ISKO. CAPÍTULO ESPAÑOL. CONGRESO (7º: 2005: BARCELONA) 584-596

The Format of the Online Scientific Journal in the Extensive Communication model

Elmira Luzia Melo Soares SIMEÃO, elmira@unb.br
António Lisboa Carvalho de MIRANDA, emiranda@unb.br

Universidade de Brasilia, (Brasilia, Brazil). Departamento de Ciência da Informação

Abstract

The scientific journal has been greatly affected by the advent of its online digital accessibility. It is the priority publication medium for scientific communication, one of the document categories where changes in the electronic format discovers new and greater possibilities other than the traditional ones. Extensive communication – also known as the emblematic model of network interactions – comes equally in new forms of document production and in the organization of the technical landscape in which scientific information adapts to flexible and unstable forms. Gradual changes (in support, format, content, and publication type) were observed in 400 online electronic journals, all by main international publishers, as made available at the *CAPES portal* (http://www.periodicos.capes.gov.br). A data collection was assembled through a checklist for 70 variables, and the results were inserted into a spreadsheet for an initial statistical analysis. This investigation has shown that the new format is outstanding due to the insertion of tools and services, consolidating extensive communication by means of interactivity, hypertextuality, and hypermediation, also known as the main distinctive features of the electronic format. After technological resources bring the online format to maturity, they establish a new perception of the contents of journals. The results demonstrate the dependence of the electronic format on the printed format. By combining all the variables to measure the levels of interactivity, hypertextuality, and hypermediation, journals were grouped by platform and the results have proven that there is no direct relationship between the three characteristic features of the online electronic format. In other words, the most interactive groups are not necessarily the most hypertextual or hypermedia ones. The performance of the journals was also evaluated comparatively across platforms.

Keywords

scientific journals, electronic journals, communication models, hypertext, scientific information publishing, electronic publishing, thematic portals, bibliometrics, interactivity, *CAPES*

1 Introduction

The official representative of formal, hierarchical and vertical communication, the scientific journal was structurally modified by the forms of presentation and digital access. It is still the priority medium of dissemination, but unveils itself as a tool to identify changes undertaken by an extensive communication model (Simeão 2003) stimulated by the new telecommunication networks. There is also a technical scenario in which the information and its symbolic content change quickly, in flexible and stable forms. The adaptation of the literature to a framework for interconnections makes differentiated procedures and access viable, a pro-active availability that favors virtual browsing.

The electronic journal started its migration to the network bearing its own production rituals and traditional criteria of evaluation. The pioneering experiences of insertion of primary publication, according to Couzinet and Muskat (1999), occurred in 1978 at the New Jersey Institute of Technology (USA), with the advent of the Electronic Information System. Subsequently, the *Computer Human Factor* (1980-1984) was published in England and the *Journal of Revue* (1984-1987) in France. Brown (Brown 1999, p. 44) therefore defines his expectations in relation to new formats:

> With the existence and scientific massification of electronic texts, the bibliographical capacities add themselves in order to establish links to the electronic body of the texts, be it in form of magazines or in electronic document servers. The multimedia capacities are introduced to the magazines, and therefore there is a change in the concept of what the magazine is or can be, incorporating not only videos and sound, but also active mathematical formulas, the visualization of theorems and collected data, the visual display of genetic structures and simulations that calls for the interactive participation of the reader, researcher and visionary.

The resulting changes in the extensive model of communication, regarded as more ephemeral and sporadic, must reach the practices of evaluation of scientific literature, motivating significant improvements in printed magazines. For Harnad, it is foreseeable, for example that the formally evaluated journals carry on part of the on-line process, as well as the access and the distribution of works. But there is a long way to go until the scientific community reaches the optimization of the process due to the restrictions of the culture of printed communication and the publishing industry. In this stage of innovations there are still inequalities and problems of access, lack of standards and limitations in the technological structure of the networks, beyond limits of incompatibilities in the archives and software. Since they are the priority channel for the diffusion of science, the printed and electronic journals should maintain their place in community preferences if they are to turn these difficulties into opportunities. Boyce (2000) emphasizes that the portals with scientific publications function as excellent agglutinant points of specialized

and pertinent information, with signals of the functioning of an interactive and extensive communication.

The author cites the experience of the community of astronomers in 1995, when part of primary and secondary literature was re-assembled and interconnected in modules forming a great database. The software used to monitor the accesses improved services, adjusting them to demand. The result showed in this context, an unanticipated, different and unviable vision. Thompson explains «The ways of communication are spinning wheels for weaving in the modern world, and when using these ways human being weave webs of meanings for themselves» (BROWN 1999, p. 20).

2 THE *CAPES* PORTAL

The decade of the 90s damaged the national program of acquisition of scientific literature in Brazil, affecting collections of periodicals available in the main libraries in the country. The *CAPES* program of support to the acquisition of journals was created in 1994 to help federal academic institutions, especially those with post-graduation programs, in order to keep the collections updated. The significant decrease in resources in the 90s required the adoption of rigorous procedures not only for the acquisition of new titles, but also in keeping the periodicals available in Brazilian universities up to date. The decentralization in the distribution of resources that were directly distributed to the IES underpinned the CAPES strategy in 1999, when it subscribed to the Web of Science, and also provided financial resources aimed at forming a consortium for periodical sharing.

In 2000, three lines of access attempted to facilitate access to scientific journals: an investment of 12 million, the guidelines for the assembly of islands of access in each institution, and the availability of the content of international periodicals and referential database through electronic portals: <http://www.periodicos.capes.gov.br>.

Since the implementation of the portal the results were excellent but were not enough to guarantee, besides access, better visibility of national titles. Since 2000, professors, researchers, pupils and staff members from 97 higher education and research institutions in the country have access to international scientific output through Internet-connected terminals. There are cases of free access through open network.

FIGURE 1. Main page of the periodical portal maintained by *CAPES* (June, 2002)

The portal provides access to the complete text of a great many publications, besides reference periodicals, encyclopedias, databases, etc., provided by editors and international distributors. All the main platforms provide specific search tools that make bibliographical searches possible, access to the complete text of documents and other products and services, as well as information of technical and scientific interest. Only the publications of the Institute of Electrical and Electronic Engineers (IEEE) and the Institution of Electrical Engineers (IEE) require special passwords possessed only by participating libraries.

3 INSTRUMENTS AND METHODS

In the selection phase, the portal had, according to *CAPES*, 2568 titles, including abstract journals. In the general listing of titles, however, there were titles taken for the sample, since there were only 2412 titles with available URLs. The sample congregated 400 periodicals: only 28 titles of this group were on the restricted platforms.

In order to attempt precise measurements in electronic format periodicals, variables were defined that would display each one of the attributes (profile, interactivity, hypertextuality and hypermediation). The different variables incorporated into the study are linked to the print and/or electronic format and those specific to the electronic format. All of them were identified through products and services available in the formats.

TABLE 1. Number of titles by platform

Platform	Number of publications
1. ACS	33 publications from the American Chemical Society.
2. APA	39 publications from the *Psychological Association* and from the *Psychological Association and access to the PsychINFO database with weekly updates.*
3. AIP	41 publications from the American Institute of Physics, from the APS, American Physical Society, and from the Russian Academy of Science and other editors.
4. Blackwell	257 periodicals from the areas of Applied Social and Human Sciences.
5. GALE	249 titles from all areas of knowledge.
6. High Wire	11 publications from universities and international societies, emphasizing Science.
7. IDEAL	215 titles from the Academic Press.
8. IEEE	160 periodical publications from the Institute of Electric and Elect*ronics Engineers* (IEEE) and from the Institution *of Electrical Engineers* (IEE).
9. OVID	121 titles from the Biological and Health Science areas.
10. SciElo	102 scientific publications from Brazil, Chile, and Cuba.
11. Science Direct	Over 1.180 periodical publications from Elsevier and other scientific publishers.
12. McMillan	*Nature* and derived publications.
13. ACM	79 publications from the *Association for Computing Machinery*

Source: CAPES Portal (June 2002)

TABLE 2. Description of variables of each attribute

	Profile	visibility	interactivity	hipertextuality	hipermediation
ATTRIBUTES	Title	Content renewal	Content Evaluation:	Links:	Audio Emission (Audio Reception (Sound)
	URL	Content Recovery	Format evaluation (Products and services) Format (Products and services)	Internal Links	
	ISSN/EISSN	Network access		External Links	Signs/banners
	Area	Number of access		Conceptual Authorship Links	Moving graphics
	Country	Idiom (s)	Records		Kinetic graphics
	Nature of the periodical	Index databases	Chats or forums	Subject conceptual links	Kinetic images and/or 3D images
		Transmition	Alert services	Texts and citation cross-operations	
	Responsible Institution	Impact	FAQs		
	Type of format		E-mail author	Coding	
			E-mail editor		
			E-mail journal		

The software that were used during the data collection phase, the observation and description of variables and finally the statistical cross-examination, were selected according to their operational possibility:

— *MS Excel* – Spreadsheet for data collection and storage.

— *SPSS* (*Statistical Package for the Social Sciences* – 10.0 version) – Application for the statistical treatment of data used in the sample selection, starting from the total of titles; also used in the verification and correction of data, generation of variables, tabulation, application of quantitative analysis techniques and tests.

The M*ozilla* net browser assisted in the correct retrieval of data such as the URL, the total size (in bytes) of the opening of each serial (homepage or index), the total number of links and forms on the main page, and the characters codification used as standard in the main platform where the magazine is deposited.

4 General measurement procedures

For the measurement of each electronic format characteristic (interactivity, hypertextuality and hypermedia), the data was grouped in accordance to their relevance to the aspect studied: the qualitative variables are expressed in proportions and the quantitative variables (yes or no, 0 or 1) are tested to check absolute distribution. The results of the totaling (qualitative and quantitative variables) form a general profile of the journals selected for the sample. Subsequently, the combinations look for Interactivity, Hypertextuality and Hypermediation indicators. In the Interactivity analysis the journals are grouped by platform (editor), by size and number of links in order to test the dimensions of the groups. The same procedure was adopted for the measurement of hypertextuality and hypermediation.

5 Results by characteristic – Interactivity

Twenty-five variables that were linked to aspects of the interaction between the user with other users of the system were grouped to measure the journals' interactive characteristic. The interactivity table scored each of the magazines with between 0 to 90 points. Each variable had a specific score, and only the warning, journal personalization and research and the content and correlation sharing services could be given a score of 10 points. This maximum score (10 points) is obtained from the specificity of the variable regarded as the utmost representation in interactive terms. Other items, such as indexing of authors and subjects, were given 5 points, as well as the indexing of journals included in referential databases. The less significant variables for measurement were given one or two points each.

Twenty-eight journals of the IEEE and a further 20 where the variable had received no points were excluded from this analysis, thus totaling 12.3% (48 periodic ones) being measured. 352 headings were evaluated (88% of the total), with the most interactive journal receiving 81 points

and the least interactive one 17 points. The results show that it has interactivity resources in most of the periodicals and in sufficient number and with safe margins of error to guarantee the formation of the interactivity table. A total of 171 magazines (48.6%) received between 17 and 50 points and 181 periodicals (51.4%) were scored above 50. But three journals had shown 17 points. A total of 50 headings, the largest group in this table, obtained 69 interactivity points of, a characteristic evaluated in 88% of the 400 journals of the sample.

6 Medium of Interactivity by Platform

The establishment of standards and routines make it possible to group titles by platforms and by groups of editors. It made it possible to have the option of adopting this variable as reference as it would allow greater precision in the dimensioning of interactivity. Once again it is observed, according to the established standards, that there are common tendencies that segment the journals into more or less interactive groups. As it assembled a larger number of interactive groups, according to the proposed table, SB is the platform with the highest score (more interactive, with an average of 69.7 points in the group) followed by Ideal, Academic Press (49.72 points and Blackwell. The proximity of the data counted for these platforms confirms that the merging of the publishing houses and the establishment of standards led to a balanced score, which is the one currently adopted by the Ideal and Academic Press in its interfaces.

Table 3. Interactivity score Average by Platform

Pattern	Average	Pattern Deviation	% of Total N
SD	62.70	6.95	52.4%
AIP	19.00		0.3%
Gale	33.95	2.61	15.7%
HW	33.00	8.49	0.6%
OVID	22.57	2.21	4.0%
Scielo	19.30	1.13	5.7%
Blackweel	35.22	4.22	13.1%
Ideal and Acad Press	49.72	8.50	8.3%
Total	**49.15**	**16.63**	**100.0%**

The Gale, OVID and Scielo platforms are considered to be the least interactive. The ACM, AIP and HW platforms had been removed from the final verification for presenting a non-significant number of titles, being unacceptable to the sample total, leaving the acceptable margin of error for the total of the sample. These platforms, therefore, did not score well enough to join the interactivity indicator, being thus excluded from the final result of this analysis.

7 Interactivity by Areas of Knowledge

The interactivity of the platforms was tested in relation to the area of knowledge, in order to verify whether this variable would imply a greater or minor less interactivity between groups. The tests followed the same logic used with the platform variable, since the results also grouped the titles in significant and revealing form. Fifty (50) titles were excluded from the analysis.

Table 4. Interactivity by area of knowledge

Area of knowledge	N	Average	Standard deviation	Standard Error	Average intervals Inf.	Sup.	PMin	PMax
Applied Social	88	39.39	12.06	1.29	36.83	41.94	17	69
	91	56.43	14.55	1.53	53.40	59.46	18	71
Letters and arts (<)	4	28.50	7.68	3.84	16.28	40.72	117	33
Biological Health	36	47.22	19.70	3.28	40.56	53.89	19	81
Biology, Agrarian	6	57.00	15.09	6.16	41.17	72.83	34	69
Mix	125	51.65	16.50	1.48	48.73	54.57	17	75
Total	**350**	**49.18**	**16.63**	**.89**	**47.43**	**50.93**	**17**	**81**

Regarding area of knowledge, there is a greater interactivity in the Biological, Agrarian, Exact and Earth Areas. The highest score was achieved by periodicals from Biological-Health (81 points), Applied Social and Letters and Arts group, and also by mixed titles.

8 Size, format and the number of links

This comparison was only applied to aspects of interactivity, considering the assumption that these variables determine a strong influence in this indicator, rendering it unnecessary to observe them for hypertextuality (for its obvious influence) and hypermediation, whose attributes pertain to another dimension of the analysis. The results demonstrate that journals with a size of up to 10KB have less interactivity than those size between 10KB and 50KB and also between 50 KB and 100 KB. These two groups are equivalent in terms of interactivity. The test was applied to 370 titles, the total number of periodicals whose first page is available, and which were subsequently measured by the *Mozila* control tool.

Periodicals up to 10KB have less interactivity than those that from 10 to 500 and from 50 to 100. The last two are equivalent in terms of interactivity. Group 1 (the least interactive) has the titles with up to 10 KB and group two has the largest ones. It was also observed that the interactivity average in periodicals that do not include articles with HTML is bigger than the interactivity average in journals that do not include articles with HTML. The journals that have up to 50 links are less interactive than those last ones that have more than 100 links, and since the latter are equivalent in terms of interactivity they can form a single group.

9 Conclusion on Interactivity

Interactivity is obtained through more open and flexible languages, with the availability of a set of tools, products and services that will provide greater storage space in servers and databases, and greater capability of editors and authors. The results indicate that it has resources in headings to guarantee interactivity between journals and the scientific community using them. A total of 171 magazines had a score between 17 and 50 points and 178 magazines achieved scores above 50, with a maximum of 81 points, showing that the interactivity potential did not increase in all the journals of the same level. Neither was possible maximum level reached. When sizing interactivity in platforms, graphic and operational standardization is seen to determine common tendencies that segment the groups into interactive platforms.

To congregate a greater number of interactive services, according to the proposed tables, SD is the most interactive platform, as opposed to Scielo, the least interactive platform of the group. Area of knowledge can also interfere in the interactivity of journals, confirming that there is more interactivity in the Biological (agrarian), Exact and Earth areas. The area of Letters and arts represents the area of least interactivity. The size and number of links of the main page shows greater interactivity, bringing better results in journals that have articles with open formats such as HTML. In short, if the journal is on the SD platform it will have more than 100 links and 100 KB on the main page and will be potentially more interactive than any other.

10 Results for Hypertextuality

In order to measure the hypertextuality of the journals they have been grouped in nine variables. HTML language is a basic pre-requisite, for it provides flexibility from one to another point of the network structure. As occurs in all titles, this language is used in the general structure, for it observed the frequency of the HTML in the texts of articles, thus demonstrating the attempt to develop the main content of the periodical. Observation of the journals is partial (only three articles randomly chosen from each title) and has an ephemeral behavior that can be altered through the insertion of another similar language.

The variables related to hyperlinks are involved in the results of this phase of investigation. Conceptual hyperlinks in the articles received a greater score (10 points), followed by hyperlinks in the bibliographical references. The combination of the two resources means a higher larger score in the hypertextuality table. The automatic indexing of authors and articles received 05 points, for it was performed automatically, making the automatic insertion of contents in the databases possible, which in turn guaranteed availability of the information and the contents of the citations. It was not possible to check all the variables in all the titles in-

cluded in the sample (400), since the absence of part of the data did not affect the margin for security.

The amount of links also presented greater or less hypertextuality possibility, as well as the size of the main page of the journal, variables considered as important and which received a proportionally higher score. Most (184 journals) have up to 50 links in their opening page. Only 18.5% of the magazines use PDF as standard format in the body of the text of the articles, which means a lower score in terms of hypertextuality. However, even considering a closed text, there are versions of PDF where navigating inside the text is possible, proving the need for hypertextuality in network reading. Grouped internal (for connections with points inside the structure) and external hyperlinks (outside the structure) hyperlinks total the concrete possibilities for connections (with points inside the structure) and external (outside the structure) hyperlinks totals the concrete possibilities of displacement in the reading. They can accomplish a displacement without conceptual effect or carry through links that complement the understanding of the agreement of the arguments presented in a body of a text (article), thus materializing the objectives of a conceptual interlink, with a higher score (10 points). The correlation of contents is another service that demonstrates a high level of hypertextuality, found in only 61 titles that had received 10 points in the table. Only the GALE platform showed a good performance in the use of this resource.

11 Average Hypertextuality by Platform

The grouping of titles in relation to the common characteristics of each platform demonstrated that when dimensioning hypertextuality as a function of the established standardization, there are common tendencies that segment the groups of publishers into hypertextual platforms. As it grouped bigger hypertextual resources, the Gale platform is the platform that has greatest hypertextual capability, although it got the biggest score with two titles. Then there are the SD periodicals, statistically grouped with the OVID titles. After the Academic Press and Ideal magazines, the Scielo group of journals is the least hypertextually-enabled platform of the group.

12 Conclusion on Hypertextuality

Hypertextuality depends on more open and flexible languages, with the availability of a set of internal and external links complemented by tools that will result in greater storage space on servers and databases and in greater skills by publishers and authors. The results show that there is hypertextuality in most part of the titles. A total of 205 journals received outstanding scores by making links in the body of articles. However, hy-

pertextuality must be boosted by advances in the correlation between contents of different platforms. When dimensioning hypertextuality, graphic and operational standards are seen to determine common tendencies that segment the groups into more or less hypertextual platforms, demonstrating that the titles with the greatest hypertextuality are on the Gale platform. It is followed by the SD and OVID platforms. The Ideal and Academic Press platform comes in third. The Sielo platform is the least hypertextual.

13 Results on Hypermediation

Hypermedia is basically characterized by the use of audio and image resources in movement (kinetics) within the structure of journals. Only seven journals of the sample presented more complex resources, mostly (46.5%) showing movements (zoom) in graphics and tables in the body of articles to facilitate data display, thus configuring a hypermedia effect, albeit limited. About 143 titles (36.6%) do not have any primary hypermedia solution. Banners and signboards (graphics or images with repeat movement) are frequent, when applied in electronic format, as a resource to disseminate events and sites on the network, which does not characterize a conceptual hypermediation, which is a more complex characteristic.

Table 5. Presence of multimedia resources

		Frequency	Percentage	% Valid	% Accumulated
Valid	Non existent	143	35.8	38.6	38.6
	Graphic movement	172	43.0	46.5	85.1
	letter boards	13	3.3	3.5	88.6
	Graphic movement, letter boards	39	9.8	10.5	99.2
	All	3	.8	.8	100.0
	Total	370	92.5	100.0	
No data		30	7.5		
Total		**400**	**100,0**		

Only three journals (two HW and one SD) use kinetic resources in the body of the articles, receiving 10 points in the table, since this is the most advanced form to work with hypermedia resources, as a form of demonstration of the experiments. Multimedia effects are used in the journal article. The significance tests define only three subgroups. The Ideal and Academic Press platforms appear with an average degree of hypermediation and the Gale platform is not defined as being in the lower or average degree. The Blackwell platform presents the lowest degree of hypermediation.

14 Conclusions and recommendations

The attempt to measure characteristics, initially qualitative, is a challenge for the social sciences. The tables developed in this work demonstrate that it is possible to set rules for the partial understanding of a phenomenon when its configuration is not certain, in this case the electronic format of a publication. The characteristics of the electronic format were built from the grouping of specific variables, sizing the qualitative characteristics. Before that, however, it was necessary to analyze the profile of the electronic journals, drawing the profile of the general results of these variables, in order to unite them coherently to understand Interactivity, Hypertextuality and Hypermedia.

When establishing a relationship between the three characteristics of the electronic format, it can be concluded that the direct relationship between them is non-existent. The most interactive groups are not necessarily those that have greatest hypertextual potential. Hypermediation does not have a determining action on interactivity.

Table 6. Characteristic s of the electronic format

	Interactivity	Hypertextuality	Hypermediation
Greater Potential	SD	Gale	HW
Less Potential	Gale	Scielo	Gale

It is true that a greater number of resources in the platform means a better chance of extensive action. The Scielo platform, for example, presents few resources as opposed to the others, maintaining a lower score in all indicators, being outstanding in language only. But there are more resources on the SD platform, allowing greater representation in actions for interactivity, the first indicator for extensive communication. Hypertextuality is configured in an interactive action,

But it is also the type of language that needs to be improved in actions of correlation to contents such as the ones that exist on the GALE and OVID platforms, and also in the improvement of bibliographic connections. Audio resources do not appear in this sample, that showed scant progress in resources with kinetic images in the body of articles.

References

(Boyce 2000) Boyce, Peter. «The power of interlinked information». In: INTERNATIONAL CONFERENCE OF SCIENCE (10th: 2000: Rio de Janeiro). (Rio de Janeiro: IFSE, 2000).

(Braga 1982) Braga, G. M; Obehofer, C. «Diretrizes para a avaliação de periódicos científicos e técnicos brasileiros». *Revista Latinoamericana de Documentación*. v. 2, n.1 (Jan./Jun. 1982).

(Brown 1999) Brown, J. Gary. «La revista electrónica: los desafíos de autores, lectores y editoriales». In: *Revistas Científicas en América Latina*. (México: Interna-

cional Council of Scientific Unions; Universidad Nacional Autónoma de México, 1999).

(CAPES 2002) *CAPES* [electronic resource]. <www.periodicos.capes.gov.br>. [cited 2002].

(COSTA 1999) COSTA, S. M. S. *The impact of computer usage on schorlarly communication amongst academic social scientists*. 1999. Doctoral Thesis – Loughborough University, by Arthur Jack Meadows, Leics.

(COUZINET 1999) COUZINET, V.; MUSZKAT, Estera. «O interesse das revistas brasileiras e francesas de biblioteconomia e ciências da informação pela revista eletrônica no período de 1990-1999». *Ciência da Informação*. v. 28, n. 3 (Set./Dez. 1999), p. 276-283.

(HARNAD 1996) HARNAD, S. «Implementing peer review on the net: scientific quality control in scholarly electronic journals». In: PEEK, R.; NEWBY, G. (eds.). *Scholarly Publication: The Electronic Frontier*. (Cambridge MA: MIT Press), p. 103-108. Available online: <http://www.princeton.edu/~harnad/>. [cited 10 March 2002].

(HARNAD 2000) «Open archiving for an open society: freing the scholarly and scientific research literature on-line throught public-self archiving». In: INTERNATIONAL CONFERENCE OF SCIENCE (10th: 2000: Rio de Janeiro).

(MIRANDA 2002) MIRANDA, Antonio; SIMEÃO, Elmira. «A conceituação de massa documental e o ciclo de interação entre tecnologia e o registro do conhecimento». *DataGramaZero*. v. 3, n. 4 (Ago. 2002). <http://www.dgzero.org/ago02/Art_03.htm> [cited 2002].

(SIMEÃO 2003) SIMEÃO, Elmira; MIRANDA, A. «Comunicação Extensiva e a linguagem plástica dos documentos em rede». In: *REPRESENTAÇÃO e Organização do Conhecimento: Série estudos avançados em Ciência da Informação*. (Brasília: UnB/CID, 2003).

(TARGINO 1998) TARGINO, Maria das Graças. *Comunicação científica: o artigo de periódico nas atividades de ensino e pesquisa do docente universitário brasileiro na pós-graduação*. [Brasília: Universidade de Brasília, 1998]. Tese (Doutorado em Ciência da Informação) – Departamento de Ciência da Informação e Documentação, Universidade de Brasília.

(TARGINO 2001) TARGINO, Graça, et al. «Perfil de periódicos eletrônicos em medicina e biologia: grupo e-pub». *Revista de Biblioteconomia de Brasilia*. v. 25, n.1. (jan/jun 2001).

(THOMPSON 1998) THOMPSON, J.B. *A mídia e a modernidade: uma teoria social da mídia*. Petrópolis: Vozes, 1998.