EXTENSIVE COMMUNICATION AND THE FORMAT OF THE ONLINE SCIENTIFIC JOURNAL

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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 uncover an extensive action, different from traditional practices. The extensive communication — a.k.a. the emblematic model of network interactions — comes as much in new forms of document production, as well as 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, being all by main international publishers, as made available at CAPES portal (www.periodicos.capes.gov.br). The portal offers access to the complete text of a lot of publication, encyclopedias, databases, etc., supplied by editors and international distributors. In all the platforms we can find specific search tools that make possible bibliographical searches, alert services and other products and services, as well as information of technical and scientific interest. A data collection was assembled through a checklist for 70 variables, and the results were inserted in a spreadsheet for an initial analysis. Afterwards, data were cross-examined through the use of the SPSS software for statistical analysis. This investigation has shown that the new format stands out through the insertion of tools and services, strengthening extensive communication by means of interactivity, hypertextuality, and hypermediation, a. k. a., the main distinctive features of the electronic format. After technological resources mature the online format, they establish a new perception of the journal contents. The variables were grouped according to their pertinence to the studied aspects in the electronic format, and were expressed in percentage ratios. The results display the dependence of the electronic on the printed format. By combining all the variables once again to measure the levels of interactivity, hypertextuality, and hypermediation, journals were grouped by platform (i. e., the online publishing base as, for example, Scielo, Science Direct, Gale, OVID, etc.) to test for interactivity, hypertextuality, and hypermediation levels among platforms. The descriptive measures of indexes were first calculated: average, standard deviation, minimum value, maximum value, percentage ratios — among other data — to confirm level variations of each one of the characteristics among the platforms. Observing the grouping by platform, the results have shown evidence that a direct relationship (in other words, the most interactive groups are not necessarily the most hypertextual or hypermediatic ones) does not exist among the three characteristic features of the online electronic format. The online journal is using a communication in a differentiated dimension from the traditional system. The performance of the journals was also evaluated comparatively among platforms. At this stage in the evolution of electronic publishing, serious experimentation is needed. Models like CAPES Portal should be developed, allowing for continued expansion and enhancement of scholarly communication.

Keywords: extensive communication; interactivity; hypertextuality; hypermediation; electronic journal; scientific journal; CAPES Portal; scholarly communication.

INTRODUCTION

Official representative of the formal, hierarchical and vertical communication, the scientific journal was structurally modified by the forms of presentation and digital access. It still is the priority means of dissemination, but it unveils itself as a tool to identify changes undertaken by an extensive communication model [1] stimulated by the new networks of telecommunication. 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 viable differentiated procedures and access, a pro-active availability that favors the virtual browsing.

The electronic journal started its migration to the network carrying within itself production rituals and traditional criteria of evaluation. The pioneer experiences of insertion of primary publication, according to Couzinet and Muskat [2], happened in 1978 at the New Jersey Institute of Technology (USA), with the advent of the Electronic Information System. Later on, the Computer Human Factor (1980-1984) was published in England and the Journal of Revue (1084-1987) in France. Brown 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". [3:44]*

The changes brought to the extensive model of communication, considered to be more ephemeral and prompt, must reach the practices of evaluation of scientific literature, motivating significant improvements in printed journals. For Harnad[4], 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, for the restrictions originated from the culture of the 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, above limits of incompabilities in the archives and software. Since they are the priority channel for the diffusion of science, the printed and electronic journals should keep its place in the preference of the community if they are to change these difficulties into opportunities.

Boyce [5] 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. Software used to monitor the accesses improved the services, adjusting them to the demand. The result showed in this context, a unanticipated, different and not viable vision. Thompson explains "The ways of communication are spinning wheels to weave in the modern world and, when using these ways, the human being manufacture webs of meanings for themselves ". [6:20].

THE CAPES PORTAL

The decade of the 90´s harmed the national program of acquisition of scientific literature in Brazil, affecting periodicals collection 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 for those that had post-graduation programs, aiming at keeping up the collections up-to-date. The significant decrease of the resources in the 90´s requested that rigorous procedures were adopted not only for the acquisition of new titles but also in keeping up-to-date the periodicals available in the Brazilian universities. The decentralization in the distribution of resources, that were directly distributed to the IES, and the incentive of commutation constituted the CAPES strategy, in 1999, when it subscribed to the Web of Science, and also provided financial resources, aimed at forming consortium for periodicals sharing.

In 2000, three lines of access tried to facilitate the access to scientific journals: an investment of 12 millions (repassed to IES), 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 the electronic portals: www.periodicos.capes.gov.br

Since the implementation of the portal, the results had been great but they were not enough to guarantee, besides the access, better visibility to the national titles. Since 2000, professors, researchers, pupils and staff members from 97 higher education and research institutions in the country can have access to the international scientific production, through terminals linked to the Internet. There are cases of free access through open network.
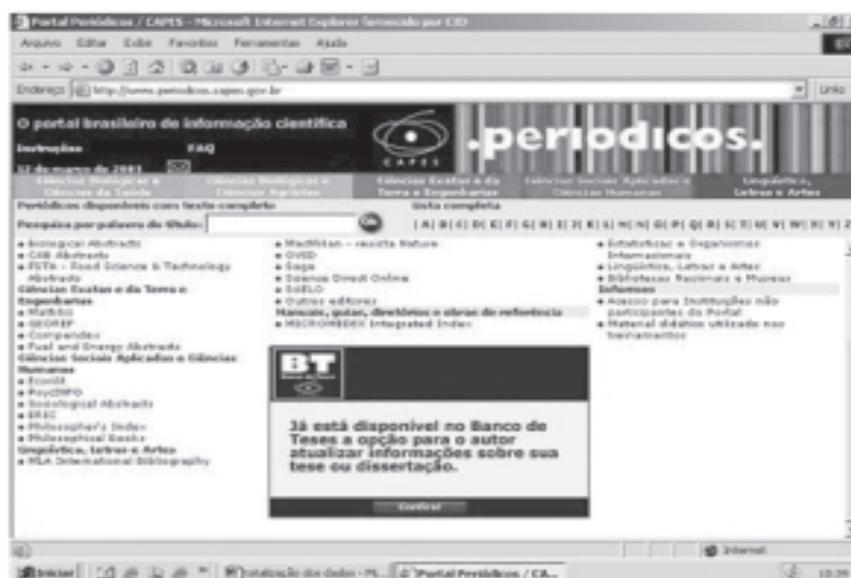
FIGURE 1 – MAIN PAGE OF THE PERIODICALS PORTAL KEPT BY CAPES (SAMPLE CARRIED OUT IN JUNE, 2002)

The portal gives access to the complete text of a lot of publications, besides reference periodicals, encyclopedias, databases, etc., supplied by editors and international distributors. In all the main platforms we can find specific search tools that make possible bibliographical searches, 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 Institution of Electrical Engineers (IEE) demand special passwords possessed only by participant libraries.

INSTRUMENTS AND METHODS

In the selection phase, the portal exhibited, according to CAPES, 2,568 titles, including abstract journals. In the general listing of titles, however, there were titles taken for the sample, since there existed only 2,412 titles with available URLs. The sample congregated 400 periodicals: only 28 titles of this group integrated the restricted platforms.

TABLE 1. NUMBER OF TITLES BY PLATFORM

PLATAFORM		NÚMBER OF PUBLICATIONS
1.	ACS	33 publications from the American Chemical Society.
2.	APA	39 publications from the *Psychological Association* e from the *Psychological Association and access to the database PsycycINFO with weekly updating.*
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 Electronics *Engineers* (IEEE) e 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. Direct	Science	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 (sample carried out in june 2002)

To try precise measurements in electronic format of periodicals, variables were defined that would display each one of the attributes (profile, interactivity, hypertextuality and hypermediation). The several variables incorporated to 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.

The applicants 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 the collection and data storage.

· SPSS (Statistical Package for the Social Science- 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 variable, tabulation, application of techniques of quantitative analysis, and tests.

The tool MOZILA, navigator for the net, assisted in the correct recovery of data as the URL, the total size (in bytes) of the opening of each periodic one (homepage or index), the total

number of links and forms of the main page, beyond the used codification of characters as standard in the main platform where the magazine is deposited.

TABLE 2 – DESCRIPTION OF VARIABLES OF EACH ATTRIBUTE.

	PROFILE	VISIBILITY	INTERACTIVITY	HIPERTEXCTUALITY	HIPERMIDIATION
A T R I B U T E S	Title	Content renewal	Content Evaluation: Format evaluation (Products and services) Format (Products e services)	Links: Internal Links	Audio Emission(Audio Reception (Sound) Signs/banners
	URL	Content Recovery			
				External Links	
	ISSN/EISSN		Records		
		Network access	Chats or forums	Conceptual Authorship Links	Moving graphics
	Area				
	Country	Number of access	Alert services	Subject conceptual links	Cinetic graphics
			FAQs	Texts and citations cross-operations	Kinetic images and/or tridimentional images
	Nature of the periodical	Idiom (s)	E-mail author		
	Responsible Institution	Index databases	E-mail editor	Codification	
			E-mail journal		
	Type of format	Transmition			
		Impact			

GENERAL PROCEDURES FOR MEASUREMENTS

For the measurement of each characteristic of the electronic format (Interactivity, hypertextuality, and hypermedia), the data was grouped in accordance to its pertinence to the studied aspect: the qualitative variables are expressed in proportions and the quantitative variables (yes or no, 0 or 1) are tested to check its absolute distribution. The results of the totalization (qualitative and quantitative variables) form a general profile of the journals selected for the sample. Later on, the combinations look for Interactivity, Hypertextuality and Hypermidiation indicators. In the analysis of Interactivity, the journals are grouped by platform (editor), by size and number of links in order to test if there was a bigger or smaller between the groups. The same procedure was adopted for the measurement of hypertextuality and hypermidiation.

RESULTS BY CHARACTERISTIC – INTERACTIVITY

To measure the interactive characteristic of the journals, 25 variables that were linked to aspects of the interaction between the user with other users of the system were grouped. The interactivity table punctuated each of the magazines between 0 and 90 points. Each variable had a specific punctuation and only the services of alert, the journal personalization and research, and the content and correlation sharing were contemplated with 10 points. This maximum punctuation (10 points) results from the specificity of the variable considered to be the utmost representation in interactive terms. Other items, such as indexation of authors and subjects received 5 points as

well as the indexation of journal included in referential databases. The less significant variables for measurement received one or two points each one.

Excluded from this analysis were 28 journals of the IEEE and others 20 that the variable had not gotten points in all, thus totalizing 12.3% (48 periodic ones) without the measurement of interativictivity. A total of 352 headings had been evaluated (88% of the total); being that the most interactive journal received 81 points and the less interactive, 17 points. The results show that it has resources of interactivity in the biggest part of the periodic in number enough and with safe margins of error to guarantee the formation of the interactivity table. A total of 171 magazines (48, 6%) had punctuation between 17 and 50 points and 181 periodic ones (51, 4%) had had bigger punctuation that 50, average value in the measurement. But three journals had shown overhead, that is, 17 points. A total of 50 headings, the larger group of this table, obtained 69 points of interactivity, characteristic evaluated in 88% of the 400 journals of the sample.

MEDIUM OF INTERACTIVITY BY PLATFORM

The establishment of standards and routines make possible the grouping of titles by platforms, and of the group of editors that manage journals. It made possible the option of adopting this variable as reference for it would allow a bigger precision in the dimensioning of interactivity. It is observed, once more, in function of established standards, that there a common tendency that segments the journals into more or less interactive groups. Because it assembled a larger number of interactive groups, according to the proposed table, SB is the platform with the largest punctuation (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 counted data for these platforms confirms that the merging of the publishing houses and the establishment of standards caused a balanced punctuation, being that currently the Ideal and Academic Press have adopted in their interface SD standards

TABLE 3. AVERAGE OF PUNCTUATION OF INTERACTIVITY 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 e Acad Press	49,72	8,50	8,3%
Total	49,15	16,63	100,0%

The platforms Gale (35, 95 points) OVID (22, 57) and Scielo (the least active of all with an average of 19, 3 points) are considered the less interactive. The Platforms ACM, AIP and HW had been removed from the final verification for presenting a non- significant number of titles, being not acceptable to the total of the sample, leaving the acceptable margin of error for the total of the sample. These platforms, therefore, did not punctuated sufficiently in order to join the interactivity indicator, being thus excluded from the final result of this analysis.

INTERACTIVITY BY AREAS OF KNOWLEDGE

The interactivity of the platforms was tested still in relation to the area of knowledge, in order to verify if this variable would imply in a greater or minor interactivity between the groups. The tests followed the same logic used with the variable platform, since the results also grouped the titles in a significant and revealing form. 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		.Mín	Máx
					Inf.	Sup.		
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	17	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

In relation to the area of knowledge, it is observed that there is a larger interactivity in the Biological, Agrarian, Exact and Earth Areas. The greatest punctuation was reached by periodicals from the Biological-health (81 points), the Applied Social and Letters and Arts group and also by mixed titles

SIZE, FORMAT AND THE NUMBER OF LINKS

Applying the same methodology for the measurement by platform and area of knowledge to tests in order to observe the interactivity in relation to the size of the opening pages of the periodicals and number of links. This comparison was only applied in relation to aspects of interactivity, considering the assumption that these variables determine t a strong influence in this indicator, making it not necessary to observe them for hipertextuality (for its obvious influence) and hipermediation, whose attributes belong to another dimension of the analysis. The results demonstrate that journals that have size up to 10KB have less interactivity than those with size between 10KB and 50KB and also between 50 KB and 100 KB. These two last groups are equivalent in interactivity terms. The test was applied to 370 titles, the total number of periodicals whose first page is available, and that were measured later on by the MOZILA control tool.

The periodicals with size up to 10KB have less interactivity than those that have from 10 to 500 and from 50 to 100. These last two ones are equivalent in terms of interactivity. In the group 1 (the less interactive) are the titles with up to 10 KB and in group two the biggest periodicals. It was also observed that the average of interactivity in periodicals that do not include articles with HTML is bigger than the average of interactivity in the journals that do not include articles wit HTML. The journals that have links up to 50 are less interactive than those last ones that have

more than 100 links, and since these last one are equivalent in terms of interactivity, they can form a single group.

CONCLUSION ABOUT INTERACTIVITY

Interactivity is conquered through more open and flexible languages, with the availability of a set of tools, products and services that will make possible a bigger storage space in servers and databases and a larger capability of editors and authors. The results indicate that it has resources in the larger part of the headings to guarantee interactivity between journals and the scientific community that uses them. A total of 171 magazines had punctuation between 17 and 50 points and 178 magazines had gotten bigger punctuation that 50, with the maximum of 81 points, showing that the interactivity is still not had its potential increased in all the journals of the same level. The possible maximum level was also not reached. When dimensionazing the interactivity in the platforms, it is observed that the graphic and operational standardization determine common tendencies that segment the groups in platforms more or less interactive platforms.

For congregating a greater number of interactive services, according to the proposed tables, the SD is the most interactive platform, on the contrary of Scielo, the less interactive platform of the group. The area of knowledge can also interfere in the interactivity of the journals, confirming that there more interactivity in the Biological (agrarian), Exact and Earth areas. The area of letters and arts represent the area of lesser interactivity. The size and number of links of the main page shows a larger interactivity, bringing about better results in journals that show articles with open formats such as HTML. In sum, if the journal is in the SD platform, it will have more than 100 links and 100 KB in the main page, and will be potentially more interactive than any other.

RESULTS FOR HIPERTEXTUALITY

In order to measure the hypertextuality of the journals they have been grouped in nine variables that matched register the formation of groups more or less hipertextuals. The HTML language is a basic pre-requisite, for it provides flexibility from one to another point of the network structure. As in all titles there is the usage of this language in the general structure, for it observed the frequency of the HTML in the texts of articles, thus demonstrating the intent to develop the in the main content of the periodical. The observation of the journals is partial (only three articles, randomly chosen from each title) and shows an ephemeral behavior, that can be altered through the insertion of another similar language.

The variables related to hyperlinks disclose with property the results of this phase of investigation. Conceptual hiperlinks in the articles received greater punctuation (10 points), followed for hyperlinks in the bibliographical references. The combination of the two resources means a larger punctuation in the hipertextuality table. The automatic indexation of authors and articles got 05 points, for it was automatically performed, making it possible the automatic insertion of contents in the databases that, in turn, made available the information and contents of the citations. It was not possible to check all the variables in all the titles included in the sample (400), since the absence of part of the data did not affect the margin for security.

The amount of links also evidenced a greater or lesser hipertextuality possibility, as well as the size of the main page of the journal, variables that are considered important and that received proportionally bigger punctuation. The major part (184 journals have up to 50 links in its opening page. Only 18.5% of the magazines use PDF as format standard in the body of the text of the articles, what it implies in minor punctuation in hipertextuality. However, even considered a closed text, there are versions of PDF where there is a possibility of navigation inside the text, proving the

necessity of hipertextuality in the 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 of the structure) and external (it are outside the structure) hyperlinks totalizes the concrete possibilities of displacement in the reading. They can accomplish a displacement without conceptual effect or carry through linkings 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 bigger punctuation (10 points). The correlation of contents is another service that demonstrates high level of hipertextuality, being 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.

AVERAGE OF HYPERTEXTUALITY BY PLATFORM

The grouping of titles in relation to the common characteristics of each platform demonstrated that when dimensioning the hipertextuality in function of the established standardization, there are common tendencies that segments the groups of publishers in more or less hipertextual platform. Because it grouped bigger hipertextual resources, the Gale platform is the platform that has bigger hipertextual capability, although it was able to get the bigger punctuation with two titles. After, 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 hipertextually capable of the group.

CONCLUSION ON HIPERTEXTUALITY

The hipertextuality depends on the more open and flexible languages, with the availability of a set of internal and external links complemented by tools that will result in a larger storage space in servers and databases and a larger skills by publishers and authors. The results show that there is hipertextuality in most part of the titles. A total of 205 journals had stood out in punctuation by making linkages in the body of articles. However, the hipertextuality must be potentialized with advances in the correlation between contents of different platforms. When dimensioning the hipertextuality, it is observed that the graphic and operational standards determine common tendencies that segment the groups in platforms more or less hipertextuals, demonstrating that the titles with the biggest hipertextuality are in Gale platform. After that, it appears, as media of equivalent hipertextuality, the SD and OVID platforms. In third, the Ideal and Academic Press platform. The less hipertextual is the Sielo platform.

RESULTS TO HIPERMEDIATION

The hypermedia basically is characterized by the use of audio and image resources in movement (kinetic) within the structure of the journals. Only seven journals of the sample presented more complex resources, being that in great part (46,5%) shows movements (of zoom) in graphics and tables in the body of articles to facilitate the visualization of data, what configures an hypermedia effect, a still limited one. About 143 titles (36, 6%) do not have any primary hypermedia solution. Banners and signboards (graphics or images with repeated movement) are frequent, when applied in electronic format, as a resource to disclose events and sites in the network, what does not characterizes a conceptual hipermediation, a characteristic of a bigger complexity.

Only three journals (two of HW and one of the 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 the hypermedia resources, hitching the resources as form of demonstration of the experiments. The

multimedia effects are used in the article of the journal. The significance tests define only three subgroups, being that most of the platforms are in the highest hipermidiation degree. The Ideal and Academic Press platforms appear with average degree of hipermidiação and the Gale platform, is not defined as being in the lower or average degree. The Blackwell platform presents the least degree of hipermidiation.

TABLE 5 – PRESENCE OF MULTIMEDIA RESOURCES

		Frequency	Percentual	% Válid	% Accumulated
Valid	Non exintent	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	
Without data		30	7,5		
Total		400	100,0		

CONCLUSIONS AND RECOMMENDATIONS

The attempt to measure characteristics, at the start qualitative, represents a challenge to 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 specific of publication. The pointers that had disclosed the characteristics of the electronic format were built from the grouping of specific variables, dimensioning the qualitative characteristics. Before that, however, it was necessary to analyze the profile of the electronic journals, drawing the the profile of the general results of these variables, in order to uniting them in a coherent way in order to understand the Interactivity, the Hypertextuality and the Hypermedia.

When establishing a relation between the three characteristics of the electronic format, observing the one, observing the grouping by platform, it is concluded that the direct relation between them is non-existent. Or either, most interactive groups are not necessarily those that have the most hipertextual potential. The hipermediation does not have a determinant action for interactivity, meaning a farther resource of communication in a differentiated dimension.

TABLE 6 - CHARACTERISTIC S OF THE ELECTRONIC FORMAT

Characteristic s of the electronic format			
	Interactivity	Hipertextuality	Hipermidiation
Bigger Potencial	SD	Gale	HW
Less Potencial	Gale	Scielo	Gale

It is certain that the more resources there are in the platform, the greater are the chances of an extensive action. The Scielo platform, for example, presents few resources in relation to the others, keeping a lower punctuation in all indicators, with prominence only in relation to the language.

But the number of resources is greater in the SD platform, allowing a bigger representation in the actions for interactivity, the first indicator for one extensive communication. The hypertextuality is configured in a interactive action,

But it also is the type of language that needs to be improved in actions of correlation to contents such as the ones that exist in the GALE and OVID platforms and also in the improvement of bibliographic connections. The audio resources do not appear in this sample that showed little advances in the resources that have kinetic images in the body of the articles.

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