

## Understanding Interaction in the NZDL

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This document aims to compare the interaction supported by the NZDL and the ACM digital libraries. It takes the problems found in the study of use of various digital libraries, which focused mainly on the ACM DL (Bryan-Kinns & Blandford, 2000) and tries to understand what would happen in similar situations in the NZDL. In doing so it also raises other issues which come to light with the NZDL as these situations are explored. To this end the following problematic situations in the ACM DL are considered in the NZDL:

- Confusion about search options – Mutuality state 0 search problem (author and title searched for, but not noticed)
- Structure of collections
- Problematic navigation between issues of a journal
- Interactional traps
- Mutuality:
  - Lack of – file size
  - Lack of – citation
  - State 1 – incomprehensible search numbers
  - State 2 – navigation problems in both browsing and use of search results list
- Discriminability
  - Repeated entries
  - Lots of similar entries

In addition, the impact of user familiarity with several collections in the NZDL is considered.

NZDL itself contains several collections. This document mainly examines the Humanity Development Library and the Food and Agriculture Organisation Library as they give examples of two extremes of browsing functionality supported by NZDL (no categories vs. four) but are still provided by the same organisation – the UN. These two interfaces are illustrated in the following screenshots.



*Screenshots showing different levels of browsing support*

## Search options

In the ACM DL users are presented with a large array of search options, and multiple data entry points as illustrated in the following screenshot. As the observation showed, this can lead to mistakes in communicating the search criteria - both in terms of the user communicating what they want, and the interface communicating what it considers the user's search to be. All collections in NZDL have a much simpler search interface as illustrated in the previous screenshots. Here a user can only enter data in one field, and they have a limited set of fields to search over. Clearly there is a trade off here between power of search specification and ease of use - the ACM DL search interface can be used to construct much more complex queries than NZDL. However, research such as Spink *et al.*'s study (1998) suggests that most users only use simple queries anyway (though this may be due to the support for query communication - when people talk to librarians in conventional libraries they don't usually just say two words and hope for the best).

**Screenshot of ACM DL search interface**

An interesting problem with collections in the NZDL is that on one hand they present themselves in a visually similar way, but on the other, many of the interaction possibilities are different. This can be seen in the search interfaces for the two example collections. All collections provide the following possible events:

- e1 – begin search
- e2 – logical operator – leading to:
  - e3 – some
  - e4 – all
- data entry events

However, different collections allow users to search over different fields. For the two example collections there are the following field options:

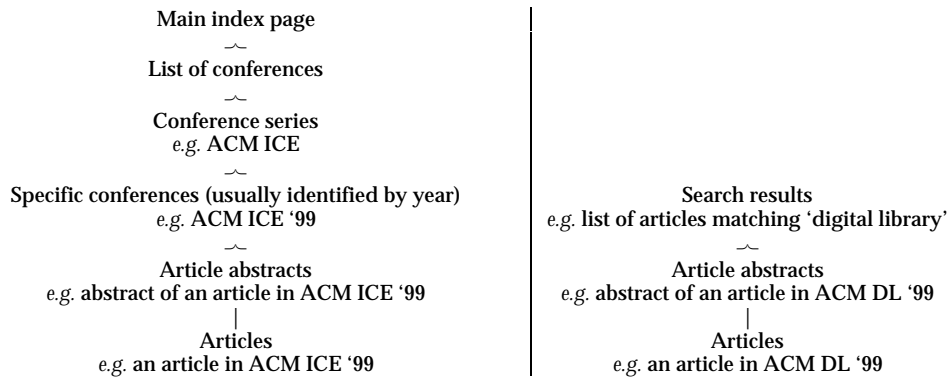
- **FAO:** text | titles
- **WDL:** chapters | section titles | entire books

In terms of familiarity, this may lead users to wonder what the relationships between, say, *titles* in the FAO and *section titles* in the WDL are, and similarly, what differences there are between searching *text* (FAO) and *entire books* (WDL). In terms of interaction there needs to be some means of relating the terminology of different collections so that familiarity with search terms can be developed across collections.

Finally, one of the problems identified in the study of the ACM DL was the lack of understanding of the purpose of the numbers on the ACM search interface. NZDL's much simpler interface has no such distractions and so again poses less confusion for users.

## Structure

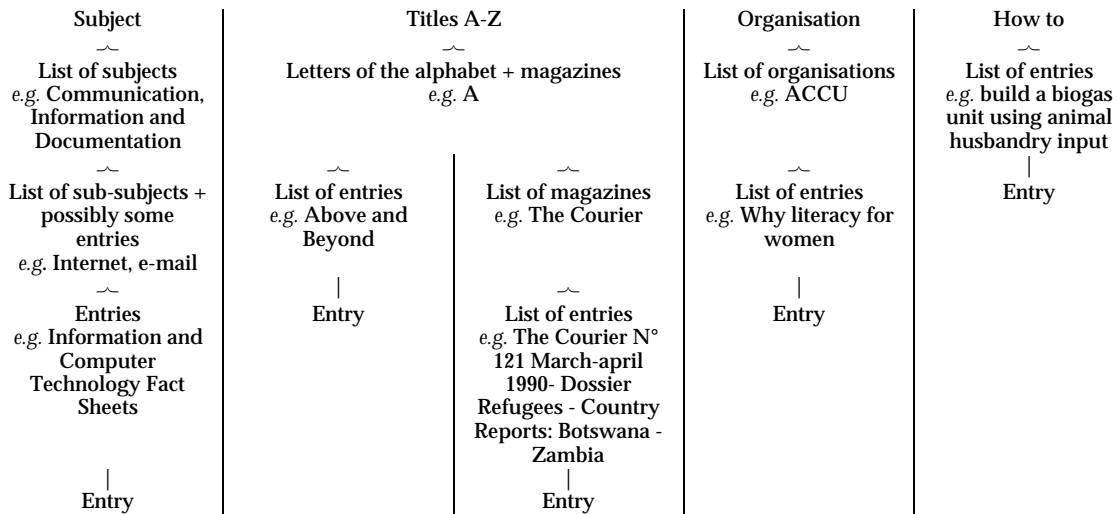
An important aspect of digital libraries which influences many interaction properties is the categorical structure provided. As discussed elsewhere, the ACM DL has a fairly simple hierarchical structure as illustrated below. This example shows how from the main index page conferences are accessed which contain lists of conferences and so on. Similarly, search results contain lists of abstracts which point to individual articles.



There are several similar structures imposed on the ACM DL including:

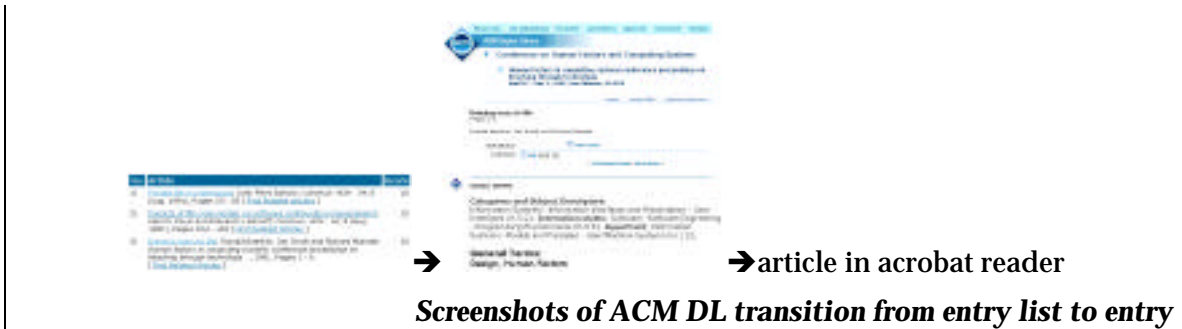
- ACM journals and magazines
- ACM proceedings by subject
- ACM proceedings by sponsor
- ACM proceedings by series (as illustrated above)
- journals and magazines by affiliated publishers
- resources from affiliated organisations

In contrast, collections in the NZDL may have many different structures – the FAO DL has no browsing structure, the Computer Science Technical Reports archive allows users to browse by FTP site (as indicated by the IP address), whereas the WDL has four categories as outlined below.



It is interesting to note that not only do different categorisations have different numbers of levels (ranging from 1 to 3), there is also a split within one categorisation – the *Title A-Z* categorisation. In this category entries can be viewed by letter, or *via* a different categorisation – *Magazines*. This categorisation itself has a list of magazines, each of which has its own list of entries. In terms of interaction this may be cause problems with familiarity as some parts of the *Title A-Z* categorisation lead straight to entries whereas others (*magazines*) do not.

An interesting comparison between ACM and NZDL is in terms of their structuring of abstracts as illustrated in the following screenshots. Both approaches use abstracts of some sort, but ACM's are on a separate web page to the article, whereas NZDL's appears within the same page as the entry is displayed. In terms of interaction, both require a mouse click event to get from the abstract to the entry, but because NZDL displays the entry on the same page (replacing the abstract) it somehow seems less effort to view the article – possibly because the browser appears to expend less effort as it does not clear the page before loading a new one, it simply updates the current one. Furthermore, the NZDL approach allows the structure of the entry to be displayed with the abstract, so allowing shorter interaction paths to particular parts of the entry (as the entry does not have to be viewed from the start first as with ACM). This approach also benefits the user in terms of familiarity when compared to the ACM DL where navigation within an entry depends upon the navigation provided by the article viewer e.g. Adobe Acrobat.



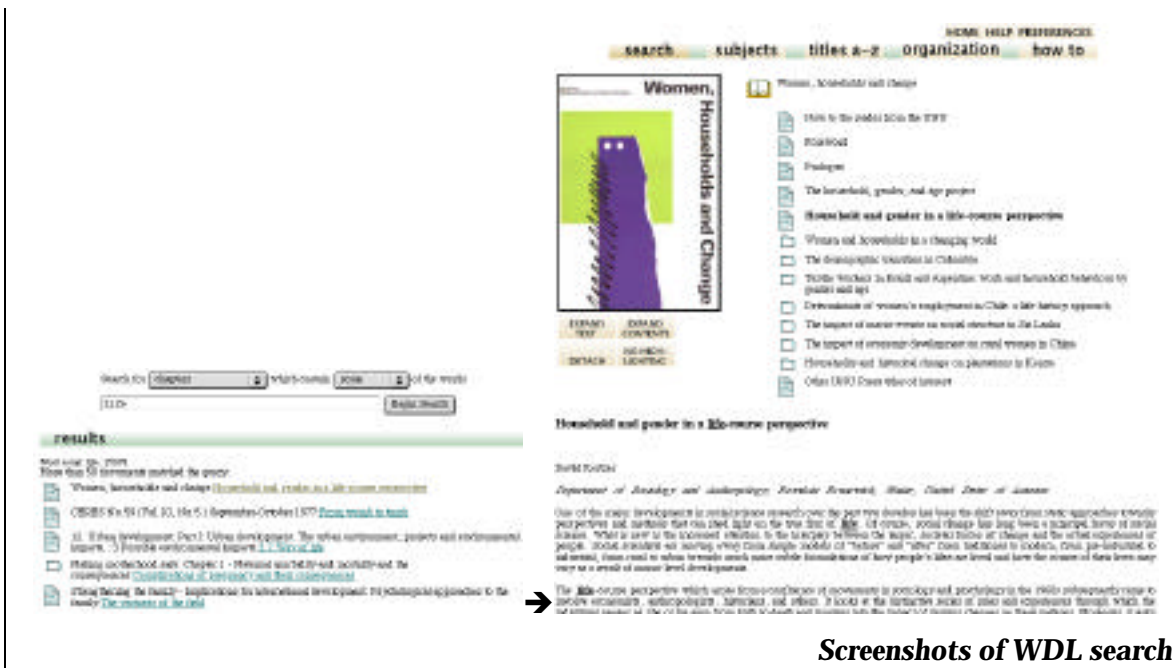


**Screenshots of NZDL transition from entry list to entry**

It is worth noting at this point that the information provided in the ACM DL's list of entries is more detailed than that in the HDL's – it includes details of authors *etc.* However, it is debatable whether all this extra information is useful. Clearly, when looking for particular authors it would be, but the study of ACM use showed that typically the amount of information provided by the ACM DL was not appropriate anyway (the abstract and article had to be viewed to determine its relevance).

Both the ACM DL and the NZDL share the problem identified with the ACM DL that in order to identify the relevance of an entry the user needs to navigate to the entry itself rather than utilising the information in the indices. This information can be used to make coarse assessments, but typically the entry itself must be viewed even if it only seems slightly relevant from the index. In the ACM study this was referred to as a problem with establishing mutuality - the index only allows users to reach level 2 where they know that the entry exists, and what type it is, but they do not have enough information to form an opinion of the content. This leads to extended interaction trajectories which involve the user in many sequences of movement from the index to entries and back again. Ideally users would be able to assess the relevance of the entry from the index.

Similar problems were found with the ACM DL's support for searching. In the ACM DL, when search results are returned they are presented in a list of entries whose structure is illustrated in the table at the start of this section. As with browsing, the user tends to view the abstract first, and then the article to determine if it is relevant. This then involves them in navigating back to the search results list to continue their view of the results. In the NZDL the search results list points directly to the entries (as opposed to providing links to abstracts). It could be argued that this saves the user time and effort in their interaction as they are taken directly to the relevant part of the collection. Moreover, items of the entry which matched the search are highlighted. Both these points are illustrated in the following screenshots. However, as mentioned previously, the indices in WDL provide terse information about entries and so users are more likely to want to view the entry to check if it is suitable anyway. Other collections such as the Computer Science Technical Reports (CSTR) provide abstracts with the entry in the index which may help the user to determine the relevance without any additional interaction. Of course, this relies on there being some abstract for the entry which, as illustrated in the second screenshot below, is not always the case.



Screenshots of WDL search



Screenshot of CSTR search results

**Navigation between issues of a journal**

As with the ACM DL, navigation between issues of a journal can only be accomplished by returning to the parent index page. The NZDL provides a relatively flatter structure in that journals are not grouped into years. This has the side effect of reducing the interaction required to navigate between issues of a journal over years, but long running journals may require a prohibitively large number of possible events to be displayed.

**Interactive Traps**

The study of the ACM DL revealed that it was possible for a user to form mis-beliefs about the content of the library e.g. thinking that certain articles didn't exist that in actual fact do. In the NZDL there may be similar situations as reported elsewhere. For example, in the Gutenberg Collection (another NZDL collection) a novice user who searched for the author Jules Verne and was presented with the set of texts illustrated in the following screenshot may assume that the text *Survivors of the Chancellor* is not held within the collection (even though it is). As far as such as user is concerned, the computer system has presented evidence that it does not exist. This leads to the user incorrectly abandoning their objective, and moreover leads to them maintaining the belief that searching on author's full names is the most appropriate form of search within the collection, possibly generalising such a belief to other collections. The

problem in this case is that that particular entry is categorised under the author *J. Verne*, not *Jules Verne*.



**Search results for Jules Verne**

## Mutuality

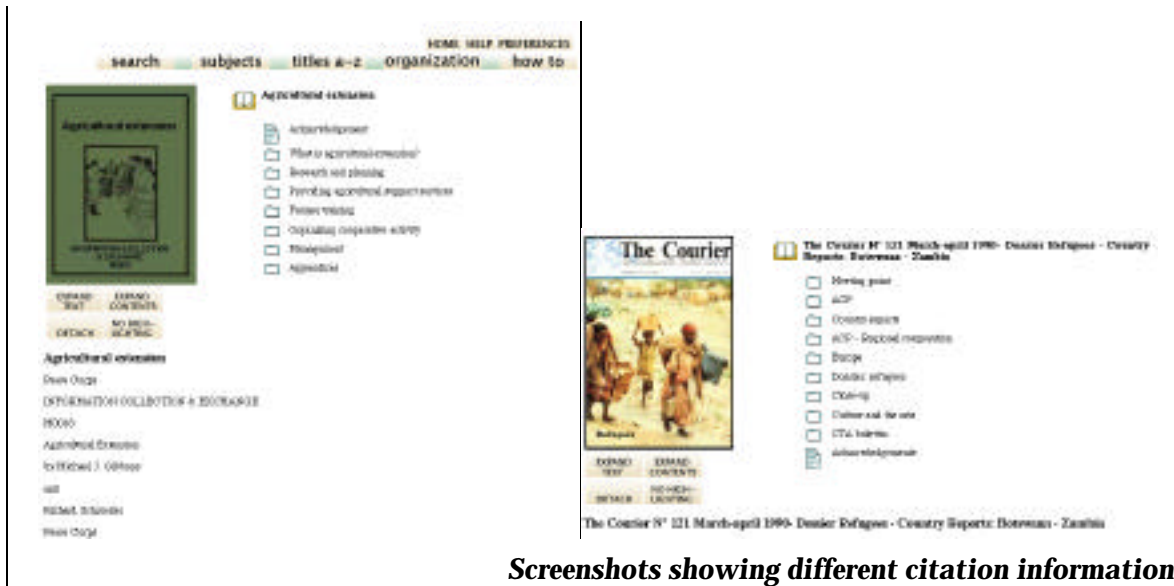
So far, problems of establishing mutual understandings have been discussed in the context of other problems. The following points consider situations in which there is no attempt by the interface to establish mutual understandings.

### Lack of – file size

One of the problems encountered in the study of the ACM DL use was the sometimes lacking communication of file size – usually once some article was being loaded. In the NZDL there is no explicit notion of entry size, so the user has no way of knowing how long an entry might take to view before they start the interaction.

### Lack of – citation

Again, in the ACM DL, there were often problems with lacking citation information, or at least difficult to locate citation information. In the NZDL there citation information is typically *ad-hoc*. For example, in the following screenshot there is some citation information provided at the bottom of the left page, but it is not clear how this is to be interpreted. Other entries such as magazine articles in the WDL do give more explicit citation information such as exemplified in the right hand screenshot below. In this case the name of the magazine, the date of publication, and the number are given. It is interesting to note that both these entries come from the WDL.



Screenshots showing different citation information

**Discriminability**

Good discriminability is particularly important in digital libraries as users are often faced with a bewildering number of possible events (e.g. in the results of a search) which they need to be able to distinguish and determine which are most relevant to their objectives. This section considers some of the problems found with discriminability in both the ACM DL and the NZDL.

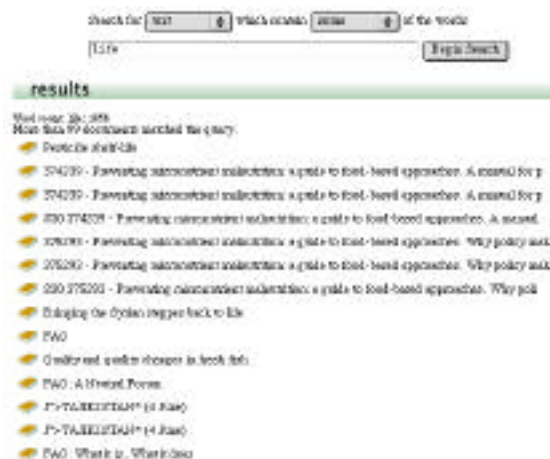
**Repeated entries**

The ACM DL appears to have very few repeated entries. In the study only one repeated entry was found in a search results list. In the NZDL it is a different matter. Each collection defines its own policy, so whilst UN collections have no repeated entries, the Gutenberg collection does (see previous screenshot of the Gutenberg collection with multiple entries for *Classic Books*). As discussed later, this causes problems in terms of what understandings of the workings of collections can be carried over to other collections. In addition, where there are multiple entries, users do not know from the information presented whether these entries are identical, or whether they have the same name, but different content (e.g. different translations). Conversely, there may be some entries which appear to have different names in the index, but are essentially the same entry (e.g. *De la Terre à la Lune* and *De la Terre □ la Lune* may be superficially different names, but lead to identical entries).

**Lots of similar entries**

As discussed previously, the NZDL provides less information for entries in indices than the ACM DL. Whilst this means that more entries can be displayed per page, it also means that there is more chance of entries appearing to be similar in the index. For example, searching for *life* in the FAO produces a long list of search results, some of which are illustrated in the screenshot below. In this list there are several entries related to *Preventing micronutrient malnutrition*, and two entitled *J" >TAJKISTAN\* (4 June)*. These do not give much information to the user about their content, how they differ from each other (if at all), nor how they are relevant to the search. One solution may be to include the abstract with the index entries as the CSTR does, though this would involve larger amounts of information for the user to trawl through in the index.





**Screenshot of FAO search results**

### **Familiarity between collections in NZDL**

The NZDL acts as an umbrella for several different collections which all employ similar user interfaces based on Greenstone software. This has advantages in that there are clear similarities between the use of different collections, and so users can employ their familiarity with one collection to others. However, each collection is independent and has its own policies for structuring, searching, and notions such as uniqueness. As touched upon in this document, these differences could lead to problems when users move between different collections, some of which are summarised in the following paragraphs.

#### **Search terms**

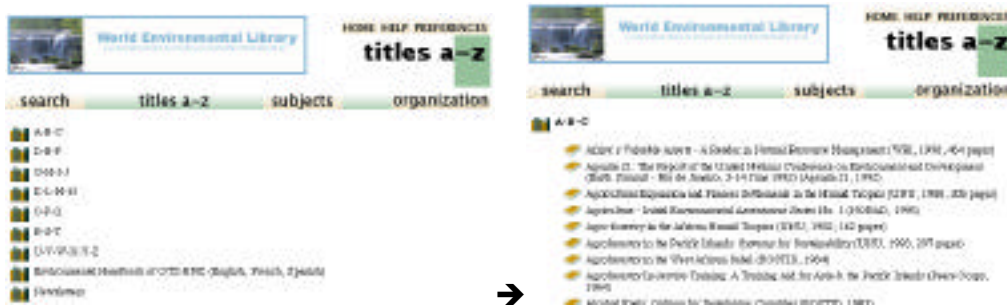
As discussed previously, different collections provide different names for fields to be searched which may or may not be the same as the names used in other collections. This makes it difficult for users to carry over their familiarity with the kinds of information being searched from one collection to another.

#### **Structure**

Not only do different fields have different names, but categorisation may be employed differently between collections. Clearly different kinds of collections might need different structures to support their use, but resolving the idiosyncrasies of different structures may be problematic for users. For example, even within the UN collections there are differences in the use of *Titles A-Z* structuring, as illustrated in the following screenshots. In the HDL there is a categorisation for sets of letters which runs along the top, articles are then shown as a list. In the World Environment Library (WEL) on the other hand, the categorisation is treated as folders giving a different form of interaction as shown in the following screenshots. These differences might cause users confusion when changing from one collection to another, or difficulty in becoming familiar with the structures if they user both at the same time.



Screenshots of Titles A-Z in WDL



Screenshot of Titles A-Z and A-B-C in WEL

Entry uniqueness

As discussed previously, different collections in the NZDL have different policies on uniqueness of entries. The Gutenberg collection, for example, allows multiple entries, whereas UN collections do not. Again, becoming familiar with one policy will have impact on use of collections with different policies.

Conclusions

The main conclusions to draw from this brief view of the NZDL relate to the familiarity between collections just discussed. The issues of allowing different collection policies, whilst also informing users of these differences, need to be addressed so that user can employ their familiarity with collections more effectively. As with the ACM DL the issue of navigation between entries (either in a search list, or in issues of series) needs to be addressed. The NZDL provides more efficient support for browsing in some cases, but further work needs to address how users can grasp a notion of the appropriateness of the content of entries without viewing them in full.

Acknowledgements

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References

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Spink, A., Bateman, J., & Jansen, B. J. (1998). Searching Heterogeneous Collections on the Web: Behaviour of Excite Users. *Information Research*, Volume 4 No. 2.