discourse: Deakin University Library research and practice

No. 6 2017

Content management for dynamic, digital displays in academic libraries

Danielle Johnson and Lauren McDonald
No. 6 2017

Content management for dynamic, digital displays in academic libraries
Danielle Johnson and Lauren McDonald

ABOUT THE AUTHORS

Danielle Johnson is the Manager, Digital Library Technologies at Deakin University Library. She has previously worked as the Digital Experience Librarian at Deakin University and also in a variety of library and IT roles at Federation University. Danielle’s professional interests include digital content strategy; trends in digital user experience, research and testing; and innovation in the provision of integrated, high-value digital services to university communities. ORCID http://orcid.org/0000-0002-0845-1485

Lauren McDonald is Digital Content Writer and Editor at Deakin University Library. She has previously worked as an online health writer, student counsellor, and in various other psychology roles. Lauren’s professional interests include communications strategy, user experience, research, support and education based content. ORCID http://orcid.org/0000-0002-1016-9964

RECOMMENDED CITATION

Johnson, D & McDonald, L 2017 ‘Content management for dynamic, digital displays in academic libraries’ discourse: Deakin University Library research and practice, no. 6, Geelong, Deakin University Library http://dro.deakin.edu.au/view/DU:30092212

ISSN 2205-0531

February 2017

DISCLAIMER
This report has been written as part of a series of reports published by Deakin University Library. The views expressed in this report are those of the author only and do not necessarily reflect the position or policy of Deakin University.

©DEAKIN UNIVERSITY
This work is copyright under the Copyright Act 1968 and equivalent legislation in overseas territories. In addition to uses permitted under the Copyright Act 1968, you may download, store in cache, display, print and copy all or part of this document for educational or non-commercial purposes and only in an unaltered form. Any reproduction made must include the above citation and the original copyright information.

All other reproduction or uses, require permission from a copyright_inquiries@deakin.edu.au.
discourse: Deakin University Library research and practice

discourse: Deakin University Library research and practice shares the research and experience of Deakin University Library staff with a global audience. discourse provides a forum for the development of ideas, bridging the divide between formative library working documents and final peer-reviewed works. discourse is delivered via our repository channel, Deakin Research Online and its content is discoverable via free, public search tools.

Deakin University Library staff are active participants in our professional community where we build and share expertise; interpret, analyse and communicate trends and developments that may have significant impacts for the Library and Deakin University, and that can assist in building a bold and exciting future for Deakin.

We welcome your feedback on any of the papers in discourse and your discussion on the topics that they raise.

Series Sponsor
Dr. Craig Anderson
University Librarian

In this series:

No. 1 2015, Towards an understanding of ‘Digital Literacy(ies)’, Pauline Hagel
http://dro.deakin.edu.au/view/DU:30073198
No. 2 2015, What is good practice in the development, assessment and evaluation of digital literacy for graduate employability?, Pauline Hagel  http://hdl.handle.net/10536/DRO/DU:30073199
No. 3 2016, Digital literacy, Sue Owen, Pauline Hagel, Bernie Lingham, Daisy Tyson
http://dro.deakin.edu.au/view/DU:30082926
No. 4 2016, ‘Just dance’ with digital literacy, Christine Oughtred and Sabina Robertson
http://dro.deakin.edu.au/view/DU:30073227
No. 5 2016, Bridging the copyright and licensing gap, Alice Fahey, Chrissy Freestone, Fiona Russell and Caitlin Savage
http://dro.deakin.edu.au/view/DU:30068890
No. 6 2017, Content management for dynamic, digital displays in academic libraries, Danielle Johnson and Lauren McDonald  http://dro.deakin.edu.au/view/DU:30092212
Content management for dynamic, digital displays in academic libraries

Danielle Johnson and Lauren McDonald

Abstract

Deakin University Library installed eight large multimedia screens in late 2013. Five touch-interactive screens, known as The Verge, became the central component of the installation and were positioned inside the main entrance of our Geelong Waterfront Campus Library. Based on our experience creating and maintaining displays for The Verge, this paper will discuss content types and patterns of success. We will also explore key considerations including user engagement, interaction and animation, physical space, hardware and software, resourcing, defining and measuring success. By reflecting on our experiences and considering research trends we draw conclusions to inform future development plans for digital displays in academic libraries.

Keywords: digital display, multimedia, touch screens, interactive, engagement, The Verge, digital signage

Introduction

In 2013 Deakin University Library installed eight multimedia screens. The vocal point for the digital displays was the five large, vertical, touch-interactive screens inside the entry to the Geelong Waterfront Campus Library. These five screens were grouped together to become one display, known as The Verge, and will be the focus of this paper.

At the time of installation, the broad vision for our screens was to provide a window into the digital library; showcasing library resources and services and encouraging student use of them (Horn, Lingham & Owen 2014). Since that time, the goals have been adapted to more specifically encourage interaction and engagement with the screen content and to be a focus for activity and a talking point among library users.

‘Large interactive displays are among the most promising technologies that will become ubiquitous over the next twenty years’ (Schmidt cited in Ardito et al. 2015, p. 23). Deakin University Library has created a unique opportunity to engage library patrons, and the lessons we’ve learned through our experience will continue to inform display development in the future. As interactive displays become a standard method of information provision, we expect to refine and target content development to support our users by providing relevant, engaging and interactive content.
Content management for digital displays can be challenging. Library users are not homogenous and are engaged in a variety of tasks. ‘Providing display content to inform this wide user base poses a significant challenge’ (Clinch, Alexander & Gehring 2016, p. 15). Although our primary focus for interaction and engagement is library resources and services, we have also used the screens for non-library content in an attempt to generate greater interest, adapt to user interests, and support other events. Similarly, in order to meet both business and library user needs we have adopted and adapted a range of content types for presentation on the screens.

Content types

In their survey Ardito et al. (2015) identify five key digital display content types, or ‘application purposes’; productivity, entertainment, social interaction, gaming and advertising. They note that the same ‘application’ may have more than one purpose (p. 5). Davies, Alt and Clinch (2014) identify four applications or content types; signage, advertising, information boards and art and entertainment.

For our own purposes, Deakin University Library categorises content types as events (including live streaming), games & competitions, informational resources/services, signage and notices, and Deakin University showcase. Although nuanced, each of these categorisations have parallels with previously identified research, as illustrated in Table 1.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>Advertising</td>
<td>Signage and notices/Showcase</td>
</tr>
<tr>
<td>Entertainment</td>
<td>Arts &amp; Entertainment</td>
<td>Events</td>
</tr>
<tr>
<td>Gaming</td>
<td>No correlating content type</td>
<td>Games and competitions</td>
</tr>
<tr>
<td>Productivity</td>
<td>Information boards</td>
<td>Informational resources or services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/Showcase</td>
</tr>
<tr>
<td>Social interaction</td>
<td>No correlating content type</td>
<td>No correlating content type</td>
</tr>
<tr>
<td>No correlating content type</td>
<td>Signage</td>
<td>Signage and notices</td>
</tr>
</tbody>
</table>

Table 1: Correlation between application purposes by Ardito et al. (2015), applications by Davies, Clinch & Alt (2014) and content types by Deakin University Library

We live streamed a number of major events (events/entertainment); created or hosted interactive games (games and competitions/gaming); displayed digital signage for promotional or directional purposes (signage and notices/advertising); designed content to enhance student awareness of, and access to, library resources and services (informational/productivity). Our showcase content, such as presenting Deakin researcher output or student digital projects, can be paralleled with the Ardito et al. (2015) productivity and advertising purpose. All of these content types worked in different ways to generate interest in, engagement with, and awareness of, the screens. They also create a focus of activity around the digital display.

Patterns of success

Our ‘most popular’ displays collected the highest volume of positive feedback. Highly engaging displays required audience use of the touch screens to colour in digital pictures, or compete in gamified challenges. We measured success through observations, ad hoc feedback from library users and staff, analytics tracking and informal interviews.

Using a gaming style or system that is familiar to users can provide an incentive to engage with non-gaming content (Walsh 2014, p. 42). In keeping with this approach, an installation from our suite of games applied the popular gaming theme of Candy Crush™ with an overlay of graphics from material in our Special Collections. This introduced an element of fun, and created a bridge between archival collections and tangible interactions via multimedia. Bringing elements of play and games into the library serves a dual purpose of engaging users to interact with the resources, and helping to shift perceptions towards seeing the library as an approachable...
environment (Walsh 2014, p. 41). In particular, play can help to create a safe environment to experiment and learn, with potential to remediate new student ‘library anxiety’ (Walsh 2014, p. 48).

Another clear success, as evidenced by crowd numbers, has been our coverage of live sporting events. The Melbourne Cup for example draws a significant audience to the space each year. Live streaming events across the screens supported a sense of Deakin community and engaged students and staff. Arguably, they also heighten awareness of The Verge’s existence, thereby improving responsiveness to subsequent displays.

We observed that more successful displays contained elements of potential motivators, recognised by Malone (cited in Davies, Alt & Clinch 2014, p. 41) as content development techniques. These include challenge and control – providing just the right amount of challenge to encourage users to interact without producing anxiety; curiosity and exploration – producing novel and surprising, but not incomprehensible, elements; choice – providing users with options rather than being prescriptive; fantasy and metaphor – using imagination and imaginary settings; and collaboration – the ability to interact with other people whilst also interacting with the screens. Notably, our games and competitions content have adopted many of these motivating techniques.

The Verge helped raise the profile of the Library. Within Deakin, other Divisions request their content be published on the screens. Library staff have also presented at conferences across the globe (Horn, Lingham, Owen, 2014; Sadler, 2015). While feedback has been reassuring, we continue to try new ways to measure interaction and engagement and define display success.

Considerations

**Content creation and goals**

Sourcing and creating content can be challenging. Addressing the various copyright and licensing requirements of resource vendors and external sources such as logos, trademarks, and imagery is one such challenge. Copyright and licensing requirements around what can be displayed has impacted on content development, with some concepts not progressing due to vendor licensing restrictions. The complexity of copyright approval needs to be factored into the design and development process and timeframes. Liaison with vendors and copyright and licensing specialists has been an important factor to consider in content creation.

Secondly, managing library and university relationships is necessary in order to plan content that is fit for purpose. As Horn, Lingham and Owen (2014, p. 6) noted, ‘it was challenging to ensure non-Library colleagues developed a deeper understanding of outcomes to be realised beyond the notion of a digital signage system’. Similarly, today some content providers find it difficult to visualise the potential of their content and the message they want to deliver beyond a static billboard format. The notion of replacing their text-based messaging with interactive and visual formats is generally well received once we have conceptualised options fit for purpose. However, we do need to factor in time, effort and stakeholder engagement in order to help people arrive at this point.

Identifying a clear content purpose is necessary to ensure both business and user goals are met, and that a measurable outcome is possible. This can be a problem. Broad and varied content goals challenge us, most notably in how to measure their effectiveness. Even if a very specific purpose is defined for a display, measuring its effectiveness can be complicated. Data, both qualitative and quantitative, to measure and compare success of displays is inherently difficult to obtain.

**Defining and measuring success**

For a touch display, there are ongoing questions around what a definitive success measure might be. Do you focus on the area that gets touched first, gets the most touches, or remains exposed on the screens for the longest period of time? Orphanides (2011, p. 13) conducted an analysis on the premise that the first content the user selected from a suite of kiosk options was presumably the most relevant content to their needs. What of
installations that do not require touch? The reality is that different displays with different purposes each have their own definitions and thus measure(s) of success, as recognized by Alt et al. (2012).

There is not one single goal that public displays (or their content) try to achieve. Ads most likely strive for maximizing attention, interactive games may want to create an engaging experience, informative applications (e.g., a public transport schedule) may aim at maximizing usability, and some displays may be deployed to show warnings to passers-by or support the fast evacuation of a building … measuring the effectiveness of a display is difficult. (p. 1)

Measuring the success of gamified material should consider the motivations for players to participate. Zicherman and Cunningham (cited in Walsh, 2014, p. 43) outline the four key motivations for an individual to engage with gaming: mastery, de-stress, have fun, or socialise. The best measures of success for these displays would be dependent on the goal of the display. For example, gamified or novel content around exam time that aims to help our students de-stress would ideally measure stress levels before and after interactions with the screens, rather than touches on the screen alone. Therefore, it is difficult to accurately measure the success of content that doesn’t require interaction and is focused on sharing information, reducing users’ stress levels or creating an engaging and inviting space.

Despite the complexity defining and measuring success presents, ‘there is an emerging need for both practitioners and researchers, to understand how to best evaluate public displays with regard to effectiveness, audience behaviour, user experience and acceptance, and social as well as privacy impacts.’ (Alt et al. 2012, p. 1). To this end, in the future we will be focusing on creating a framework for content creation, and measures of success for further analysis. We expect to have more qualitative and quantitative data available once those measures have been introduced, which will further shape plans and themes for displays.

‘Display blindness’ and user engagement

Drawing users to the screens can be a difficult task as Memarovic, Clinch and Alt (2016) discovered.

Research has shown that modern viewers appear to look at pervasive displays for very short periods of time (less than two seconds), and many have become accustomed to ignoring them altogether – a phenomenon known as “display blindness”. (Memarovic, Clinch, & Alt cited in Clinch, Alexander & Gehring 2016, p. 21)

Recognising ‘display blindness’ is an important part of managing content. Media bombardment is inevitable in our technology saturated world, which can be overwhelming for the audience (Bae, Jun & Hough 2016, p. 323). Our students are also inundated with messaging from across the University. To avoid becoming noise, our content aims to serve a purpose, and draw attention without being obtrusive. This is an ongoing balancing effort, between the business goals that support library objectives, and meeting user needs. Horn, Lingham and Owen (2014, p. 8) reflect that as critical as selecting the right content is, how the content is visualised, the messages conveyed and how the content speaks to the target audience underpins the achievement of project outcomes and success.

An approach that can improve the relevance of displays and therefore help user engagement, is ‘situatedness’. This involves tailoring displayed media to the specific location of the screen. This might vary from simply tailoring the clock or weather to local conditions, to displaying community-relevant content, and even to displaying hyper-local travel information (Clinch, Alexander & Gehring 2016, p. 16). We use ‘situatedness’ in the context of displaying library specific content, for example, extended opening hours, our liaison librarian program and library resources. Research indicates that ‘users have a growing expectation that a display will have some sense of ‘situatedness’ – that is, it will have a connection to the space in which it’s embedded’ (p. 20). As such, this contextualisation will be a key element of our future displays.

Another consideration is the discipline of students enrolled at the Waterfront Campus. Margaryan, Littlejohn and Vojt (2010) found that students enrolled in a technical subject, such as engineering, used more digital tools than students of non-technical disciplines, such as social work. This may impact on how intuitive displays are to users with varied levels of digital competence or interest. Certainly with The Verge, architecture students in particular
have been very proactive in suggesting content and working with our designers to create displays for our screens. It is unclear how the screens are connecting more specifically with students in less technical fields.

Even when many of the proverbial boxes for development and engagement have been ticked, the reality is that some students will still be uninterested in our multimedia screens. Ultimately, ‘display blindness’ may simply be reflective of the reality that users come to the library for very specific purposes and the content on the screens may be incidental to their given need. Still, understanding who we are trying to engage with, beyond the generic student, and why, is important in creating relevant content our target audience notice and want to engage with.

Interactivity and animation

Although we have experimented with the use of external devices for gaming purposes, touch modality is the main form of interaction used. We contend that ‘interaction’ can also be considered in non-technical terms, such as users stopping to read screen content, or observing and conversing with other students that are engaging with the screens.

A project review of our displays in 2015 indicated that feedback was minimal where no interactivity or animation was incorporated into the design. Of the minimal feedback we did receive for those displays, a lack of engagement with the content was noted. Where installation design included either interactivity or animation, or both, an increased volume of positive feedback was received, but the extent of engagement tended to be determined by the content itself. That is, library clients may have observed or been drawn to the display but their level of subsequent engagement was content dependent.

For animated only displays, feedback reflected that library clients glanced at or noticed the display, but rarely engaged more deeply. For interactive only displays, feedback reflected that library clients were less likely to notice the display, but when they did observe it, they engaged with content only where interaction was obvious and simple to use.

Importantly, although we know both interactive and animated content received a higher volume of positive feedback, it only constituted around 10% of our display content. This is primarily because a significantly higher level of technical, design and planning complexity is involved in creating this type of content. For expediency, on occasion we have had to rely on only one element (either interactivity or animation) with the result that 69% of our content for 2015 was either interactive or animated only.
Although ‘it’s now commonplace for deployments to support some form of user interaction’ (Clinch, Alexander & Gehring 2016, p. 20), and users seem relatively familiar with touch screens, we’ve found a general reluctance to interact with the screens unless the interaction is highly intuitive. The screens are located in a public place where users may feel exposed or ‘on show’ while interacting. ‘Display blindness’ may also be a factor. Passers-by do not expect the screens to be interactive, nor do they expect to find interesting content (Alt et al. 2012, p. 5). It is also important to recognise that visitors to the library do not come for the purpose of interacting with our screens. As Davies, Alt and Clinch (2014, p. 41) note, users do not go out looking to interact with a digital display, they come across them and are motivated by external factors to engage with it.

Some of our displays are not touch interactive, and others are. So for users, there is a level of unpredictability around whether they should approach the screens for any given display. For this reason our signage has had to be quite clear on the displays where we are encouraging touch. Orphanides (2011, p. 5) found similar difficulties, introducing students to touch-enabled content, as a replacement of non-interactive e-board displays. The team’s approach included consistently using a button-like appearance for content that users touch to navigate to specific content. The same button motif was used on other controls as a cue to the user that the content was interactive. Consistency was key. As such, our aim is to create displays that require minimal instruction, and are predictably and instinctive to use.
Placement and the physical space

Physical space has a significant impact on engagement and interaction. ‘The design and placement of large displays have to be conceived according to user tasks and context’ (Ardito 2015 p. 23). Variables, such as meaningfulness of the activity and the setting in which the activity takes place, are also part of the user experience (Hassenzahl and Tractinsky cited in Bae, Jun & Hough 2016, p. 325). Our screens are in a public space within the main entrance of the library. This gives the screens great visibility but also creates limitations for the development of content that may require more detailed interaction or engagement. There is also tension between personalising content, which supports ‘situatedness’, and maintaining privacy in a public space. Although the original intent when positioning the screens was to attract and optimise student engagement (Horn, Lingham, Owen 2014, p. 5), in such a visible location, stopping to engage with the screens becomes a public activity.

Koppel’s research of vertical chained display screen setups in university settings found that ‘a flat arrangement triggers the strongest honey-pot effect. It attracts other people to interact even in collaboration, while the concave arrangement does not stimulate collaborative interaction’ (Koppel in Ardito et al 2015, p. 10). The Verge is somewhere between a flat and slightly concave layout. Where our content has been suitably intuitive and fun, for example colouring activities, students have collaboratively interacted with the screens, colouring on different screens but commenting on and discussing the activity together as they do so.

Indeed, the nature of being a public display appears to impact on motivation and confidence to interact with the content. In addition to being positioned within the main entry to the Library, the five screens are also beside the service desk, and underneath fluorescent lighting. While this does showcase the screens for billboard type displays, it also creates a very exposed space that can hamper the likelihood of students approaching the screens to experiment. As previously mentioned, having intuitive designs such as interpretations of familiar gaming formats can help to remediate that effect. The user is more likely to have a natural confidence and awareness of what to do when they approach the screens.

Despite the challenges of open public spaces for interactive content, generally the physical location of our screens have allowed a positive, in-situ method for us to present information and make connections with library users. Displaying information in-situ has ‘a number of advantages over other forms of information provision. First, it offers users increased levels of trust in the relationship between the physical space and the data being presented. Secondly, in-situ presentation can rely on the physical space to frame the information presented’ (Clinch, Alexander & Gehring 2016, p. 20).

The prominent placement of our screens acts as a marker for library clients. It helps us to make connections with students that are arguably not possible via the broad range of other digital mediums we use to connect.

Hardware and software implications

While this paper is not focused on an in-depth technical discussion about digital display setup, it is worth noting that technical specifications can limit content development, design and presentation.
The Verge was implemented as part of a library refurbishment project. There are difficulties in marrying building and technical projects (Horn, Lingham, Owen 2014, p. 6). As many of the hardware decisions had to be made before we really understood the type of content we wanted to create, at times this has resulted in limitations for content development. Ideas have to factor in capabilities of the software, interface and portrait layout of each individual screen. For this reason, touch interactive content ideas with a short lead time can be challenging. Creative design has been necessary in order to embrace the specificity of our hardware and software setup.

It is thus necessary to assess, in as much detail as a project will allow, the potential content requirements for a digital display before committing to specific technical solutions, and ensuring wherever possible that technical flexibility is built into hardware and software solutions.

**Resources and work behind the scenes**

As Alt et al. (2012, p. 5) assert ‘creating customised content that reflects the users’ needs is expensive.’ We also found that production times and staff resources have been challenging to gauge from the outset.

Specialised resources have been required to create and maintain content. For example, a multimedia specialist was required to work with subject matter experts and writers to create displays across a rolling schedule. From a support perspective, having a dedicated multimedia specialist has been integral to the success of this initiative. Content development can be time consuming and requires a high level of expertise, especially to create high-quality, engaging and interactive material. Additionally, strategic content planning and stakeholder management takes considerable effort. However, the need for such operational and strategic resourcing is critical if value is to be derived from the hardware and software investment made.

**Conclusions and future plans**

The library has been on a considerable learning curve since The Verge was implemented. We learned from early successes in 2014, where popular displays included live televised events and gaming activities. From 2015 the focus was on generating greater interest in, and encouraging interaction with, the screens. The results of these efforts were evident in the success of more animated, interactive and engaging content.

While movement and animation have proved effective in drawing the attention of users toward the screens, interactivity has been the better judge of whether students engaged with the displays. Positive feedback was consistently more prevalent for displays that included both interactivity and animation. This did not necessarily correlate in terms of ‘the more animated and interactive the better’. Rather, we found that the content itself determined whether users interacted with the screens or took the time to engage with them. This further illustrates the need not just to draw an audience, but to provide useful and purposeful content for them once there.

Of the five content types we have categorised our installations into: games, competitions and events had the greatest success. These content types invariably include some form of animation or interaction. The challenge now is to take lessons learned and apply those strategies to less successful content types, especially informational digital library content, in order to produce purposeful content that supports library objectives.

Key considerations for similar digital display projects should include the positioning of the screens in relation to the intended purpose of the content. For a digital signage approach with informational content, a public and prominent display would work best. To encourage closer interaction, a more discreet setup may work best where users do not feel like they too are on display if they approach the screens. Likewise, an assessment of potential content modes should be determined before making decisions about the hardware and software for the display, to ensure suitability and flexibility. Staffing resources should also be a primary consideration for content development, planning and stakeholder management.
For the most part, observations and ad hoc feedback were used as a measure of success. This has been inconsistent and applied only to specific displays rather than as part of a broader framework for evaluation. In future, the development of a clear display purpose, content criteria, and measurement framework would greatly assist in determining the type of content to develop and how to measure success. As we continue to solidify the importance of The Verge in our academic library, increases in user engagement and positive feedback have been encouraging, and continue to shape our display plans.
References


GEELONG WATERFRONT CAMPUS
1 Gheringhap Street
Geelong Victoria

GEELONG WAURN PONDS CAMPUS
Pigdons Road
Waurn Ponds Victoria

MELBOURNE BURWOOD CAMPUS
221 Burwood Highway
Burwood Victoria

WARRNAMBOOL CAMPUS
Princes Highway
Warrnambool Victoria

deakin.edu.au/library