

# **Behavioral trends in the use of printed book or e-book: a case study in Portuguese university libraries**

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**Abstract:** This study analyses the behavioural trends in the use of scientific information from printed books and e-books and the way university libraries users choose to use it. To this end, a survey was conducted on a sample of users from various Portuguese higher education schools. The first part focused on the characterization of respondents, which includes data on gender, area of knowledge and academic level attended. In the second part we sought the opinion about advantages and disadvantages of each medium, frequency of use, choice of medium according to the purpose of reading, devices used and acquisition suggestions for the library. The results allow us to observe the factors that influence and affect the behaviours of users regarding their choice. Studies such as this help to support the decision in choosing the information resources to be purchased taking into account user preferences, but also to outline strategies for promoting the use of various media that, rather than competitors, should be complementary.

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## **1. Introduction**

In recent years, library collections have become more hybrid, with printed and digital support converging on them. These changes confirm the pioneering attitude of library and economic systems and their librarians, who have sought to adapt resources and services to the emergence of this reality, looking for more suitable physical and virtual spaces, more powerful discovery systems and more appropriate forms of storage for different types of resources. However, collections do not survive on their own. They are living organisms that need users to develop and thrive, to the extent that they respond appropriately and pertinently to user requests. Therefore, it is legitimate to ask: if library collections have undergone these changes, how are users adapting their own strategies for searching and reading information due to the changing of medium?

The emergence of e-books as resources of scientific information in university libraries has been imposing at the pace of technology, with advantages such as portability, cost or accessibility, assuming that e-reading is being well received and appropriated by library users, who can access scientific information from anywhere. However, recent studies point to the resurgence of paper reading preferences.

The purpose of this study was to know the preferences of users of university libraries when using printed and digital media, in Portugal. To this end, an online survey was distributed at the universities of Lisbon and Porto, in

selected schools, to a convenience sample, in order to observe the preferences of library users regarding the use of printed books or e-books.

The University of Lisbon has more than 50,000 students, and about 5,843 employees, being the largest academic community in Portugal. The study includes data on users of the Faculty of Dental Medicine, Faculty of Psychology and Institute of Education libraries.

The University of Porto has almost 30,000 enrolled students and more than 4,000 teachers, researchers and technicians. Its campuses consists of three centers, fourteen colleges, a business school, sixteen libraries, twelve museums and four sports centers. For this study data was collected on users from the Faculty of Sciences.

We used statistical methods and quantitative data based on the survey results to compare the behaviors of the library users' concerning their preferences on choosing e-books or printed books.

## **2. Literature review**

According to Cordon Garcia (2011), the electronic book is any form of file in digital format that can be downloaded on electronic devices for later viewing. It is a digital file that needs an additional element to be viewed, the reading device, which must contain software suitable for reading the document. It may contain textual elements, sound graphics or visuals integrated and viewable according to the query device: computer, e-reader, tablet or other. Another simpler definition is proposed by Feather & Sturges (2003), stating that it is "a text analogous to a book that is in digital form to be displayed on a computer screen."

In general, electronic documentation triumphed for its intrinsic characteristics, which make it easier for librarians to manage, store, disseminate and search for information (Garcia Marco, 2008). However, some difficulties prevail in the management of digital documentation, particularly that of electronic books. Librarians must be aware of the suppliers' proposals, the availability of the authors, the conditions of access and preservation, the forms of licensing or ownership, the conditions of storage on servers or repositories, and, at the same time, the preferences and conditions of user access (Serra, 2016), situations that become challenges for the maintenance, dissemination and use of these collections (Haugh, 2016). On the other hand, the digital environment has renewed the traditional concept of the book and according to Cordon Garcia & Lopes (2012) it has favored the socialization of reading, user participation and the rupture of the traditional publishing chain, converging on the creation of new digital formats that go further than simply transposing or digitizing the printed format.

At the same time, there is a growing demand from users of digital information, due to their constant connectivity to digital environments, where they access content of all kinds more quickly. Electronic books seek to continue the advantages of the printed book (in its form and function as a cultural and social artifact), but it is not certain that it will replace the printed book, even in the university environment.

Cross-sectional studies on e-books have sought to understand what happens to users and the results are broad and contradictory, ranging from the most optimistic views, which reveal a massive acceptance of these documents by the millennium generation, to the most skeptical or indifferent, who consider that it is not yet possible to speak of a true appropriation of electronic books (Berg, Hoffmann, & Dawson, 2010).

Some studies have revealed users' preferences for the use of printed

information over digital information (Davidovitch, Yavitz, & Druckman, 2016; Spencer, 2006), recommending some prudence in decision-making that can exclusively favor the digital environment. Podolsky and Soiferman (2014, p. 2) refer that “the majority of students prefer to read paper based texts because it is easier to take notes, it is easier on the eyes, they are in the habit of reading paper documents, they have a better spacial understanding of where they are in the text, and there are less distractions when reading paper documents.”

Cordón García, Alonso Arévalo & Martín Roderó (2010) stated that the development of specific collections by publishers, the creation of increasingly sophisticated online distribution systems and the improvements introduced in portable reading devices (e-book readers) are causing a change in that situation, in such a way that the production and consumption of this type of documents is changing. And they find that after the reference works and scientific journals have made their transition to the digital environment, e-books represent the next level of evolution in the digital revolution. However, their presence in libraries, the skill of librarians in their management and the level of knowledge of users are still low. Bozarth and Zhong (2016, p. 232) affirm that it is from the knowledge of the users' preferences that we can prepare our work as librarians, justifying the pursuit of studies of this nature, since “understanding what preference users have regarding e-books will help with current and future collection-development decisions. For librarians to provide e-book resources and services effectively, a thorough understanding of faculty, staff, and student e-book needs and preferences is needed”.

In the present work we seek to echo these questions, seeking to understand the Portuguese situation, similarly to what has already been done in several countries, such as Australia and New Zealand (Hinze, McKay, Vanderschantz, Timpany & Cunningham, 2012), Hong Kong (Lai & Li, 2013) or United States of America (Shelburne, 2009), just to mention a few examples.

In the inspiring article by Blummer and Kenton (2018), it appears that the problem surrounding the use of e-books has been a vast and fertile area in scientific research. In this article, the main trends of studies in the area are revealed, and particularly the implications that the roles of librarians will have in promoting these digital collections to users.

The authors highlight the advantages pointed out by e-book users “the accessibility, portability, and search capability of the online format” (Blummer & Kenton, 2018, p. 12), however, most users prefer to convert the online format to print, downloading it for later reading, off the screen. Additionally, it is mentioned that e-books “were largely used to support course work or for reference” (p. 20). On the other hand, in the study by Al Saadi, Lane-Kelso, Al Hafeedh, Al Sheithani, & Al Wishahi (2017) it is concluded that “despite e-books growing presence, students may need more time and encouragement to change their use and preferences to e-books so exclusively”, stressing their preference for access to printed information.

Following these investigations, and inspired by the academic work of Figueiredo (2016), which sought to ascertain the presence of e-books in a Portuguese university library, the authors of this study were interested in trying to understand the behavior of users in two major Portuguese universities, in an attempt to confirm international trends that point to a similarity of interest in using, in the university environment, both e-books and printed books (Blummer & Kenton, 2018, p. 18). However, there is the hypothesis that there is, in Portugal, a predominance of preference for consulting electronic books for academic tasks and reading printed books for leisure activities.

It was considered important to investigate the issues related to the

characterization of the population, the frequency of reading, the preference given to the type of medium, the advantages associated with each of these typologies, the influence of electronic devices and the preference in access to scientific information in each one of the formats. The questions are found in several studies of the same typology, confirming the importance of the analyzed variables.

Regarding the characterization of the population, in a study carried out in Canada (Lamothe, 2013) it is concluded that “doctoral students exhibited the strongest relationship with e-book usage, while undergraduate students showed signs of the weakest and faculty demonstrated the overall weakest relationship with e-book usage.”

Regarding the preference of university students over printed or digital material, another investigation was carried out (Cumaoglu, Sacici, & Torun, 2013), which results point to a “significant correlation between book reading frequency of university students and book reading habits of their social environment”, providing a readiness for reading, in any of the formats, being therefore interesting to ascertain the respondents' reading habits.

At the same time, in a study on the strategies for using e-books, it was found that the tools associated with their consultation have a significant impact on the advantages of use. The authors conclude that “students using e-books for academic coursework experience problems with access, insufficient context in search results, awkward navigation tools, an unpleasant reading experience and interfaces that are not intuitive to use. Despite these, e-books are regarded as being a potentially valuable educational resource” (Muir & Hawes, 2013, p. 272).

Regarding electronic devices for consulting e-books, it appears that the use of these documents is affected by the intermediation device.

In a study on user behavior towards digital collections, pursued at an Australian University, “results showed that users were more satisfied with desktop PC and laptop as library e-book use platforms. At this point in time, smartphones, tablets and e-book readers do not provide a satisfying viewing experience with library e-books yielding ambivalent (neutral) responses” (Ahmad & Brogan, 2016).

Gilbert & Fister (2015) sought to understand how university students perceived their leisure and instrumental reading habits when using printed and digital collections. The conclusions are somewhat surprising: “while students appreciate the ease of access provided by e-books, many imagine that research would be more difficult using e-books”, relegating therefore e-books for a more recreational use.

Finally, in a comprehensive study on awareness, usage and attitude towards e-books (Wang & Bai, 2016), the main conclusions indicated that students, particularly undergraduate students, used e-books mainly for the purpose of leisure and in contrast, postgraduate students tended to use e-books more for academic purposes. On the other hand, the use of mobile devices and computers was preferred when reading e-books; but for academic e-books students preferred print part of them for reading. University students showed strong preference for printing books. The authors recommend that academic libraries should put more efforts on promotion, stimulating demands, and cooperation with teachers to improve e-books usage.

Taking all these aspects into account, we were interested in characterizing the reality of Portuguese university libraries, based on an analysis of preferences regarding the use of printed and digital media.

### 3. Methods

The methodology of this investigation was developed in several stages: establishment of indicators based on the literature review; elaboration of a questionnaire; collection of data through an online questionnaire; data analysis using the mixed method (quantitative and qualitative data).

The questionnaire consists of 12 questions. In the first five questions, it was intended to obtain data to identify the profile of the respondent based on gender, age, scientific area in which teaching, learning or research develops, at the academic level and, finally, in the category within the academic community (professor, student, researcher and other). Following are two questions asking for the characterization of reading behaviors related to study / research and leisure activities, three questions for the characterization of ebooks and printed books, ebook reading devices and preferences in reading these documents. Finally, there is one open question to obtain data on qualitative characteristics. Table 1 presents the indicators established in the investigation.

**Table 1. Indicators**

Indicator	Description
I.1	Gender
I.2	Age group
I.3	Scientific area
I.4	Category at university (Professor/Student/Researcher)
I.5	Academic degree (Graduate/Master/PhD)
I.6	Frequency reading study/research
I.7	Leisure frequency reading
I.8	Characterization print book / ebook
I.9	Devices used for ebook reading
I.10	Reading preference in electronic/printed format
I.11	Open question

Table 2 shows the universe benefitting from the resources of the libraries under study.

**Table 2. Constitution of the population**

Universe					
Type	FCUP	FMDUL	FPUL	IEUL	Total
Totals	4393	791	1049	919	7152

The online questionnaire was created using Google tools (Google Forms). There were 504 responses obtained in the period between February 4th and March 13th, 2020. The purpose of this investigation was to collect data for two months to obtain a more representative sample of the universe under study (FCUP – Faculdade de Ciências, Universidade do Porto; FMDUL – Faculdade de Medicina Dentária, Universidade de Lisboa; FPUL – Faculdade de Psicologia – Universidade de Lisboa; IEUL – Instituto de Educação,

Universidade de Lisboa). However, with the emergence of the COVID-19 pandemic and with the closure of the universities that participated in the study, the hypothesis of a quick bias in the responses to this questionnaire with the emergency created was raised. It will be advisable, in the coming years, to collect data and research changes in behavior that are observed with the serious pandemic that has emerged.

#### 4. Results

##### 4.1 Quantitative Data

Using statistical methods of quantitative analysis, the results obtained from the online questionnaire are shown. Table 3 shows the characterization of the study sample.

**Table 3. Constitution of the sample**

Sample			
	Type	Responses	
		Number	%
Gender	Male	174	34,5
	Female	326	64,7
	No answer	4	0,8
Age	< 30	359	71,2
	31-45	82	16,3
	46-60	49	9,7
	60 >	14	2,8
Field of Knowledge	Social and Human Sciences	64	12,7
	Health sciences	73	14,5
	Science and Technology	340	67,5
	Other fields	27	5,4
Category	Professor	48	9,5
	Researcher	46	9,1
	Student	388	77,0
	Other	22	4,4
Degree	Graduate	257	51
	Master	134	26,6
	PhD	113	22,4

The data obtained on the preferences for the use of the information - Study / Research and Recreation are presented in Table 4.

**Table 4. Frequency of the preferences to the information use**

Frequency of the preferences to the information use						
Type	Preference	Rarely	1 in 15 days	1 in a week	2 to 3 a week	Every day
Book	Study/Reseach	71	71	99	146	117
	Recreation	82	84	99	123	116
Ebooks	Study/Reseach	28	44	86	151	195
	Recreation	221	70	64	75	71

Table 5 shows data obtained regarding the characteristics of the formats under study (paper and digital versions).

Table 6 refers to data on devices used to access electronic documentation and

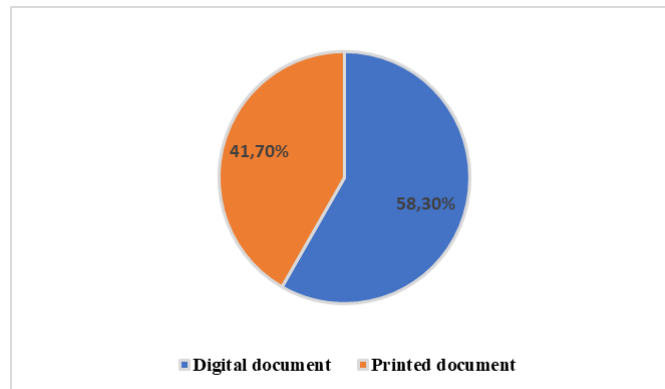
**Table 5. Characteristics of the formats**

Characteristic	Format	
	Book	Ebook
Portability	141	363
Economic	95	409
Easy use	308	196
Physical/Sensory Contact	470	34
Difficult handling	210	294
Expensive	392	112
Causes visual fatigue	45	459
Causes lack of concentration /dispersion	48	456

**Table 6. Devices used to access electronic documentation**

Devices	Access to e-documentation	
	Number	%
Smarthphone	320	63,5
PC / Laptop	458	90.9
Kindle	33	6,5
Sonyreader/similar	3	0,6
iPad / Nook / similar	97	19,2

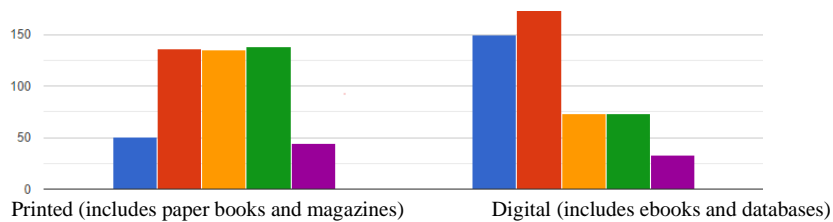
Figure 1 shows the preference in the format of the information made available for study and investigation.



**Figure 1. Preference in the format of the information made available for study and investigation**

Figure 2 shows data about the users' knowledge on the print and digital library collections:

*Can you say that you know the collections in your institution's library? (Choose only one option: 1 (nothing); 2 (little knowledge); 3 (know enough); 4 (know well and use); 5 (extremely well and use assiduously)*



**Figure 2. Collections Knowledge**

#### 4.2 Qualitative Data

Qualitative data obtained refer to the open question of the survey and express the opinion of many respondents who want to clarify their quantitative responses. Therefore, they are compatible with the latter, reinforcing the results presented above.

#### 5. Discussion

The sample of this study is mostly female (64.7%), under 30 years old (71.2%), from the Science and Technology scientific area (67.5%) and being undergraduate students (77%).

In a context of digital transformation and recognition by the academic community of the importance of electronic resources as privileged instruments for research and access to scientific information, the analysis of these data reveals that although digital support is widely used, reading habits on paper continue to deserve a prominent place in the teaching-learning process.

It appears that the choice of reading medium varies fundamentally according to the purposes of using the information: the electronic format is used primarily in the work of data related to study, teaching and research, and the printed format, in turn, is more connected with reading in leisure time and, above all, with a

type of study that requires concentration and a deeper study of topics and informational content.

These conclusions are observed in the following quantitative data from the frequency of the preferences of the information usage: book - study / research, 2 to 3 times a week, 146; ebook - study / research, every day, 195; book - recreation, 2 to 3 times a week, 123; and ebook - recreation, 2 to 3 times a week, 75.

Figure 1 shows the preference in the format of the information made available for study and investigation: 58.30% - printed document and 41.70% - digital document.

In addition to consulting scientific journals and databases, digital medium is considered preferable with regard to the availability of bibliographies and manuals, due to its potential for updating and articulating contents.

Ebook, specifically, is seen not as a substitute for the printed book but as a complement to reading on traditional media, being these two forms of access to information and learning distinct but compatible.

In terms of environmental sustainability, the information created and stored digitally is associated with less waste of resources, being seen as a factor in reducing the ecological footprint, as opposed to the expenses associated with excessive consumption of paper.

When quantitative data from Table 5, "Characteristics of the medium", is analysed, we see that accessibility, portability, speed and convenience are some of the most valued aspects that result from the use of electronic books, along with more negative aspects such as the need for reading devices, considered expensive, in addition to a greater propensity for dispersion and visual fatigue. The experience of physical interaction with the book as a physical object is one of the positive aspects most highlighted by users, due to its ease of reading and the sensory pleasure associated with it. On the other hand, it is considered that there are limitations inherent to the paper format, such as less availability of copies and less speed of updating its contents.

Access to information that is produced and maintained in digital support brings, in the opinion of the respondents, multiple benefits, but it also raises some critical problems in terms of digital rights management (DRM-Digital Rights Management), in terms of creation, storage, access and digital dissemination of scientific information, which should not be overlooked.

## **6. Conclusions**

The choice of reading medium varies fundamentally according to the purposes of information usage: electronic format is used primarily in the work of data related to study, teaching and research and the printed format, in turn, is more connected with reading in leisure times and, above all, with a type of study that requires concentration and a deeper study of topics and informative content.

Digital documents proved to be: less waste of resources and reduced ecological footprint, have more accessibility, more portability, speed, and convenience; the need for (expensive) reading devices; and greater propensity for dispersion and eye strain.

Printed books were characterized by being a physical handling experience, ease of reading and sensory pleasure, lower availability of copies and slower content update speed.

Although interesting advantages are observed in the use of e-books, the study is consistent with previous investigations, which indicate that in Portugal there is still a preference of the printed book over the digital one.

Similar studies should be carried out in the future to observe variations in

behavior in relation to reading and its medium.

With the emergence of the COVID-19 pandemic and, with the closure of universities and their libraries worldwide, due to the emergency created, it will be very useful, in the coming years, to collect data and to research the changes in behaviors that are observed with this particular situation.

**7. Appendix:** Questionnaire (originally in Portuguese language but translated by the authors for the benefit of non Portuguese readers)

**Preferences in the usage of digital/printed information**

This study aims to analyze behavioral trends in the use of scientific information with a focus on the type of medium. It is observed how the users of university libraries choose to use printed / digital information, with emphasis on the binomial traditional book. vs. ebook. The study is confidential and guarantees the anonymity of the participants.

\* Required

**Characterization of participants**

**Gender \***

Male

Female

Rather not answer / Other

**Age \***

Till 30

Between 31 and 45

Between 46 e 60

More than 60

**Scientific Area \***

Human and Social Sciences

Health Sciences

Science and Thecnologies

Other

**Institution \***

Instituto de Educação, ULisboa

Faculdade de Psicologia, ULisboa

Faculdade de Medicina Dentária, ULisboa

Outra Escola da ULisboa

Faculdade de Ciências, Univ. Porto

Outra Escola da Univ. Porto

Outra Instituição de Ensino Superior

**Type of user \***

Professor

Researcher

Student

Other

**Degree obtained or undergoing \***

1st degree

Master / Post-graduate Diploma

PhD

**Preferences for information usage**

Select, for each question, the option that applies to you, filling in the presented options or using the scales presented (1 - Rarely or never; 2 - Once every 2 weeks / rarely; 3 - Once a week /sometimes; 4 - Two to three times a week / many times; 5 - Every day / Often)

**1. How often do you read for studying/research? \***

Books or other printed documents

E-books or other digital documents

**2. How often do you read for pleasure? \***

Books or other printed documents  
E-books or other digital documents

**3. How do you characterize the printed book/ebook? Choose only one answer for each line \***

I prefer physical / sensory contact  
Causes lack of concentration / dispersion  
Expensive  
Portable  
Economic  
Easy to use  
Difficult to handle  
Causes eye strain

**4. What devices do you use when using electronic documentation? \***

Mobile Phone  
Personal computer  
Kindle  
Sony Reader or similar  
iPad, Nook, or similar

**5. In what format do you prefer the bibliography to be made available? (Choose only one option) \***

Printed (books or articles available in the library / photocopies)  
Electronic (e-books, links to chapters or electronic magazine articles)

**6. Can you say that you know the collections in your institution's library?**

**(Choose only one option: 1 (nothing); 2 (little knowledge); 3 (know enough); 4 (know well and use); 5 (extremely well and use assiduously) \***

Printed (includes paper books and magazines)  
Digital (includes e-books and databases)

**If you wish to make further comments, please use the space below.**

Your answer:

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