

## **Added Value: new interfaces for cultural collections**

Dr Ben Ennis Butler

Lecturer, Discipline of Creative and Cultural Practice,  
Faculty of Arts and Design, University of Canberra

[ben.ennisbutler@canberra.edu.au](mailto:ben.ennisbutler@canberra.edu.au)

Ben Ennis Butler completed his PhD, *Escaping the search box: developing digital interfaces that encourage exploration and discovery*, at the University of Canberra in 2017. He is currently a Lecturer in the Discipline of Creative and Cultural Practice, Faculty of Arts and Design, University of Canberra. He is an independent web developer with a focus on access to cultural collections.

In this paper I will argue that the creation of innovative digital interfaces allows increased public access to large digital cultural heritage collection as well as the emergence of new forms of collaborative practice. To demonstrate the value of these practices, I will present two case studies from my doctoral research. These were both undertaken through a partnership with the department of Australian Prints and Drawings at the National Gallery of Australia. The first, Subjects Explorer, allows a user to engage in visual information seeking, rather than using keyword-based search. The second, Timeline, provides a comprehensive data-driven overview of an artist's career.

In these interfaces I introduce the concept of dynamic focus + context displays, which combine data visualisation techniques with modern web design methods in order to create new forms of exploration. Central to the creation of both interfaces was an emphasis on high quality and visually orientated design components, this was achieved through careful consideration of typography, layout and colour. I will place my interfaces within historical and theoretical contexts and will refer to specific concepts of serendipitous discovery, free-form exploration and generous interfaces. I will also discuss ways of overcoming technical constraints associated with the creation of experimental web-based interfaces.

Our cultural institutions hold the rich resources which make up our national cultural heritage. These vast collections are increasingly accessible online, and available to a worldwide audience via a standard keyword-based search field. There are, however, limitations with this method of access. In this paper, I argue that the creation of innovative digital interfaces allows increased public access to cultural heritage collections, as well as the emergence of new forms of collaborative practice. I will demonstrate the value of these practices by describing two case studies, *Subjects Explorer* and *Timeline* were produced as part of the Explore Australian Prints and Printmaking (AP+P) project, in partnership with the department of Australian Prints and Drawings and the National Gallery of Australia. They were completed during my doctoral research in 2016. These interfaces introduce the concept of dynamic focus+context displays, which combine data visualisation techniques with modern web design methods to create new forms of exploration.

Keyword-based collection access has a long history. It evolved from early card-based cataloguing systems, the development of modern databases, and morphed into the keyword-based search interface we are now so familiar with (Kowalski, 2010; Manning et al., 2008; Sanderson and Croft, 2012). Keyword-based search is an extremely powerful technique, however, as Backhausen (2012) argues, it assumes a user has an information need which they can identify and are proficient with the use of keywords that will return relevant results. The problem with this scenario is that it leaves little room for the outsider, the general user who might happen upon the digital collection but who do not know either what the collection is, or how to query it effectively. A keyword-based search does little to encourage such users to interact with, and explore, a digital cultural heritage collection.

I am particularly interested in engaging with these general users who might be visiting a gallery, library or museum (GLAM) collection website hoping to stumble across something they haven't seen before, in much the same way as one might discover a new work on display at a gallery or an interesting book on the shelves at a library. The aim of my practice-based research was to create interfaces that allow these users to engage in a process of free-form exploration and serendipitous discovery.

When I refer to the phrase 'free-form exploration and serendipitous discovery', I am specifically concerned with promoting exploration within digital interfaces, where the user is not following a linear path and has no specific goal but through a chance encounter with unexpected items experiences feelings of surprise and delight. In the context of my research project, these feelings are central to the notion of serendipitous discovery. Hangal, Nagpal and Lam (2012) describe

serendipitous discoveries as being important because they entertain and captivate users. Chan (2007) explains how the design of an environment, be it physical or digital, can be made to encourage serendipity: 'it is increasingly important to offer visitors opportunity for serendipity [...] to retain their attention and to encourage them to explore the Web site.' Chan (2007) and Taramigkou et al. (2003) go further and argue that chance encounters can lead to advancements in knowledge. It is clear that if the design of the interface can provide users with the opportunity to engage in free-form exploration, then serendipitous discoveries are likely to eventuate. The design choices I have made are strongly linked with popular cultural references, through the use of typography, colour and integration with Google's material design guidelines, and the Bootstrap framework.

The interfaces I introduce in this paper, *Subjects Explorer* and *Timeline* are the final two in a group of six interfaces created between 2012 and 2016. Earlier interfaces, *Works and Networks*, *Decade Summary* and *All Artists* were introduced at *Museums and the Web* in 2013 (Ennis Butler, 2013) and were produced in collaboration with Assoc Prof Mitchell Whitelaw. These early works informed Whitelaw's (2012) concept of generous interfaces. *Subjects Explorer* and *Timeline* are the most complex and substantial of the interfaces produced, and responded to feedback provided through a mixed-method evaluation study I completed during my candidature. They provide additional understandings of the principles of generous interfaces in action. All of the interfaces are accessible online at: <http://www.printsandprintmaking.gov.au/explore>.

## **Subjects Explorer**

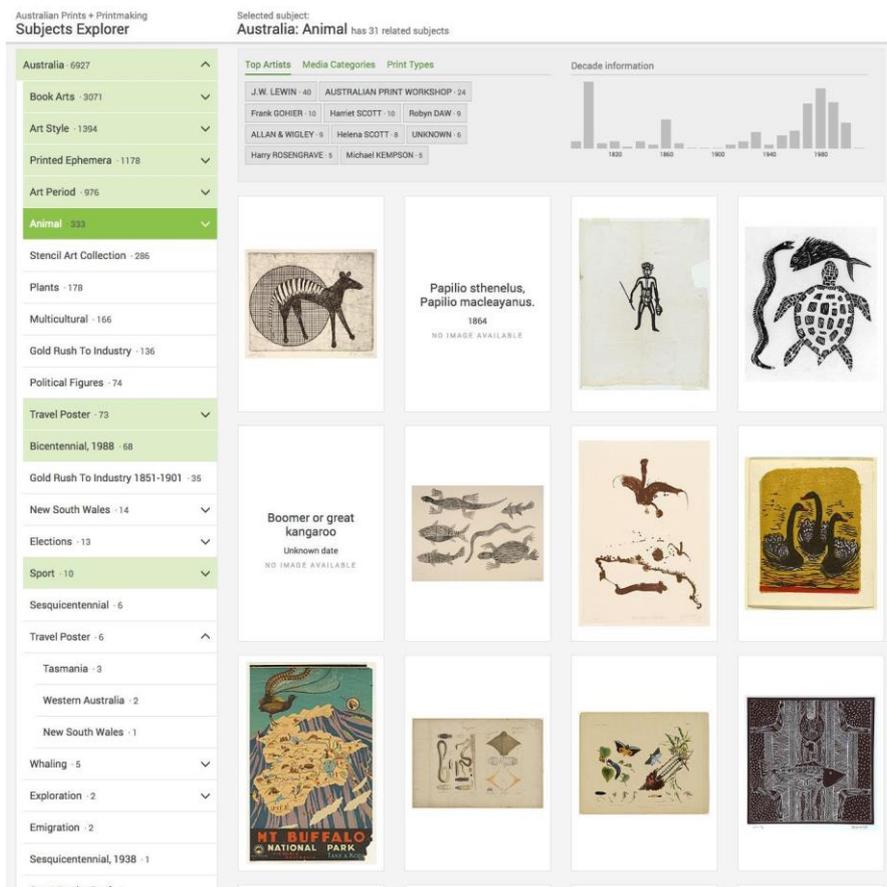


Figure 1. Subjects Explorer.

*Subjects Explorer* provides a unique way to explore the AP+P collection based on an artwork's subject (Figure 1). This detailed information would normally only be accessible on the individual artwork page on the main AP+P website. *Subjects Explorer* aims to bring this rich information to the fore by revealing related subjects, encouraging new ways of accessing the collection and allowing new discoveries to occur.

*Subjects Explorer* embraces a strong column based layout and consists of two main sections: on the left, a hierarchical list of all the subjects from the AP+P collection; and on the right, the associated artwork information.

The subject list displays 90 top-level subjects, many of which have nested subjects. Clicking the chevron arrow on the right of the box will reveal them—they can be up to four levels deep. Next to the subject is an artwork count where the user can quickly see that many subjects have fewer than 20 artworks. I deliberately chose to leave this 'long tail' visible, rather than grouping them together into one box (containing, for example, all subjects with less than 20 artworks) because I didn't want

them to be absorbed and 'lost' within the main list. By keeping the subjects separate, a user can actually see them and explore their contents in a random manner. A dark green background identifies the currently selected subject and a light green background indicates that there are related subjects within those artworks. These muted shades of colour are a design feature aimed at providing visual cues to captivate the user. For instance, after selecting 'Anti-War', we see that 'Unemployment', 'Human Rights' and 12 other subjects all have a light green background too; upon viewing the details for the artwork, *Daddy what did you do in the nuclear war?* by Chips Mackinolty and Toni Robertson, we can see that it has three subjects: 'Nuclear', 'Nuclear: Issues' and 'Anti-War' (Figure 2).

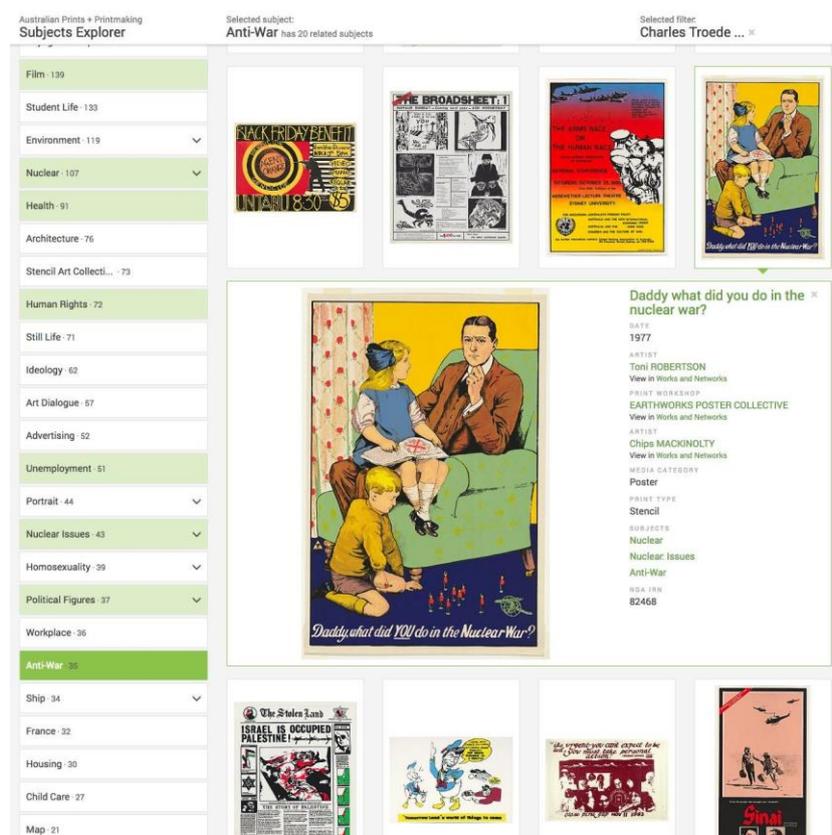


Figure 2. Detail of selected artwork in Subjects Explorer.

The section on the right takes up the majority of the screen width and contains associated information about the artworks for each subject. At the top an interactive summary allows the user to refine the display of the artworks below. There are three tabs which allow filtering by: top artist, media category or print type; and a bar chart to filter by decade. Under each tab there can be up to 10 buttons; in these the font size is scaled to be relative to how many items they represent—again, immediately providing the user with a visual indication as to which button has the most records associated with it.

The artworks themselves are displayed in a four column grid with large thumbnails. If there is no image, rather than displaying an 'x', the artwork title, date and an explanation 'No image available' is shown. Clicking an artwork creates a focus+context display where a new full width row is inserted immediately below the selected artwork, which contains a larger image and additional cataloguing information. A link to the full artwork or artist record in the AP+P site is available via the artwork title or artist name; as is an additional link to view the artist in the *Works and Networks* interface. Each subject associated with the artwork is also listed. Clicking on one of these will refocus *Subjects Explorer*, for example, changing focus from Australia to Human Rights. This allows a further method of navigating the interface without having to go through the main subjects list.

## Timeline

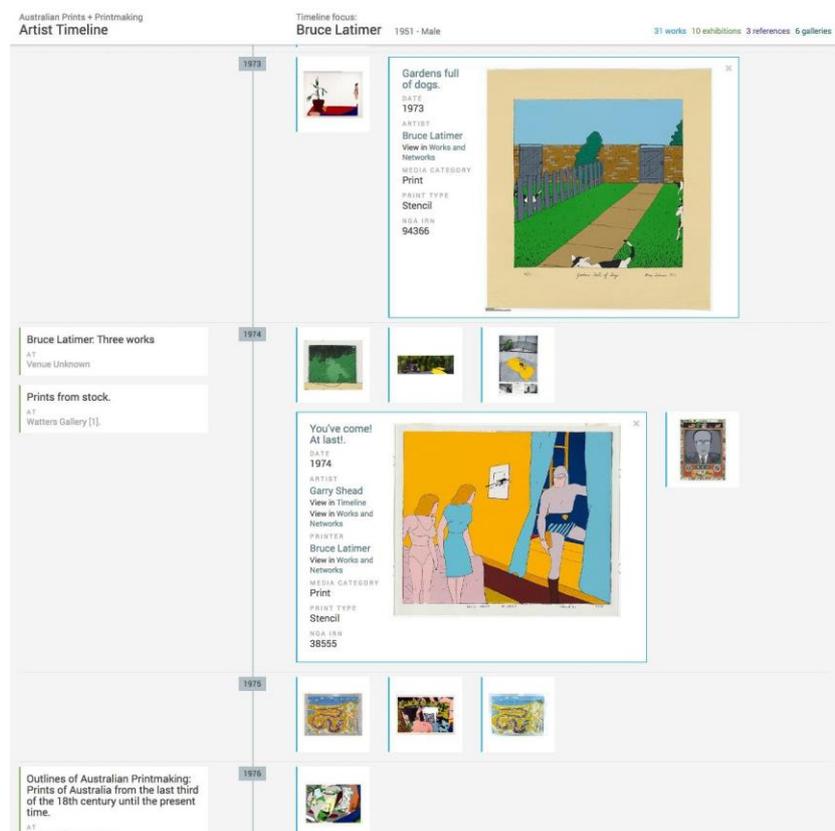


Figure 3. Timeline - focused on Bruce Latimer.

*Timeline* provides the user with an immediate visual overview of the life of an artist or gallery (Figure 3). For the first time, it became possible to see detailed information about artworks, exhibitions and references all within a single view.

*Timeline* defaults to an artist centric view, where the user is presented with 70 random boxes containing different artist names and artwork count. The font size in each of these is modified using the same technique as in *Subjects Explorer*. This provides an immediate visual clue as to which artists might have a more developed timeline. Above these boxes is a search field, which allows a quick search for other artists represented in the collection. I added this function to make the interface as useful as possible, as it enables those users who already know the collection or are looking for a particular artist, to easily find them and view their timeline. Even though the initial view of artists' names is randomised, the order is retained so that if a user returns to the start screen by using the back button, they will still be able to see the original selection of artists. Clicking a name will load the *Timeline* for that artist.

*Timeline* features a three-column display. To the left, exhibitions, galleries and references are displayed; the middle pane contains the year; and on the right are the artworks themselves.

The artworks, exhibitions, galleries and references are displayed in boxes, each of which has a colour coded left border. These colours align with a label and count in the page header, with light green for exhibitions, blue for artworks, purple for references and dark green for galleries. As with *Subjects Explorer*, the design gives subtle visual cues regarding aspects of the interface.

The left pane contains boxes with information on exhibitions and references. For an exhibition, I show the title, primary gallery name and total number of artworks included in the exhibition (if this data is available); a reference box contains the title and author. All are interactive and clicking on a box will either: expand the current box to show more information, or for an exhibition, insert a new full width row into the interface (under the current year) containing detailed exhibition information (Figure 4). This is one of the most exciting features of this interface as it shows how richly structured data can be used to create engaging new methods to represent collection data. For the first time it is possible to view an exhibition and artworks in both the context of an artist's life span and amongst artworks produced by fellow artists.

Figure 4: Detail of expanded exhibition view in *Timeline* for Jessie Traill. [INSERT IMAGE]

The year labels are shown in the middle pane, joined by a lovely grey-blue coloured line that extends between each one. Where there is no data for a particular year, the line is broken and the label removed, thus significantly reducing the page height and ensuring as concise a display as possible. For example, Margaret Preston was born in 1875 and her first artwork in the AP+P

collection was produced 40 years later, as each year label is 30 pixels high, it would have added 1200 pixels of blank space to the start of the interface.

Unlike most timelines, this one often continues after the artist's death (and into the future), and so I have designed it to accommodate exhibitions and references created past the current year, ensuring longevity of the interface. At the bottom are the records that have an unknown date, these are grouped together and are always available; removing them from the interface would skew the representation.

The right pane contains information about artworks produced in each year. These are displayed in a box that either contains a thumbnail image of the artwork, or the title and text: 'No image'. The boxes are interactive and clicking on one will cause it to expand and show a large artwork image alongside the title, date, list of creators, media category and print type.

The expanded exhibition row maintains the exhibition border colour at the top and bottom and has a white background to clearly differentiate it from the rest of *Timeline*—thus allowing me to introduce an additional layout for the information within the box. Two panes are in this extra display, the left contains detailed exhibition information, and the right, the artwork data.

I have made the representation of data within this focus+context display as rich as possible in order to maximise their usefulness. Therefore, in addition to detailed exhibition information containing the title, date and summary, I have also included the name of the primary gallery, how many other exhibitions were held at the gallery and the total number of artworks in all of their exhibitions; as well as the total count of artworks in the current exhibition, how many artworks were by the current artist and a list of other artists in the exhibition. The timeline can be refocused from within this pane by clicking on an artist's name or following the 'View Gallery *Timeline*' link below the gallery name. I call this technique a 'dynamic focus+context display' which I will discuss later in this paper.

The right pane contains a grid of artworks from the exhibition. Exhibited artworks by the current artist are shown first (if that information is in the AP+P collection); followed by exhibited artworks by all other artists below. For each of these, rather than just showing the thumbnail of the artwork, I include the title, primary artist name and artwork date. A link on the title takes the user to the original cataloguing record on the main AP+P site. Clicking the artist name will refocus the timeline.

Where possible, I have added additional data-driven descriptive text to the timeline to help reveal further aspects about the artist (Figure 5). For instance, in the first year of the timeline, the exact date of the artist's birth and their birthplace is listed; if the data contains a death date and place, then it is listed beside the corresponding year also—if the data contains both the birth and death years then I can calculate the age of the artist when they died, and that is listed too. I have found this simple feature creates a more humanising interface which was confirmed in the evaluation I conducted. This style of turning simple catalogue data into more meaningful information has also been demonstrated on the Cooper Hewitt collections site (see Figure 6 it is particularly effective as it changes the way the data viewed, it is no longer simply a catalogue listing.

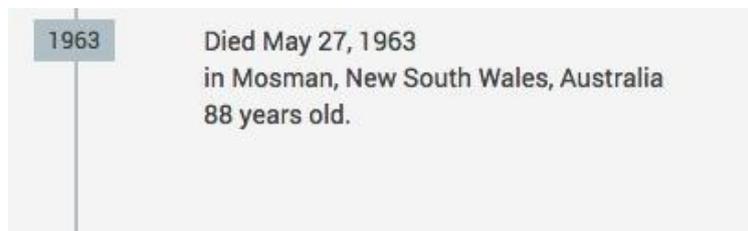


Figure 5. Detail of data-driven descriptive text in *Timeline*.

## **PH ARTICHOKE HANGING LAMP, 1958**

✚ Click the icon to save this object

This is a **hanging lamp**. It was designed by **Poul Henningsen** and manufactured by **Louis Poulson & Co. A/S**. It is dated 1958 and we acquired it in 1983. Its medium is **bent sheet copper, cast steel, enameled metal**. It is a part of the **Product Design and Decorative Arts** department.

Figure 6. Detail of data-driven descriptive text on the Cooper Hewitt collections site.

### **Dynamic focus+context displays**

In my discussion of these interfaces I have referred to the use of dynamic focus+context displays. This technique was described by Card et al. (1999) as one in which the user is simultaneously provided with both the overview (context) and detailed information (focus). Cohen and Brodlie (2004) explain how the challenge is to 'find a way of looking at a high level of detail at this area of

focus, without losing the overall context.’ Much of the literature (Lamping et al., 1995; Rao and Card, 1994; Card et al., 1999) refers to the creation of focus+context techniques in software that creates information visualisations. In *Subjects Explorer*, a dynamic focus+context display is shown when a user clicks on an artwork thumbnail and the full width row is inserted into the display; in *Timeline*, the action is similar, larger artwork images alongside the thumbnails, and detailed exhibition information is inserted into the interface. Rather than relying primarily on visualisation techniques I have combined focus+context displays with dynamic data and Web-based methods to provide access to fine-grained detail whilst maintaining context. This is in stark contrast to traditional collection access interfaces.

### **Free-form exploration and serendipitous discovery**

Exploration is a crucial process which the design of an interface should allow to occur. Throughout the interfaces I provide multiple opportunities for a user to begin the exploration process, as I demonstrate in initial views of both *Subjects Explorer* and *Timeline*.

In *Subjects Explorer*, the view includes the full list of subjects in the left pane, and in the right, the top subjects are repeated, with the font size relative to the artwork count—giving the user two different ways to start exploring. In *Timeline*, a random sample of artists is shown, again using the font size adjustment technique, which aims to prompt the user to make a selection. These are rich hooks that do not attempt to show everything or provide an overview, but instead aim to show ‘enough’ to encourage the user to start exploring the collection.

### **Conclusion**

In conclusion my research has demonstrated the best way to stimulate curious, creative and critical engagement is to create interfaces that liberate the general user from the traditional constraints of keyword-based search interfaces and offer multiple methods to start exploring, as well as providing detailed representations of the data within the sites. The interfaces developed for the AP+P site make an ongoing contribution to a field which is in a rapid and exciting phase of development and the methods, techniques and overall approach they embody are applicable to any other collection of cultural data.

## References

- BACKHAUSEN, D.T.J., 2012. 'Adaptive IR for exploratory search support', in: *Proceedings of the 35th International ACM SIGIR Conference on Research and Development in Information Retrieval*, SIGIR '12. ACM, New York, NY, USA, pp. 992–992.  
doi:10.1145/2348283.2348416
- CARD, S.K., MACKINLAY, J.D., SHNEIDERMAN, B., 1999. *Readings in Information Visualization: Using Vision to Think*. Morgan Kaufmann.
- CHAN, S., 2007. 'Tagging and Searching – Serendipity and museum collection databases'. Presented at the Museums and the Web, Toronto.
- COHEN, M., BRODLIE, K., 2004. 'Focus and context for volume visualization', in: *Proceedings Theory and Practice of Computer Graphics*, 2004. Presented at the Proceedings Theory and Practice of Computer Graphics, 2004., pp. 32–39. doi:10.1109/TPCG.2004.1314450
- ENNIS BUTLER, B., 2013. 'Visual Exploration of Australian Prints and Printmaking', in: *Museums and the Web 2013*. , N. Proctor & R. Cherry (eds). Silver Spring, MD: Museums and the Web. Published February 28, 2013. <http://mw2013.museumsandtheweb.com/paper/visual-exploration-of-australian-prints-and-printmaking/>
- HANGAL, S., NAGPAL, A., Lam, M., 2012. 'Effective Browsing and Serendipitous Discovery with an Experience-infused Browser', in: *Proceedings of the 2012 ACM International Conference on Intelligent User Interfaces*, IUI '12. ACM, New York, NY, USA, pp. 149–158.  
doi:10.1145/2166966.2166994
- KOWALSKI, G., 2010. *Information Retrieval Architecture and Algorithms*. Springer Science & Business Media.
- LAMPING, J., RAO, R., PIROLI, P., 1995. 'A focus+ context technique based on hyperbolic geometry for visualizing large hierarchies', in: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM Press/Addison-Wesley Publishing Co., pp. 401–408.
- MANNING, C.D., RAGHAVAN, P., SCHÜTZE, H., 2008. *Introduction to information retrieval*. Cambridge University Press, New York.
- RAO, R., CARD, S.K., 1994. 'The table lens: merging graphical and symbolic representations in an interactive focus+ context visualization for tabular information', in: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM, pp. 318–322.
- SANDERSON, M., CROFT, W.B., 2012. 'The History of Information Retrieval Research'. *Proceedings of the IEEE* 100, 1444–1451. doi:10.1109/JPROC.2012.2189916
- TARAMIGKOU, M., BOTHOS, E., APOSTOLOU, D., MENTZAS, G., 2013. 'Fostering serendipity in online information systems', in: *2013 International Conference on Engineering, Technology*

*and Innovation IEEE International Technology Management Conference*. Presented at the 2013 International Conference on Engineering, Technology and Innovation IEEE International Technology Management Conference, pp. 1–10.  
doi:10.1109/ITMC.2013.7352707

WHITELAW, M., 2012. *Towards Generous Interfaces for Archival Collections*. Presented at the International Council on Archives, Brisbane.  
<http://www.ica2012.com/files/data/Full%20papers%20upload/ica12Final00423.pdf>