

# *Bibliographic Displays of Web-based OPACs: Multivariate Analysis Applied to Latin-American Catalogues*

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Library online public access catalogues (OPACs) are automated information retrieval systems that constitute the most readily available source of information for non-professional users. Web-based OPACs represent a huge step forward in the development of user interfaces for catalogues. The present study evaluates Latin American OPACs against a checklist for full bibliographic display in web-based OPACs,

developed at the University of Toronto. The checklist contains four sections that cover the most important facets of the OPAC: 1) labels, 2) text, 3) instructional information, and 4) page layout. Finally, multivariate analysis methods are applied to the results. Such techniques include 1) cluster analysis, 2) principal components analysis (PCA), and 3) multidimensional scaling (MDS).

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## *Introduction*

The growth of Internet and emerging network technologies has been making information available in revolutionary new ways. For instance, the general public now has convenient access to library information. Online public access catalogues (OPACs) are automated information retrieval systems that constitute the most readily available source of information for non-professional users. The services provided by the OPACs, however, are not always geared to the user's real needs. Hence, there has been steady activity on the part of information science researchers and developers over recent years (Fernández-Molina 1998). The main objective of such studies is to propose guidelines for the design of qualitatively improved automated catalogues that are truly adapted to user needs (Moya-Anegón 1994).

In this study we focus exclusively on so-called Web-based OPACs. Because of the popularity of the Web setting and the fact that they are simple to use, Web-based OPACs are rapidly increasing in number. Nonetheless, this does not necessarily

mean that the products are well elaborated and operate properly. It is not unusual to encounter systems that were put together haphazardly, or that still seem to be in the experimental stage. This is especially true when the catalogues are not backed up by an integrated library management system with a special module designed for the Web connection. For these reasons, we evaluated a specific group of catalogues, using pre-established criteria and multivariate analysis techniques. The OPACs studied were selected regardless of their degree of development, as long as they fulfil two conditions: 1) they must belong to Latin American institutions, and 2) they must be accessible, at no cost, on the Internet.

## *Materials*

Despite the abundance of literature about OPACs, documentation of the catalogues of Latin American libraries is scarce. Only one study touches on the topic tangentially – a comparison of the academic networks of Mexico and Argentina (Herrero-Solana 1999). This made it difficult to define

the scope of the study. Not many Latin American libraries have Web-based OPACs, and those that do are hard to locate. Therefore, we based the research on the three most widely used directories (Dennis 1997):

1. *LibWeb*, developed by Berkeley Digital Library (SUNSITE) <http://sunsite.berkeley.edu/Libweb/>
2. *WebCats*, developed by Peter Scott, University of Saskatchewan <http://www.lights.com/webcats/>
3. *Online catalogs with 'webbed' interfaces*, by Erick Morgan (North Carolina State University) <http://www.lib.ncs.edu/staff/morgan/alcuin/wwwed-catalogs.html>

With the help of these directories, the best-known OPACs were located. The remainder was tracked down through the external links of the previously located OPACs. In this fashion a final list of 25 catalogues from nine countries was eventually obtained. The list is shown in Appendix A.

### *Methodology*

The first task was to decide on the items for evaluation and make up the checklist itself. We wished to adopt an evaluation checklist that was already familiar to and generally accepted by LIS professionals. Previous authors have discussed the main points that call for evaluation (Matthews 1987, Yee 1991, 1998) without suggesting an alternative list of more specific evaluation items.

One study that was particularly interesting, however, was the evaluation checklist for full bibliographic display in Web-based OPACs, developed by Joan Cherry and Joseph Cox of the University of Toronto (Cherry 1996, 1998). This checklist is actually a Web-adapted form of one created previously at the same University by Juliana Chan, originally designed to evaluate telnet-based OPACs (Chan 1995). Not only is this evaluation scheme used at Toronto; it has also been applied, with some modification by a number of authors for different situations (Moscoso 1998, Ashton 1998).

The checklist contains four sections that cover the most important facets of the OPAC:

1. Labels (to help the user identify the different parts of the bibliographic description),
2. Text (the visualisation of bibliographic data, number of issues, circulation, etc.),

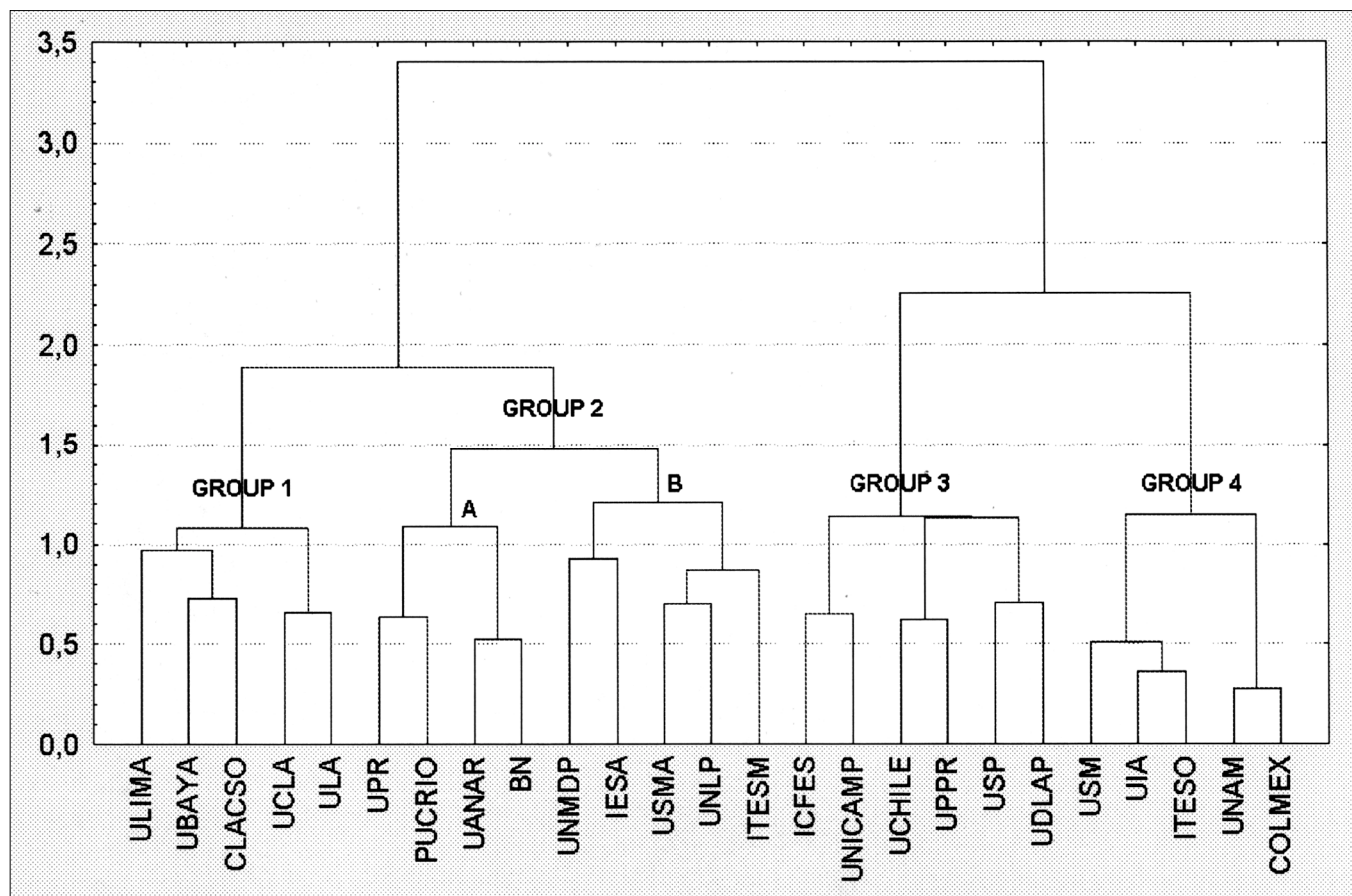
3. Instructional Information (includes instructions to user, informative messages, and available options), and
4. Page Layout (including the order of the bibliographic information, spacing, and consistency in the graphic presentation of information).

Each section is divided, in turn, into a series of more or less detailed items. Some points were too specific as formulated on the Chan checklist; therefore, as the research progressed, we dropped those items that seemed to provide little information. At the same time, we detected a need for noting the flexibility of the search screens and the order of relevance, among other items. The modified checklist we finally used is given in Appendix B. The numbering reflects the original checklist in order to facilitate comparison of the two models.

The next obstacle was to interpret or summarise the results obtained. The literature consulted uses a simple calculation for ranking the OPACs from greater to lesser number of positive responses. In some cases certain items are weighted. We attempted at first to follow this example, but were not satisfied with the results. It seemed clear that the matrix of data obtained should be analysed with some sort of multivariate technique that would permit a simple representation of results to be visualised, measured and assessed (Moya-Anegón 1998). Such techniques include 1) cluster analysis, 2) principal components analysis (PCA), and multidimensional scaling (MDS) (Kinnucan 1987).

1. *Cluster analysis*. This technique is used to create a two-dimensional display (dendrogram) of clusters of different objects whose relationships are represented by matrix values. This type of automatic classification, also known as numerical taxonomy, currently comprises more than 150 different techniques that are grouped in families according to shared procedures.
2. *Principal components analysis (PCA)*. The basic premise of PCA is that the linear relation between any two variables is best summarised by a regression line. In other words, the variable that represents the regression line as a point cloud contains essential information about both variables. The two variables are thus combined into a single factor. This mechanism can be used to reduce pairs of variables to single dimensions in order to simplify the graphic display of the elements included in the matrix.
3. *Multidimensional scaling (MDS)*. This multivariate analysis technique is used to identify the dimensions that best explain similarities and differences between vari-

Figure 1: OPAC clustering using Ward's method.



ables. Because the purpose of MDS is to generate a map of objects, this approach can be considered an alternative to PCA.

For the purposes of the present study, clustering was the preferred option for the automatic classification of the systems, while MDS was preferable for viewing the organisational topology and for allowing conclusions to be drawn from the resultant clustering.

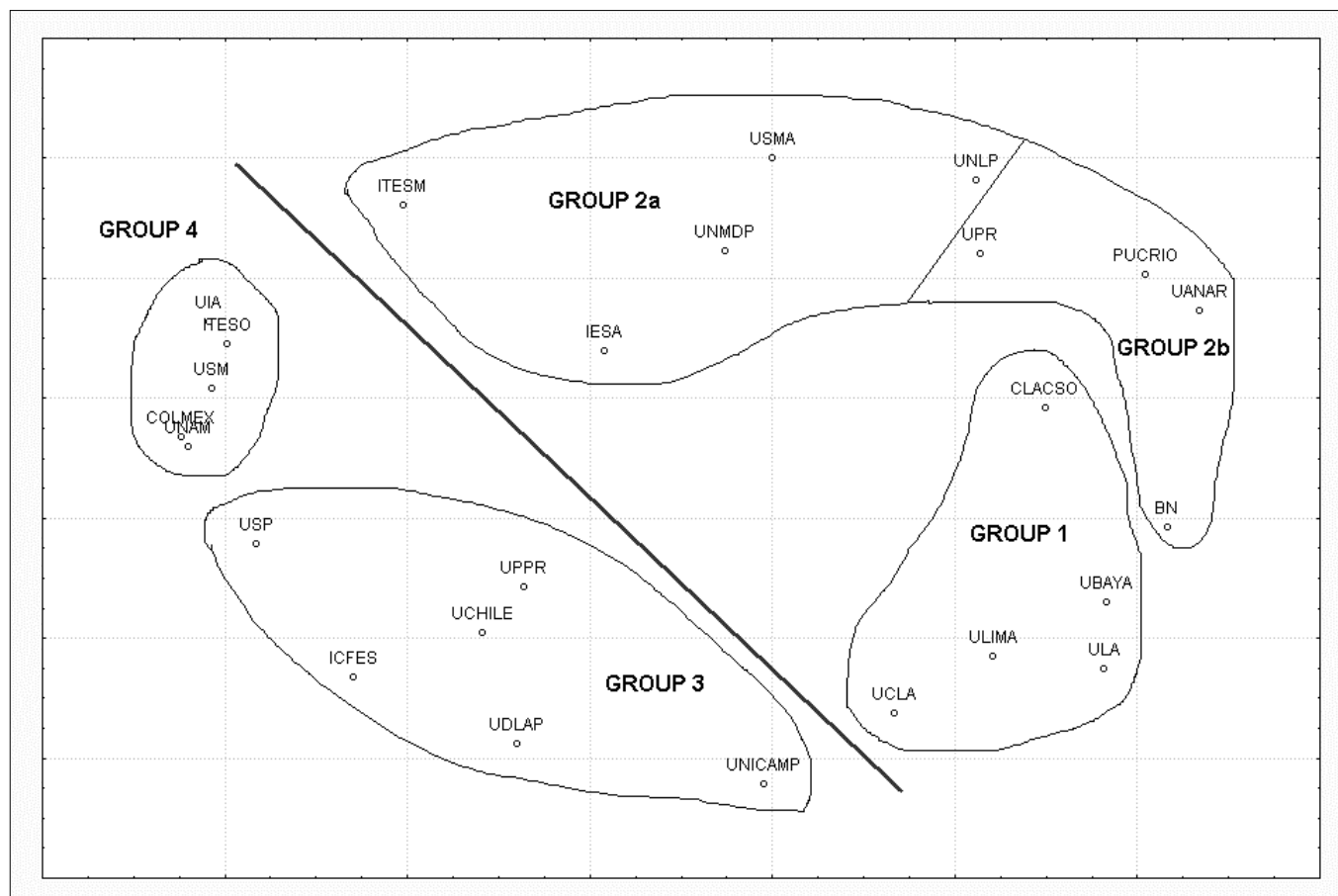
### Results and discussion

The results of the evaluation checklist were used to build different binary matrices, assigning a value of one to the affirmative responses and zero to the negative answers. In Appendix C the arithmetic calculations can be seen for each of the four sections and for the total. The formula used is similar to that applied by Moscoso: the quotient of positive responses with respect to total answers was calculated and then adjusted to a scale ranging from 1 to 10. OPACs sharing the same type of

software were identified with an additional symbol (\*"/"/°). We found considerable variation in the placement of a given evaluative criterion on the scale; that is, the OPAC features are qualitatively very heterogeneous. Even OPACs that share interfaces do not appear grouped together in the display. There is, however, a slight tendency of the integrated library packages such as Aleph, Innopac and DRA to be situated in the upper zones of the tables, while others, like Isis (UNESCO's freeware software), tend toward the bottom.

This tendency is more marked in the clustering seen in Figure 1. Here, the 25 OPACs studied are classified automatically using Ward's method. Two major classes can be distinguished clearly: the first (3–4) comprises all the Aleph systems (ICFES, USP, USM, UIA, ITESO, UNAM and COLMEX), along with Altavista, DRA, and SydneyPLUS software. The second major branch (1–2) contains the Isis catalogues and all the rest of the systems. These two groups can be subdivided into two branches, each one of which (see Figure 2) gives

Figure 2: MDS representation.



way to a further distinction of subsets (2a and 2b).

For the purposes of the present study, clustering was the preferred option for the automatic classification of the systems, while MDS was preferable for viewing the organisational topology and for allowing conclusions to be drawn from the resultant clustering.

These subdivisions allow us to establish groupings in the MDS graph of Figure 2. Each sub-branch can be viewed as a cluster of OPACs in two-dimensional space. The clearest grouping appears in 4, where all the members are Aleph systems. Group 3 includes two Aleph systems (one of them, USP, is situated close to the margin of group 4), among other systems that are fairly dispersed. Group 2 is the most diffuse of all, though it can be divided into 2a and 2b, as noted above. Group 1 is somewhat less spread out than Group 2.

It is difficult to detect regularities in the display. The proximity of the Aleph systems is evident, yet the second-most used software, Isis, does not

appear to be as compact in the representation (BN, CLACSO, UNLP and UNMDP). Meanwhile, the two WebCat systems (UPPR and IESA) seem to end up together despite their different groupings. This interesting finding can be explained by the fact Aleph is an integrated system with a carefully designed Web-based interface that can be modified easily upon installation; apparently, however, libraries do not take advantage of this feature. Isis, on the other hand, is not a package but rather a search engine, with a gateway Web that must be completely developed by the system administrator (Herrero-Solana 1998). Because this gateway has no built-in default interface, each library must develop a unique one of its own. These differences translate into distances between the systems in their graphic representation. The rest of the OPACs use individually designed software, which also tends to appear separated from the rest.

Although there is no clear pattern to the bibliographic display, it is possible to formulate a hypothesis for the graphic behaviour of the OPACs

as seen here. The evaluative period of this study showed the systems pertaining to Groups 3 and 4 to be of higher quality than those of Groups 1 and 2. We have therefore marked the boundaries of this tendency with a line, despite the contradictory fact that one of the best OPACs analysed (ITESM) is situated in zone 2, yet near Group 4. No comparisons regarding behaviour can be drawn, for example, with those systems situated within zone 2a, which represent the core of catalogues with the poorest evaluations.

In any case, this is only a hypothesis that does fit precisely into the display obtained in our study. The problem does not reside in the methodology used for representation, but rather in the shortcomings of the evaluation checklist – which should be more detailed and comprehensive – and in the nature of the systems sampled. If more systems used the same software, they could be more easily grouped for a two-dimensional display.

### *Conclusions*

When discussing the conclusions, the first question we raise concerns the validity of the methodology used and whether it is relevant in the context of OPAC analysis. In this sense, we believe that its justification lies in the data themselves since by working within a multivariate model the number of nuances to be perceived is larger than by using a simple calculation of rankings (a univariate analysis). This methodology has been imported from statistics and is widely accepted by the scientific community at large. The only requirement that should be met in applying it is the identification of three or more variables.

If we accept that as true, a subsequent problem will confront us, i.e. the representation of those multivariate nuances. The complex nature of this type of analysis involves in turn a complex and 'non-deterministic' form of representation of the elements under analysis. A list or ranking is a very effective reductionist representation if the aim is to establish a good-bad, adequate-inadequate or similar relationship. On the other hand, it is thought that graphic representations provide a higher degree of information than ranking, although it is also well known that they are more subjective and ambiguous. In this regard, the knowledge the subject (the observer) has of the

context under analysis is important since many relations and conclusions will be perceived by the subject but only suggested by the representation.

The graphic representations used in this paper are commonly used tools for knowledge discovery in databases (KDD). KDD has many definitions but the most widely accepted one tells us that it is a nontrivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns in data (Fayyad 1996).

If we had to define a profile of the type of person these representations would be aimed at, we would readily suggest specialists and analysts with a very good knowledge of the context in question who are able to easily extrapolate the relationships among the different elements under analysis. We agree with Tufte (1983, 1990, 1996) that knowledge is found within the person and that graphic representations only help to shed light on it.

As to the graphic representations and the conclusions they suggest, we make the following points:

- Software used by Latin American libraries is very diverse. This can be observed in the large number of available packages and the dispersion of points in the MDS representation.
- The Israeli software Aleph has had a great impact on the region. It is the only software to receive not only a good score but also a discernible concentration in the MDS representation (Group 4).
- The libraries of Argentina rely exclusively on ISIS. Despite being an important country in the region, Argentina seems to use exclusively public domain software and it is still some distance away from using commercial software.
- Latin American OPACs need to be included in international directories. One of the main conclusions from this study is the difficulty to find OPACs from the region on the Internet.
- There is a marked affinity and a graphic proximity of OPACs based on Aleph due to the default configuration of the Web interface. This is clearly seen in Group 4 of the MDS representation.

Finally, it is important to note that multivariate analysis methods constitute solid, useful tools for the analysis of complex series of data. These techniques should be applied with caution, however, as their success or failure will depend on the nature and specific characteristics of the data to be analysed.

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## Appendix A: OPACs

MEXICO
COLMEX Biblioteca Daniel Cosío Villegas – El Colegio de México <a href="http://200.12.162.127/">http://200.12.162.127/</a> Aleph
ITESO Biblioteca Dr. Villalobos Padilla – Instituto Tecnológico y de Estudios Superiores de Occidente (ITESO) <a href="http://aleph.gdl.iteso.mx/biblio/index.htm">http://aleph.gdl.iteso.mx/biblio/index.htm</a> Aleph
ITESM Centro de Información-Biblioteca (CIB) – Instituto Superior de Monterrey (ITESM) <a href="http://www-cib.mty.itesm.mx/">http://www-cib.mty.itesm.mx/</a> Innopac
UNAM Dirección General de Bibliotecas (DGB) – Universidad Nacional Autónoma de México (UNAM) <a href="http://www.dgbiblio.unam.mx/">http://www.dgbiblio.unam.mx/</a> Aleph
UIA Biblioteca Francisco Xavier Clavigero – Universidad Iberoamericana (UIA) <a href="http://uiacia.bib.uia.mx/piub/">http://uiacia.bib.uia.mx/piub/</a> Aleph
UDLAP Biblioteca - Universidad de las Americas - Puebla (UDLAP) <a href="http://biblio.pue.udlap.mx/">http://biblio.pue.udlap.mx/</a> SydneyPLUS
VENEZUELA
ULA Servicios Bibliotecarios - Universidad de Los Andes (SERBIULA) <a href="http://www.bieci.ula.ve/">http://www.bieci.ula.ve/</a> SARI
UCLA Biblioteca de Medicina - Universidad Centro Occidental Lisandro Alvarado (UCLA) <a href="http://bibmed.ucla.edu.ve/">http://bibmed.ucla.edu.ve/</a> Alejandría
IESA Biblioteca Lorenzo Mendoza Fleury – Instituto de Estudios Superiores de Administración <a href="http://copernico.iesa.edu.ve/uhtbin/webcat">http://copernico.iesa.edu.ve/uhtbin/webcat</a> WebCat
ARGENTINA
BN Sistema de Consultas Bibliográficas – Biblioteca Nacional <a href="http://online.bibnal.edu.ar/">http://online.bibnal.edu.ar/</a> Isis
CLACSO Biblioteca Regional en Cs. Sociales – Consejo Latinoamericana de Ciencias Sociales (CLACSO) <a href="http://www.webcom.com/clacso/BIBLIO.HTML">http://www.webcom.com/clacso/BIBLIO.HTML</a> Isis
UNLP Biblioteca de la Facultad de Humanidades – Universidad Nacional de La Plata <a href="http://www.fahce.unlp.edu.ar/biblioteca/mani/">http://www.fahce.unlp.edu.ar/biblioteca/mani/</a> Isis
UNMDP Biblioteca Central - Universidad Nacional de Mar del Plata <a href="http://www.mdp.edu.ar/INSTITUT/SERVICIO/BIBLIO/CONS.HTM">http://www.mdp.edu.ar/INSTITUT/SERVICIO/BIBLIO/CONS.HTM</a> Isis

PANAMA
USMA Universidad Santa María La Antigua <a href="http://www2.usma.ac.pa/biblioteca/">http://www2.usma.ac.pa/biblioteca/</a> ad hoc
BRASIL
USM Biblioteca - Universidade São Marcos <a href="http://200.17.21.162:4500/ALEPH">http://200.17.21.162:4500/ALEPH</a> Aleph
USP Sistema Integrado de Bibliotecas (SIBi) – Universidade de S-ao Paulo (USP) <a href="http://www.sibi.usp.br/aleph/por/index.htm">http://www.sibi.usp.br/aleph/por/index.htm</a> Aleph
PUCRIO Divisão de Bibliotecas e Documentação – Pontifica Universidade Católica do Rio de Janeiro (PUC) <a href="http://www.dbd.puc-rio.br/">http://www.dbd.puc-rio.br/</a> Pergamun
UNICAMP Sistema de Bibliotecas - Universidade Campinas <a href="http://acervus.unicamp.br/">http://acervus.unicamp.br/</a> AltaVista
COLOMBIA
UANAR Biblioteca Virtual - Universidad Virtual Antonio Nariño <a href="http://intrasur.uanarino.edu.co/biblio/">http://intrasur.uanarino.edu.co/biblio/</a> ASP
ICFES Catálogo Colectivo Nacional de Publicaciones Seriadas - Instituto Colombiano de Fomento a la Educación Superior (ICFES) <a href="http://www.icfes.gov.co/">http://www.icfes.gov.co/</a> Aleph
PUERTO RICO
UPR Servicio Bibliotecario - Universidad de Puerto Rico <a href="http://www.upr.clu.edu/webpac/home.html">http://www.upr.clu.edu/webpac/home.html</a> Notis
UBAYA Biblioteca – Universidad Central de Bayamón <a href="http://ucdb.library.net/">http://ucdb.library.net/</a> TLC-NetPac
UPPR Biblioteca - Universidad Politécnica de Puerto Rico <a href="http://Unicorn.pupr.edu/uhtbin/cgisirsi/16/1/0">http://Unicorn.pupr.edu/uhtbin/cgisirsi/16/1/0</a> WebCat
CHILE
UCHILE Sistema de Servicios de Información y Bibliotecas (SISIB) - Universidad de Chile <a href="http://www.sisib.uchile.cl/">http://www.sisib.uchile.cl/</a> DRA Web2
PERU
ULIMA Biblioteca - Universidad de Lima <a href="http://www.ulima.edu.pe/">http://www.ulima.edu.pe/</a> LotusNotes/LotusDomino

## Appendix B: Evaluation checklist of Cherry-Cox (partial)

<b>Section 1: Labels Checklist</b>	
1.1	Are all fields/variables labeled?
1.2	Are all labels full words, i.e. not abbreviations? (Commonly used abbreviations such as ISBN are OK)
1.3	Are all labels free of library jargon? (e.g. LCCN, OCLC#, added entry. Commonly used jargon such as ISBN is OK)
1.4	Are all labels accurate/appropriate/meaningful? (e.g. if a field contains co-authors, the label is "CO-AUTHORS")
1.5	Are the labels displayed less prominently than the text (i.e. data/field values)?
1.6	For the bibliographic information: (a) Are all labels in UPPERCASE? ----- (b) Does each label begin on a new line? ----- (c) Are labels right justified? ----- (d) Are labels located to left of the corresponding fields and on the same line? ----- (e) Is the amount of space provided for labels at least 12 characters and no more than 20 characters per line? ----- (f) Are labels separated from the corresponding fields by a colon and followed by at least one space? ----- (g) If it takes more than one line (e.g. a long title) or sub-field (e.g. subject) to display a field value, is the corresponding field label displayed only once, i.e. not repeated? ----- (h) Are labels without corresponding filed values avoided?
1.7	If information is displayed in tabular format (e.g. holdings information) (a) Are the column labels displayed in one of the following ways: UPPERCASE only UPPERCASE and underline (e.g. <u>UPPERCASE</u> ) UPPERCASE with hypens (e.g. --- UPPERCASE ---), or UPPERCASE in reverse video Other highlighting technique used (e.g. colour, bold, etc) ----- (B) ARE THE COLUMN LABELS LOCATED IMMEDIATLY ABOVE THE COLUMN OF FIELDS, I.E. NO BLANK LINE(S)? ----- (C) ARE THE COLUMN LABELS CENTERED ABOVE THE COLUMN OF FIELDS?
<b>Section 2: Text Checklist</b>	
2.1	Is the text in mixed case (upper and lowercase)?
2.2	Does the text contain conventional use of capitalization, i.e. to start sentences, to indicate proper nouns, acronyms, or significant words, etc?
2.3	Is the text full words, i.e. not abbreviations? (Commonly used abbreviations such as "cm" for centimeter, "p" for page are OK. But "c" for copyright is not OK)
2.5	Is the text vertically aligned and left justified?
2.8	Is non-essential text omitted? (e.g. OCLC#, LCCN, price)
2.9	Is redundant/repeated text avoided?
2.10	If the text contains a number wich should have natural splits or predefined breaks, are the splits and breaks included in the display? (e.g. Date displays as 07/21/79 instead of 072179, and cal number displays as HF 5415.12 C35 M36 instead of HF541512C35M36)
2.11	If the text contains a number with more than four digits, or an alphanumeric value with mora than four characters, is the value displayed in groups of three or four characters, with a blank, hyphen, or slash between each group? (e.g. K349 612 094 instead of K349612094)
2.14	Is the arranged logically with related fields, such as author and added author entries, and title and series grouped together?
2.15	Are call numbers displayed?
2.16	Is holdings /location information included in the full display?
2.17	Is circulation status information included on the full display?
2.18	If holdings/location and /or circulation status information are displayed: (c) Does the circulation status information of a copy include the call number? ----- (d) If a copy is on loan, does the circulation status information display the date to be returned? ----- (e) Is each additional copy of a title displayed on a new line?

2.19	Are hypertext links provided in the bibliographic record through: (a) Classification numbers? ----- (b) Authors? ----- (c) Titles? ----- (d) Subjects? ----- (e) Holdings? ----- (f) Locations? ----- (g) Other?
2.20	Are hypertext links provided from within the bibliographic record to items external to the catalogue?
<b>Section 3: Instructional Information Checklist</b>	
3.2	Are textual instructions simple, concise, clear, and free of typographical errors?
3.6	When icons are used? (a) Is the icon's meaning readily discernible independent of any accompanying text? ----- (b) Is explanatory text contained within and /or in close proximity to the icon?
3.7	Is online help provide?
3.8	Are abbreviations avoided in instructional information?
3.9	Is instructional information free of jargon?
3.11	Are options available to the user listed near both the top and bottom of the "page"?
3.12	Are options (as a group) clearly separated from the information around them? (e.g. by using blank lines)
3.13	Are the options arranged in a recognizable order? (e.g. sequence of use, function, importance, or alphabetical)
<b>Section 4: Page Layout Checklist</b>	
4.1	Are labels, text, and instructional information displayed in consistent locations and formats throughout the display?
4.3	Is the search strategy displayed near the top of the "page"?
4.4	Is there a dashed/solid/blank line(s) before and after the bibliographic information?
4.5	Are related fields in the bibliographic data grouped together and separated from other data (by, for example, blank lines, white space, etc.)?
4.6	Are dashed/solid lines used to segment the "page"?
4.7	Are highlighting techniques used? (Highlighting techniques include capitalization, bold, size of font, reverse video, and underline)
4.8	Are there at most three types of highlighting used?
4.10	Does it indicate at the top of the "page": (a) The database being searched? ----- (b) The system/host being used?
4.12	Is a call number displayed close to the top of the bibliographic display?

## Appendix C: Values table

OPACs														
I – LABELS			II – TEXT			III – INSTRUCTIVE INF.		IV – PAGE LAYOUT		TOTALS				
1	UNICAMP	7.86	1	ITESM	10.00	1	ITESM	7.50	1	ITESM	10.00	1	ITESM	7.50
2	UPR	7.14	2	COLMEX *	7.00	2	ITESO *	7.32	2	COLMEX *	7.00	2	ITESO *	7.32
3	UCHILE	7.14	3	IESA °	7.00	3	UIA *	7.32	3	IESA °	7.00	3	UIA *	7.32
4	UCLA	7.14	4	BN "	7.00	4	IESA °	7.14	4	BN "	7.00	4	IESA °	7.14
5	BN "	7.14	5	UNLP "	7.00	5	COLMEX *	6.96	5	UNLP "	7.00	5	COLMEX *	6.96
6	UPPR °	6.43	6	UPR	7.00	6	UCHILE	6.96	6	UPR	7.00	6	UCHILE	6.96
7	ULIMA	6.43	7	UPPR °	7.00	7	USM *	6.79	7	UPPR °	7.00	7	USM *	6.79
8	ULA	6.43	8	UNAM *	6.00	8	UPPR °	6.79	8	UNAM *	6.00	8	UPPR °	6.79
9	UBAYA	6.43	9	UIA *	6.00	9	UNAM *	6.43	9	UIA *	6.00	9	UNAM *	6.43
10	UANAR	6.43	10	ULA	6.00	10	UNICAMP	5.89	10	ULA	6.00	10	UNICAMP	5.89
11	IESA °	6.43	11	UCLA	6.00	11	UCLA	5.71	11	UCLA	6.00	11	UCLA	5.71
12	ICFES *	6.43	12	USM *	6.00	12	BN "	5.54	12	USM *	6.00	12	BN "	5.54
13	UNAM *	5.71	13	UNICAMP	6.00	13	ICFES *	5.54	13	UNICAMP	6.00	13	ICFES *	5.54
14	UIA *	5.71	14	ITESO *	5.00	14	ULA	5.36	14	ITESO *	5.00	14	ULA	5.36
15	COLMEX *	5.71	15	USP *	5.00	15	UPR	5.36	15	USP *	5.00	15	UPR	5.36
16	CLACSO "	5.71	16	ICFES *	5.00	16	UBAYA	5.18	16	ICFES *	5.00	16	UBAYA	5.18
17	USM *	5.00	17	UBAYA	5.00	17	USP *	5.00	17	UBAYA	5.00	17	USP *	5.00
18	PUCRIO	5.00	18	UCHILE	5.00	18	UANAR	3.93	18	UCHILE	5.00	18	UANAR	3.93
19	ITESO *	5.00	19	UDLAP	4.00	19	UDLAP	3.75	19	UDLAP	4.00	19	UDLAP	3.75
20	ITESM	5.00	20	PUCRIO	4.00	20	PUCRIO	3.57	20	PUCRIO	4.00	20	PUCRIO	3.57
21	USP *	4.29	21	UANAR	4.00	21	ULIMA	3.57	21	UANAR	4.00	21	ULIMA	3.57
22	UDLAP	4.29	22	ULIMA	3.00	22	UNLP "	2.68	22	ULIMA	3.00	22	UNLP "	2.68
23	UNLP "	2.14	23	UNMDP "	2.00	23	CLACSO "	2.50	23	UNMDP "	2.00	23	CLACSO "	2.50
24	USMA	0.00	24	USMA	2.00	24	UNMDP "	2.14	24	USMA	2.00	24	UNMDP "	2.14
25	UNMDP "	0.00	25	CLACSO "	1.00	25	USMA	1.25	25	CLACSO "	1.00	25	USMA	1.25

\* = Aleph " = Isis ° = WebCat