, especially on the 1st and 2nd floors. I think that would benefit all the entire academic community. Degree Student in Mathematics, FCUP.

Another interesting feature about this library is the way books are easily accessible and well organized by subjects Degree Student in Geology, FCUP.

I love being in the library because it is very comfortable, has a good study environment and great information resources. The staff is very nice, always with a smile on their faces - Master's Student in Mathematics, FCUP.

These testimonials are very useful to show how users, from different nationalities, interact with the Library facilities, its staff and other users. The

library is a place where they can find information resources, take a break, talk to each other, share ideas, make contacts and socialize with different cultures, in short, where Civilization is being originated (Santos and Melo, 2014).

5. Conclusions

Librarians and academic libraries managers have been debating about the growing risk of becoming invisible in a world where *electronic resources* have come to play a central role. This new paradigm is particularly evident when chief managers have to take difficult financial decisions as where to cut. In this case, the user's voice and opinions on the role and importance of library services may be particularly powerful.

Under the present circumstances, it is particularly important that the libraries are able to show that they can work not only efficiently, but also provide services that add extra value to the success of the institution itself. The return on investment is very important. Libraries need to be more proactive in order to understand their user's behaviour, improve workflows and demonstrate the impact of their activities on the improvement of the students' skills in the teaching, learning and research process (*Research Information Network and SCONUL*, 2010).

The main purpose of this presentation is to show that there is a strong impact of FCUP Library services on its users' attitudes and behaviour, within the institution and in other schools belonging to the University of Porto.

International *ISO 16439: 2014 (E) - Information and documentation - Methods and procedures for Assessing the impact of libraries* offers excellent guidelines for assessing the impact and value of libraries of different typologies (public, academic, school and specialized).

These standards rely on *ISO settings 2789: 2013 Information and documentation - International library statistics and ISO 11620 Information and documentation - Library performance indicators* to systematize and describe new concepts and assessment techniques, which are presently the most widely used and those that have been proved to be the most effective for evaluating the value and impact of libraries.

Studies like this one, whose main purpose is to assess the value and impact of libraries, are essential to encourage stakeholders (top management, middle management, employees, users, non-users, suppliers) to invest in new and improved library resources, procedures and activities.

In times of severe economic crisis and budget constraints, these methods can provide useful data to perform the *Library Advocacy*. To negotiate and to defend library services showing their impact and value to governments and society.

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