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Evolution of the formal quality indicators of the Web spaces of University Libraries in Spain

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Abstract

The need to measure and assess the electronic information made available by the Web has given rise to the development of indicators that can be used to evaluate the final quality of this information. Web spaces of the informational units, which include virtual university libraries, are prime candidates for such a process of assessment. The present study has a look at the quality of the informational services supplied by virtual university libraries in Spain, adopting as the variable of analysis the evolution that certain quality indicators of a formal character have exhibited over an exemplary period of six months. The interpretation of our results makes manifest an overall satisfactory evolution, though the breakdown by regions or Autonomous Communities of Spain reveals deficiencies in some cases.

Keywords

Virtual university libraries, Spain, formal quality indicators, evolution

1. Introduction

If we take a good look at the literature (Bar-Ilan, 2001; Thelwall, 2008), we see that since the mid-nineties, the models of informetric indicators have found applications in the environment of the Internet in general, and to the World Wide Web in particular. This has contributed to the development of new realms of research respectively known as *Cybermetrics* and *Webometrics*. This need to measure and assess the electronic resources of the web stems from the constant increase of these resources and the doubts that the final user harbours as to the ultimate quality of certain information. Although it is a generalized problem, it especially affects the "web spaces" —the expression used by Smith, 1999— of the informational units (Ramos-Simón, 1995, 2003), which include virtual libraries, offering library and documental services through the Internet, and more specifically, web technology (Bawden and Rowlands, 1999; Fitzgerald and Galloway, 2001).

In order to study these web spaces and evaluate and compare the quality of their services, there are a number of different models of analysis. Quality indicators can be applied to the sets of web spaces of virtual libraries in general (Falk, 1999; Joint, 2001; Clyde, 2004; Novljan and Žumer, 2004), or of university libraries in particular (Clyde, 1996; Clausen, 1999; Osorio, 2001; Chao, 2002). Yet because these models involve characteristics or indicators that are imprecise and difficult to quantify, it is beneficial to assess university library webs through other models based exclusively on the analysis of formal indicators, which can be extracted automatically, thereby guaranteeing greater objectivity in the results (Woodruff, et al., 1996; Nicholas, Huntington and Williams, 2002; Faba-Pérez, 2003, Faba-Pérez, Guerrero-Bote and Moya-Anegón, 2004, 2005). Very few research efforts are directed toward the topic of our study, that is, the formal quality indicators of the university library web spaces, except for the work by Stover and Zink (1996) and a handful of studies focusing exclusively on the formal indicators of accessibility (Craven, 2000; Spindler, 2002; Providenti, 2004; Schmetzke, 2005). In the environment of university webs, more research is focused on the network of links that exist between the universities and their departments (e.g. Thomas and Willett, 2000; Thelwall and Smith, 2002; Bar-Ilan, 2004a, 2004b; Qiu, Chen and Wang, 2004; Li, et al., 2005a, 2005b; Park and Thelwall, 2006; Thelwall and Zuccala, 2008) than on the analysis of characteristics or indicators, although some researchers look into both aspects techniques (e.g. Pinto-Molina, et al., 2005).

The present study is based on the hypothesis that we may analyze the quality of the services of the web spaces of university libraries (in this case, within Spain) by using as the variable of analysis the evolution

evidenced by their various formal quality indicators over a period of six months. The selection in this study of formal quality indicators previously used by Faba-Pérez, Guerrero-Bote and Moya-Anegón (2004, 2005) in their investigations and, therefore, validated by them, allow us to ensure the objectivity of the results.

2. Material and methods

2.1. Material

Our study population comprises the web spaces of the university libraries throughout Spain. We obtained the population by contrasting the following official electronic sources:

1. Directory supplied by the *Consejo Superior de Investigaciones Científicas* (CSIC): ***http://www.csic.es/cbic/webuni.htm*** *(January 2005)*

2. Directory supplied by the *Red de Bibliotecas Universitarias* (REBIUN): ***http://bibliotecnica.upc.es/Rebiun/nova/directorios/bibliotecas_rebiun.asp*** *(January 2005)*

3. Directory supplied by RedIris : ***http://www.rediris.es/recursos/centros/univ.es.html*** *(January 2005)*

Having compared these sources, and having eliminated from the study the library web space of the Universidad Alfonso X due to problems of restricted access, we elaborated a table with the 68 web spaces to be studied (**Annex I**)

2.2. Methodology

In this section we delimit the formal quality indicators that will allow us to obtain objective data upon which to apply a model for web space evaluation based on the temporal evolution of the quality indicators. Following the methodology described by Faba-Pérez, Guerrero-Bote and Moya-Anegón (2004, 2005), Table I shows the indicators used. They are divided into negative and positive indicators depending on their significance with respect to information retrieval. This methodology has been chosen for their ability and strength to be applied to any field on the Internet, including university libraries.

Table I. Formal Quality Indicators

NEGATIVE INDICATORS	POSITIVE INDICATORS
Erroneous Internal Links	Small Pages
Erroneous External Links	Updated Pages
Erroneous Anchors	Metadata
Untitled Pages	"Dublin Core" Metadata
Slow Pages	External Links
Pages without Image Attributes	HTML Links
Pages Not Updated	Multimedia Files
Links with Non-Critical Problems	
Deep Pages	

Below is a brief description of each one.

Negative indicators:

Erroneous Internal Links: indicating the number of broken internal links of the web space. These misleading links constitute one of the major problems of a web space.

Erroneous External Links: indicating the number of broken external links of the web space. The external links that misdirect the user are an even more important problem than the broken internal links.

Both the external and the internal erroneous links can be traced to one of the following causes:

File not found: the file in question may have been eliminated or moved, and cannot be located.

Impossible to establish connection: if the Server where the linked file is situated is turned off, or too busy, the file cannot be accessed.

Server not found: if Server of the linked file does not exist.

Time out: a lack of coordination in the speed of reply of the linked Server and the waiting time of the navegator being used.

Erroneous Anchors: indicating the number of wrong anchors of the web space, that is, the problems of hypertextual linking to parts of a document. The fact that they are erroneous impedes access to the information on the page and is therefore a negative indicator.

Untitled Pages: they lack the hmtl tag "*title*", or present empty contents. As the title will speed one´s grasp of the information to appear on a given page, its absence or the fact that it is empty must be considered a negative aspects.

Slow Pages: taking too long to download. It has been shown that the average waiting time for a user to download a page is 20 to 30 seconds, for pages under 50 KB in size. Therefore, if a web space has pages of a greater size, they might not be viewed by the user.

Pages without Image Attributes: that is, lacking the tags "*height*", "*width*" or "*alt*". The first two attributes warn the navigator that there are images, and so less time is needed to interpret the pages; the alternative text gives a brief description of the image, allowing the user to visualize the pages without necessarily downloading the images. This reduces waiting time for the user, and so the lack of these attributes would constitute a problem for information access.

Pages Not Updated: if pages have not been modified in the last six months, the information is likely to be obsolete. Therefore, information that is not updated periodically must be seen as a negative characteristic.

Links with Non-Critical Problems: including links to web spaces that do not work properly for some relatively insignificant reason, usually one of three causes:

Temporary redirection: this happens when the link to a file with a URL address resends it directly to another address that substitutes the first in a temporary way, causing a delay in the process.

Permanent redirection: unlike the above, this happens when the file to be accessed has been moved or erased, and is redirected to the new address (the solution being to modify the URL of the target file).

Others: they may be errors of the sort "*No connect*", if the link is correct but the file is empty, or "*Illegal Ref.*", when the route to the target file is assumed, or when there are minor problems regarding syntax.

Deep Pages: these need more than four clicks on the mouse to move from the main page. From an informational standpoint, these pages interfere with access but not with contents (furthermore, the number of clicks is necessarily tied to the size of the web space), meaning it can be considered a slightly negative characteristic, of minor significance.

Positive indicators:

Small pages: less than 3 KB in size, meaning they can be downloaded quickly, and make it easier and faster for the user to view the information.

Updated Pages: it is a positive characteristic when the pages have been modified in the past month.

Metadata: meaning the different types of META tags, elements that must be placed at the head of the web pages and specify information about the document itself. We underline the convenience of *Dublin Core* (DC)metadata, which stand as an international and multidisciplinary attempt to establish a standard metadata model that defines a set of properties recommended for electronic bibliographic descriptions in order to favor interoperability among different descriptive models.

External Links:having this type of links lends the web space two positive parameters: *Luminosity* —the more the links, the greater the luminosity— and *External validity* —the index of valid external links of the web space. In addition, the fact that one has external links that have been selected and evaluated following some quality criterion and that are reasonably updated would be a key quality indicator for assessing the contents of the space.

HTML Links: The html links of every web space offer a view of the independence or autonomy of the web space. The greater the number of links, the less the degree of isolation, and therefore a more positive consideration.

Multimedia Files: indicating the images and the audio and video files of each web space. Most of the research on design and evaluation of web spaces holds this to be a positive characteristic, though we must remember that at times their size may mean slow downloading.

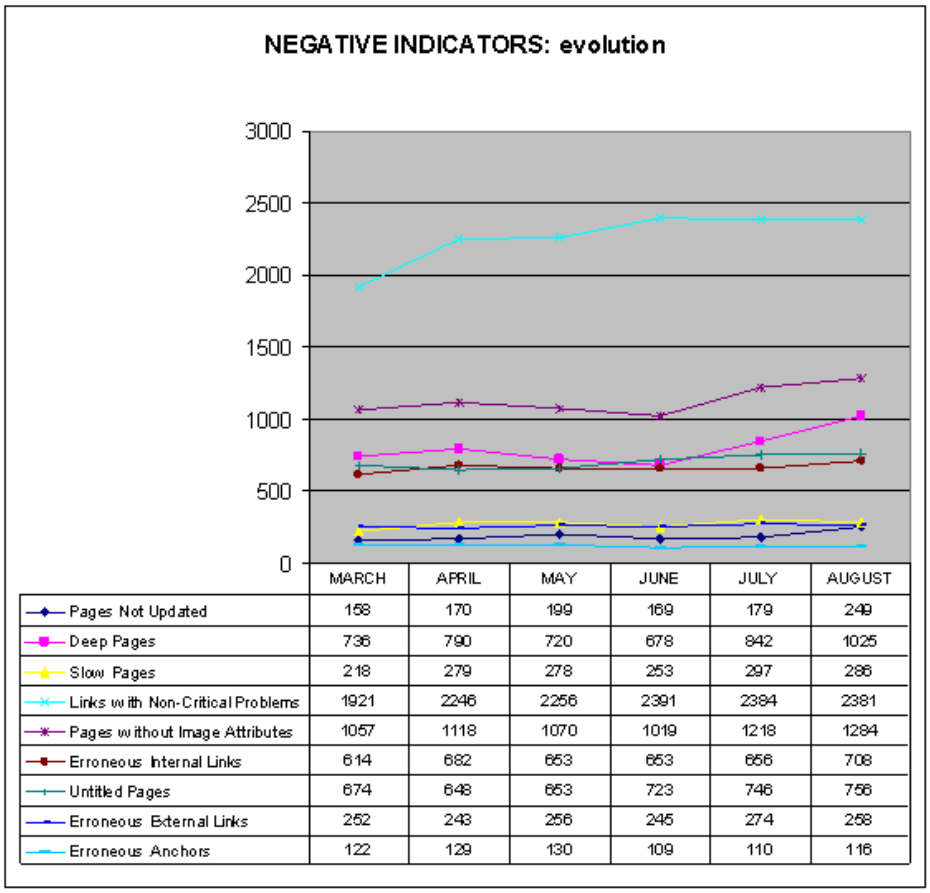
In order to obtain the data for each one of these formal quality indicators of the web spaces pertaining to the university libraries in Spain, we ran a market link examiner that crawled monthly (from March to August of 2005) over every web space of our population, automatically extracting the values associated with their indicators. Due to Web dynamics, before proceeding with this automatic monthly crawling over each one of the 68 URLs of study, we confirmed any possible variation thereof.

3. Results and Discussion

The graphs offered below show the global results obtained by applying the methodology of study. The first two figures (1 and 2) reveal the evolution over the six-month time span (March/August 2005) of the formal indicators for the set of 68 web spaces corresponding to Spain´s university libraries, on the basis of the mean values obtained for the indicators. Figures 3 and 4 show the evolution taking into account the distribution of the 68 university webs by region (one of the 17 Autonomous Communities of Spain, denoted AC) the overall averages obtained with regard to the quality indicators studied.

In Figure 1, whose distributions are ordered in view of their increase over time, we see a generalized increase, from March through August, of all the negative indicators analyzed (except for the Erroneous Anchors, whose mean declines by 4.97%). Thus, the Pages No Updated increase 57.97%, the Deep Pages show an increase of 39.28%, the Slow Pages are 30.70% more prevalent, the Links with Non-critical Problems increase 23.93%, the Pages without Image Attributes increase by 21.41%, the Internal Erroneous Links by 15.30%, the Untitled Pages increase by 12.20%, and there are 2.32% more Erroneous

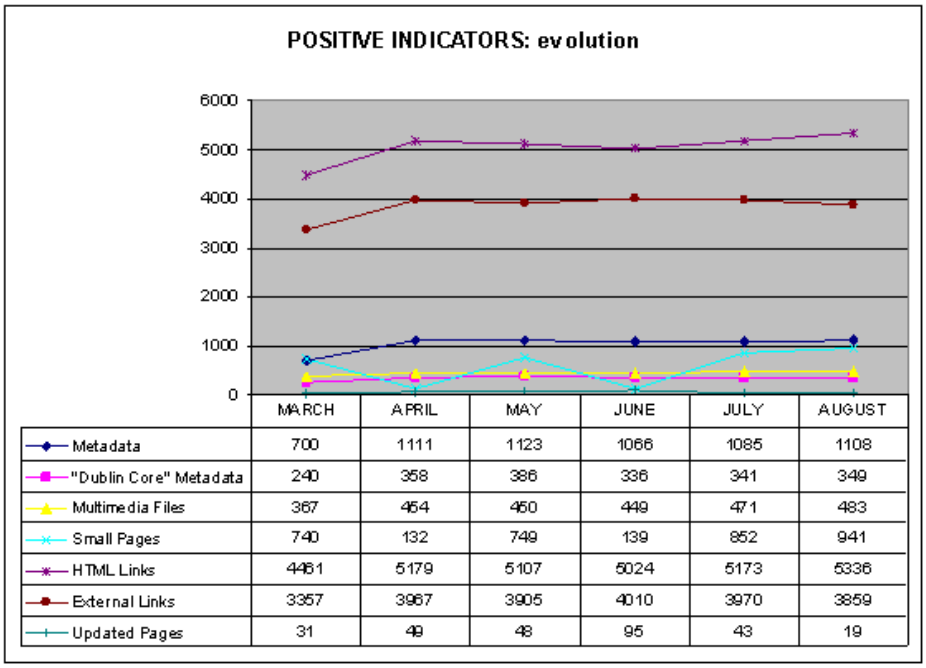
External Links. On the other hand, as favorable aspects we can point out that the External Erroneous Links, a very negative quality indicator for Information retrieval, and therefore for virtual libraries as well (Faba-Pérez, 2003) is the negative characteristic showing the slightest increase over the period of study.



	MARCH	APRIL	MAY	JUNE	JULY	AUGUST
Pages Not Updated	158	170	199	169	179	249
Deep Pages	736	790	720	678	842	1025
Slow Pages	218	279	278	253	297	286
Links with Non-Critical Problems	1921	2246	2256	2391	2384	2381
Pages without Image Attributes	1057	1118	1070	1019	1218	1284
Erroneous Internal Links	614	682	653	653	656	708
Untitled Pages	674	648	653	723	746	756
Erroneous External Links	252	243	256	245	274	258
Erroneous Anchors	122	129	130	109	110	116

Figure 1.Monthly evolution of the average negative indicators of the web spaces of Spain´s university libraries (March / August 2005)

With regard to the evolution of the positive indicators of the web spaces analyzed (Figure 2, shown according to temporary increase in the positive indicators), we can also see an overall increase of these positive indicators from March through August, except in the case of Updated Pages, where a sharp drop of 37.21% is observed. This generalized increase is reflected in the 58.37% growth of Metadata and the 45.55% increase in “Dublin Core” Metadata, the 31.46% increase in Multimedia Files, a 27.12% increase in Small Pages, a 19.61% increase in HTML Links, and the 14.97% augment in External Links. We stress that the Metadata constitute an essential element for information retrieval, and that the *Dublin Core* is a worthy multidisciplinary and worldwide means of establishing an international model for metadata to define a set of recommended properties for electronic bibliographic description, thus promoting operability among different descriptive models. That is, these are critical indicators for showing the quality of virtual library web spaces and their respective services (Méndez-Rodríguez, 2002). For this reason, it is noteworthy that these two quality indicators evidence the greatest evolution over time.



	MARCH	APRIL	MAY	JUNE	JULY	AUGUST
Metadata	700	1111	1123	1066	1085	1108
"Dublin Core" Metadata	240	358	386	336	341	349
Multimedia Files	367	454	450	449	471	483
Small Pages	740	132	749	139	852	941
HTML Links	4461	5179	5107	5024	5173	5336
External Links	3357	3967	3905	4010	3970	3859
Updated Pages	31	49	48	95	43	19

Figure 2. Monthly evolution of the average positive indicators of the web spaces of Spain´s university libraries (March/August 2005)

If we compare Figures 1 and 2, we see that of the total 16 quality indicators analyzed (nine negative and seven positive), seven follow a positive evolution, as the one negative indicator decreases and six positive indicators increase over the period of study.

Table II, meanwhile, shows the mean values obtained for the set of negative indicators of the web spaces of the university libraries (given in decreasing order in the final column) grouped by the AC or region within Spain, and by the increase (%) that they undergo in the six-month period.

Table II. By Autonomous Community of Spain: mean negative indicators of the web spaces of university libraries. Increase from March to August, 2005.

	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	INCREASE %
CASTILLA-LEÓN	128	339	286	283	286	287	124.04
MADRID	155	224	230	233	232	234	50.67
CANTABRIA	1768	2043	1289	1342	1371	2416	36.70
VALENCIA	1540	1551	1531	1339	1878	1995	29.51
CANARIAS	68	81	79	82	84	87	27.47
BALEARES	149	171	175	189	185	185	24.09
CATALUÑA	1506	1476	1518	1639	1739	1813	20.39
NAVARRA	136	135	139	146	152	156	14.25
ANDALUCÍA	743	807	821	800	800	811	9.20
ARAGÓN	221	242	237	234	230	234	5.89
CASTILLA-LA MANCHA	924	952	956	962	965	976	5.60
PAÍS VASCO	454	439	433	424	443	467	2.67
GALICIA	1188	1187	1151	1181	1184	1186	-0.12
EXTREMADURA	18	15	15	15	15	15	-15.00
LA RIOJA	13	13	13	13	14	10	-19.30
MURCIA	77	80	84	45	45	46	-40.21
ASTURIAS	255	571	522	501	124	123	-51.70

The graphic representation of Table II (Figure 3) shows that 70.59% of the ACs (12 out of 17) witnesses an unfavorable evolution over time (March to August) of the mean negative indicators associated with the university webs. In favorable contrast however, Galicia, Extremadura, La Rioja, Murcia and Asturias exhibit a decline in negative features over time in terms of these indicators (0.12%, 15%, 19.30%, 40.21% and 51.70% respectively). The ACs are listed in the figure in order of greater to lesser negative indicators.

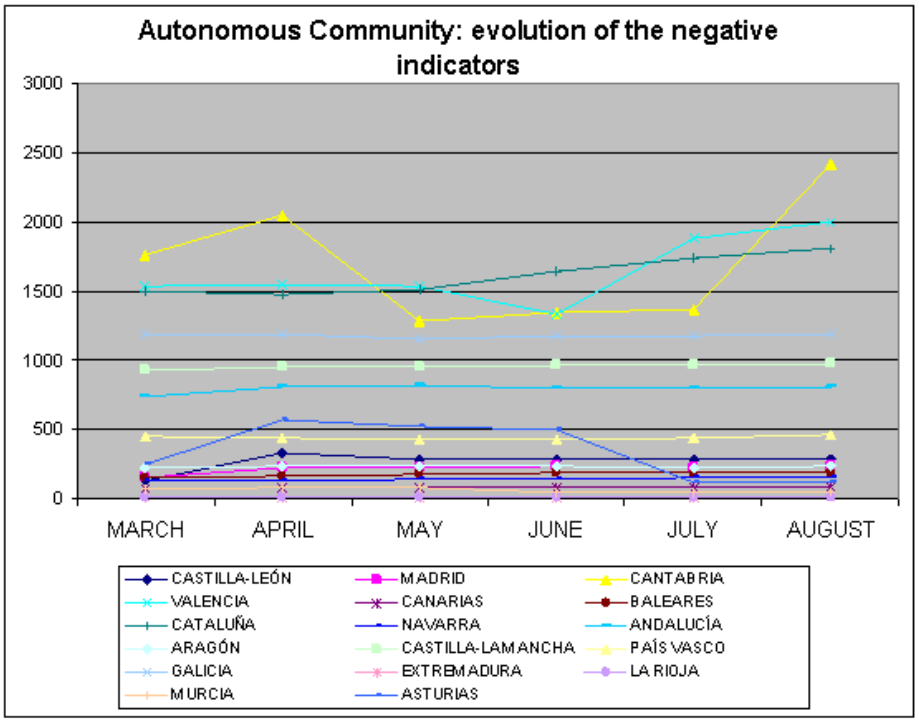


Figure 3. By Autonomous Community: monthly evolution of the negative indicators of Spain´s university libraries (March/August 2005)

In Table III (ordered top to bottom in the column "*Increase*") one can see the mean values of the set of positive indicators of the web spaces of the university libraries of study, again grouped by AC or region, as well as the percentage-wise increase over the six months of follow-up.

Table III. By Autonomous Community: mean values for positive indicators of the web spaces of Spain´s university libraries. Increase from March to August, 2005.

	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	INCREASE %
MADRID	523	990	996	1052	937	975	86.52
BALEARES	1288	1915	1510	1954	1951	1956	51.90
CATALUÑA	2454	2618	3271	2699	3387	3375	37.55
CANARIAS	230	250	251	256	261	270	17.39
NAVARRA	312	326	331	369	364	364	16.66
CANTABRIA	3309	3319	3217	2791	2782	3778	14.17
VALENCIA	1706	1753	1634	1359	1876	1931	13.23
ANDALUCÍA	2579	2733	2771	2784	2790	2761	7.08
CASTILLA-LA MANCHA	2589	2759	2730	2748	2749	2746	6.09
LA RIOJA	66	71	73	58	67	69	4.09
EXTREMADURA	99	104	105	100	99	101	2.60
ARAGÓN	1089	1127	1113	1113	1008	1114	2.31
GALICIA	2022	2024	2032	2023	2025	2028	0.31
PAÍS VASCO	1799	1711	1636	1629	1729	1782	-0.96
CASTILLA-LEÓN	701	764	657	664	671	671	-4.32
MURCIA	314	304	308	239	235	229	-26.99
ASTURIAS	652	1309	612	1144	283	264	-59.46

Figure 4 offers a graphic illustration of the evolution of the positive indicators of study. We see that 76.47% of the ACs (13 out of 17) present a favorable evolution from March to August in terms of the positive indicators associated with web services in the libraries. In other words, nearly all the virtual university libraries of Spain undergo a significant improvement in quality according to these criteria, ranging from the 86.52% rise evidenced in the Autonomous Community of Madrid, to the very discreet 0.31% improvement seen in Galicia. Increases of over 10% are seen for Baleares (51.90%), Cataluña (37.55%), Canarias (17.39%), Navarra (16.66%), Cantabria (14.17%) and Valencia (13.23%). The only ACs that show an unfavorable evolution —here, understood as a decrease in positive indicators for their university libraries— are País Vasco, Castilla-León, Murcia and Asturias.

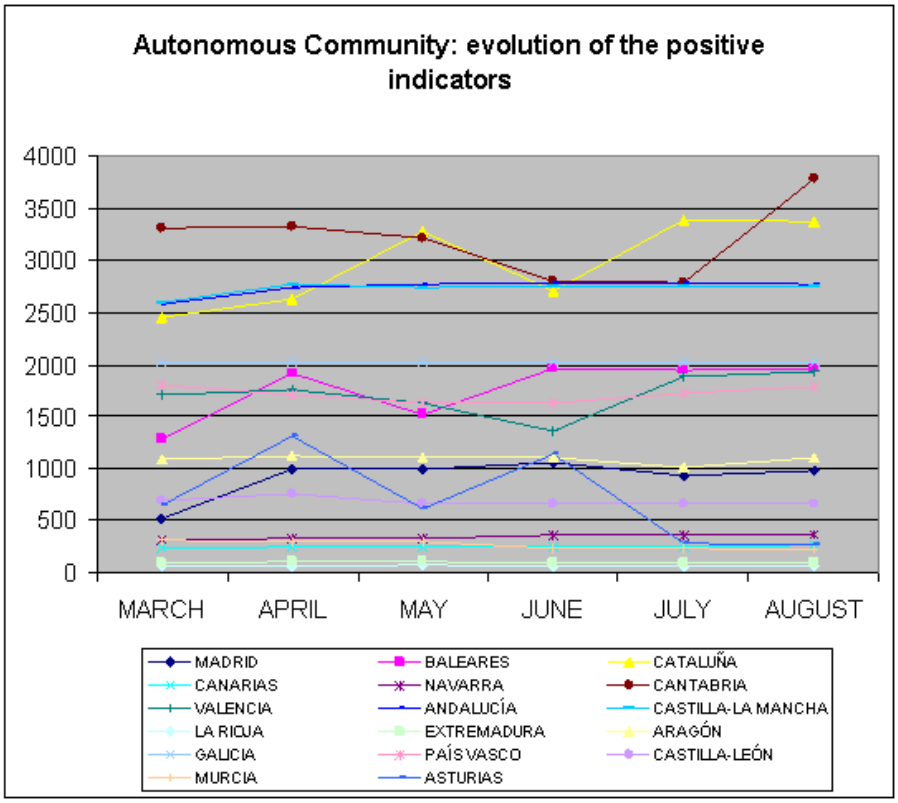


Figure 4. By Autonomous Community: monthly evolution of the positive indicators of web spaces in Spain´s university libraries (March/August 2005)

A comparison of Tables II and III reveals quite favorable developments in five of the ACs in terms of negative indicators that are on the decline (Galicia, Murcia, La Rioja, Extremadura and Asturias); and 13 ACs in terms of positive indicators on the rise (Madrid, Cataluña, Andalucía, Valencia, Navarra, Galicia, Canarias, Baleares, Cantabria, Castilla-La Mancha, La Rioja, Extremadura and Aragón). Only three (La Rioja, Extremadura and Galicia) coincide in optimal positions: that is, with rising positive indicators and decreasing negative indicators. It is important to point out, however, that La Rioja and Extremadura have only one university library, and Galicia has just three. Meanwhile, there are two Autonomous Communities that show the opposite evolution, as they suffer a temporary increase with regard to negative indicators as well as a decrease in positive indicators: Castilla-León (seven libraries analyzed) and País Vasco (two libraries).

The interpretation of the results expounded here calls for some consideration of the fact that only *moderate* correlation exists (0.43)between the increase in negative indicators and the number of web spaces of the university libraries analyzed in each of Spain´s Autonomous Communities; and only *substantial* correlation exists (0.53) between the increase in positive characteristics and the number of virtual university libraries studied in each AC (see Table IV, ordered by number of libraries studied).

Table IV. Increase in the formal quality indicators from March to August (2005) of the ACs and the web spaces of each

AC	Increase NEGATIVE INDICATORS	Increase POSITIVE INDICATORS	Nº Web Spaces analyzed
MADRID	50.67	86.52	14
CATALUÑA	20.39	37.55	11
ANDALUCÍA	9.20	7.08	11
CASTILLA-LEÓN	124.04	-4.32	7
VALENCIA	29.51	13.23	5
NAVARRA	14.25	16.66	3
GALICIA	-0.12	0.31	3
MURCIA	-40.21	-26.99	3
CANARIAS	27.47	17.39	2
PAÍS VASCO	2.67	-0.96	2
BALEARES	24.09	51.90	1
CANTABRIA	36.70	14.17	1
CASTILLA-LA MANCHA	5.60	6.09	1
LA RIOJA	-19.30	4.09	1
EXTREMADURA	-15.00	2.60	1
ARAGÓN	5.89	2.31	1
ASTURIAS	-51.70	-59.46	1

4. Conclusions

The results obtained and expounded here with regards to the evolution of formal quality indicators

applied to the web spaces of Spain´s university libraries over a six-month period of study (March through August 2005) lead us to formulate the following conclusions about their virtual evolution and that of the respective Autonomous Communities, at least insofar as their university library services are concerned:

> A separate analysis of the two groups of quality indicators (negative/positive) reveals an increase over time in both senses: the negative factors, or problems that impede full and efficient use of the web space services, are on the rise; while at the same time there is a favorable increase in the positive characteristics studied here, understood as those that facilitate and speed up user access to the services offered. The fact that 11.11% of the negative indicators (1 of 9) and 85.71% of the positive indicators (6 of 7) undergo a favorable evolution would suggest that there is indeed growing interest on the part of virtual libraries within Spain´s university system to improve their services, the bulk of evidence lying in the gradual increase in the positive indicators of their webs.
>
> Joint analysis of the indicators shows that seven of the 16 quality indicators studied (precisely, 43.75%) trace a path of positive evolution, as the negative indicators drop while the positive ones rise. Most noteworthy is the finding that, among the signs of improvement, 85.71% (6 out of 7) correspond to positive indicators, with the use of *Metadata* and *DC Metadata* at the lead. If we bear in mind that the web spaces studied belong to university library systems, and that *DC Metadata* were introduced for the purpose of conforming a standard referential unit, or a set of properties that might be upheld internationally for use in electronic bibliographic descriptions, these findings lead us to affirm that the virtual university libraries of Spain are indeed gradually incorporating such recommendations in their designs, in a general (but not unanimous) effort to offer enhanced quality to the user.

If we break down our results by Autonomous Community within Spain, other findings come to light:

> Analysis of the ACs shows the evolution of the negative indicators and that of the positive indicators do not exactly go hand in hand. Whereas only 29.41% ACs exhibit favorable progress in terms of the negative indicators, 76.47% show a favorable increase in positive indicators. Thus we may affirm that most ACs are gradually adopting positive trends in the web spaces of their university libraries.
>
> If we look at the ACs in view of both negative and positive criteria, we notice that the regions of La Rioja, Extremadura and Galicia stand out in evolutionary terms, in that their positive characteristics increase and their negative ones decrease. In other words, these would be the Autonomous Communities of Spain best positioned on the evolutionary scale of electronic library services in the University setting, as determined by the methodology applied here. This finding, in turn, leads us to emphasize the need for Spain´s diverse regions to progressively incorporate improved elements in their web spaces, along the lines of the quality indicators described here.
>
> The lack of a very *strong* statistical correlation (> 0.700; Ferreiro-Aláez, 1993) between the evolution of the indicators used in our study and the number of the university libraries analyzed here for each Autonomous Community within Spain, leads us to conclude that changes over time in the indicators are not influenced (negatively or positively) by the number of university libraries associated with each Autonomous Community.

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Appendix

ANNEX I. Web spaces of Spain´s university libraries

AC	URL (LIBRARY)	UNIVERSITY
ANDALUCÍA	http://www.etea.com/biblioteca/bibetea	ETEA, Institución Universitaria de la Compañía de Jesús
	http://desaual.ual.es/web/pInicio.jsp?id=7442	Universidad de Almería
	http://biblioteca.uca.es/	Universidad de Cádiz
	http://www.uco.es/webuco/buc/	Universidad de Córdoba

	http://www.ugr.es/~biblio/	Universidad de Granada
	http://www.uhu.es/biblioteca/default.htm	Universidad de Huelva
	http://www.ujaen.es/serv/biblio/	Universidad de Jaén
	http://www.uma.es/servicios/biblioteca/	Universidad de Málaga
	http://bib.us.es/index.asp	Universidad de Sevilla
	http://www.unia.es/biblioteca_unia/default_biblio.html	Universidad Internacional de Andalucía
	http://www.upo.es/serv/bib/bib.htm	Universidad Pablo de Olavide
ARAGÓN	http://wzar.unizar.es/doc/buz/unizar.html	Universidad de Zaragoza
ASTURIAS	http://buo.uniovi.es/	Universidad de Oviedo
BALEARES	http://www.uib.es/servei/biblioteca/	Universitat de les Illes Balears
CANARIAS	http://papyrus.bbtk.ull.es/index.htm	Universidad de La Laguna
	http://biblioteca.ulpgc.es/	Universidad de Las Palmas
CANTABRIA	http://www.buc.unican.es/	Universidad de Cantabria
CASTILLA LA MANCHA	http://www.biblioteca.uclm.es/	Universidad de Castilla-La Mancha
CASTILLA LEÓN	http://www.ubu.es/biblioteca/	Universidad de Burgos
	http://www.ucavila.es/servicios/mostrar_servicios2.php?id=32	Universidad Católica de Ávila
	http://biblioteca.unileon.es/indice.shtml	Universidad de León
	http://sabus.usal.es/bibliotecas.htm	Universidad de Salamanca
	http://almena.uva.es/	Universidad de Valladolid
	http://www.upsa.es/~/servicios/biblioteca/biblioteca.html	Universidad Pontificia de Salamanca
	http://www.usek.es/servicios/biblioteca/biblioteca.htm	Universidad SEK de Segovia
CATALUÑA	http://www.bib.uab.es	Universidad Autónoma de Barcelona
	http://www.bib.ub.es/bub/ebub.htm	Universidad de Barcelona
	http://www.uvic.es/biblioteca/ca/inici.html	Universidad de Vic
	http://www.upf.edu/bib/	Universidad Pompeu Fabra
	http://www.url.es/cas/se001.htm	Universidad Ramón Llull
	http://www.esade.es/biblio/	Universidad Ramón Llull - ESADE
	http://bibliotecnica.upc.es/	Universitat Politécnica de Catalunya
	http://biblioteca.udg.es/	Universitat de Girona
	http://www2.bib.udl.es/	Universitat de Lleida
	http://biblio.uoc.es/	Universitat Oberta de Catalunya
	http://www.urv.es/biblioteca	Universitat Rovira i Virgili
EXTREMADURA	http://biblioteca.unex.es/	Universidad de Extremadura
GALICIA	http://busc.usc.es/	Universidad de Santiago de Compostela
	http://www.uvigo.es/biblioteca/index.es.htm	Universidad de Vigo
	http://www.udc.es/biblioteca/galego/index.htm	Universidade da Coruña
LA RIOJA	http://biblioteca.unirioja.es/	Universidad de La Rioja
MADRID	**http://www.rcumariacristina.com/esp/portada1.php?idSub=23**	Real Colegio Universitario Escorial-María Cristina
	http://www.nebrija.com/servicios/biblioteca/index.htm	Universidad Antonio de Nebrija
	http://biblioteca.uam.es/	Universidad Autónoma de Madrid
	http://www.ucjc.es/biblioteca/index.htm	Universidad Camilo José Cela
	http://www.uc3m.es/uc3m/serv/BIB/indice.php	Universidad Carlos III de Madrid
	http://www.ucm.es/BUCM/	Universidad Complutense de Madrid
	http://www.uah.es/servi/biblioteca/inicio.htm	Universidad de Alcalá
	http://www.uem.es/web/buem/index.htm	Universidad Europea de Madrid
	http://213.229.161.87/web/alumnos/biblioteca_y_centro_de_doc._europea/default.asp	Universidad Francisco de Vitoria
	http://biblioteca.uned.es/lenya/bibliuned/live/index.html	Universidad Nacional de Educación a Distancia
	http://www.upm.es/bibliotecas/	Universidad Politécnica de Madrid
	http://www.upco.es/webcorporativo/Servicios/biblioteca/	Universidad Pontificia Comillas
	http://www.urjc.es/z_files/ac_biblio/nuevaweb/	Universidad Rey Juan Carlos
	http://www.ceu.es/paginaceu.asp?idpagina=3936	Universidad San Pablo- C.E.U.
MURCIA	http://www.ucam.edu/biblioteca/	Universidad Católica San Antonio
	http://www.um.es/biblioteca/	Universidad de Murcia
	http://www.bib.upct.es/	Universidad Politécnica de Cartagena
NAVARRA	http://www.unav.es/biblioteca/indice.html	Universidad de Navarra
	http://www.iese.edu/es/ConocimientoeInvestigacion/Library/Library.asp	Universidad de Navarra - IESE
	http://brocar.unavarra.es/biblio2.htm	Universidad Pública de Navarra
PAÍS VASCO	http://www.biblioteca.deusto.es/	Universidad de Deusto

	http://www.biblioteca.ehu.es/	Universidad del País Vasco
VALENCIA	http://www.ua.es/es/bibliotecas/index.html	Universidad de Alicante
	http://www.uji.es/cd/	Universitat Jaume I
	http://www.umh.es/frame.asp?url=/bibliotecas/	Universidad Miguel Hernández
	http://www.upv.es/bib/	Universidad Politécnica de Valencia
	http://www.uv.es/~infobib/index_c.html	Universitat de València

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