Developing educational websites: investigating internet use by students and teachers

The relationship between museums and the internet is one area that is only beginning to be explored by museums (Chadwick, 2003; Haley Goldman & Haley Goldman, 2005; Haley Goldman & Wadman, 2002; Witcomb, 2003). The internet is becoming increasingly available to a wide range of users. In Australia, for example, there has been a 40% increase over a six-year period in access to and use of the internet with the most current available figures showing over half of the population having access in 2004-05 and continually rising (Australian Bureau of Statistics, 2006).

The role the internet plays in museum learning is being recognised across the sector, yet little work has been undertaken into the needs of users, especially teachers and students. The Australian Museum's website monthly visitation regularly exceeds 1.5 million, and the use of the internet by students, teachers and the general population has dramatically increased over the recent years. For example, in the Museum's 2004 online survey 63% of respondents described themselves as "educational visitors". Additionally, many websites are integrating new forms of media and technology to provide unique learning experiences for visitors. These issues prompted a study to gain a better understanding of how emerging internet technologies are affecting the learning environment, with a specific focus on teachers and high-school students.

The overall objective of the research project was to provide the Australian Museum with guidance on how to best develop a website that meets the needs of students and teachers in the primary and secondary levels across a range of curriculum areas. General objectives were to gain insights into how students and teachers are using the internet and what they are looking for when they access websites.

This paper reports on the method used and the findings from the study that have broad applicability across the museum sector—how teachers and students use the internet and what would make a great educational website from their perspectives.

Method and sample

A series of five focus groups were conducted with students and teachers during November, 2005. The participants recruited for the focus groups used the internet regularly at school and home and were from a mix of both public and private institutions: primary school teachers, years 5-6; secondary teachers, year 7-10 (primarily science teacher/coordinators); students aged 13-16 years; and a mixed group of teachers with a focus on IT/computing specialists.

A discussion guide was developed that aimed to elicit from participants their use of the internet, knowledge of media, and a reaction to a range of websites. Before the groups participants received a letter outlining the aims of the research including a list of websites to review prior to attending (links to these sites can be found at http://del.icio.us/amarcAM). The sites chosen had targeted materials for teachers and two-way exchange of information and were a mix of museums, art galleries and general sites. They were also requested to bring along a list of their favourite websites for recreation and education purposes. Each discussion lasted up to two hours with each participant having a laptop to look at websites during the groups.

Results

The first part of the discussion focussed on how participants used the internet at school and at home, with a focus on websites used for both recreation and learning. All participants used the internet and computers in school, but computer accessibility varied between schools:

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- Some had to book computer rooms in a separate learning room which often involved sharing the room with another class;
- Some teachers used an interactive white board;
- Some had a few computers set up in the class;
- Some classes used laptop trolleys which often involved the students sharing laptops with partners;
- Some used the library's computers.

> *I actually am in-between a library which has 15 computers and a whole cupboard full of laptops that students can take away, all wireless. I also run the e-learning centre, which has about 32 computers in there as well. (Teacher Mixed Group, Female)*

A number of teachers commented that in some areas of Sydney internet access was not as easy:

> *At the other end of the scale I work in the inner west region of Sydney, so I'm working in schools like Auburn, Glebe, those sort of schools where you're lucky if a third of the students have computers at home, let alone Internet access. It just doesn't exist. In schools, most are still running Windows 95, Windows 98 computers, without network access. (Teacher Mixed Group, Male)*

Often schools have an intranet site for teachers and students to access educational resources based around the curriculum. When using the internet, teachers will usually direct students to specific sites to use for class projects.

The authenticity of content on the internet was a major concern for students and teachers. Teachers reported that students often had difficulty judging the validity of online content and felt that teaching computer literacy skills was of primary importance. Teachers in this study generally set online tasks for students that involved critical thinking, research and visual literacy and set tasks that go beyond the simple cutting and pasting of information. Teachers preferred to focus on the process rather than the product through using the internet as a learning tool. It was felt by some of the participants that many students and teachers generally lacked the fundamental skills for using the internet and new media, for example:

> *Kids today have a surface level knowledge of technology, but if you scratch below the surface, they often don't have much more than that. There's a big misconception out there that they have this deep understanding of how the technology works, but they don't. They're consumers of technology, and that's probably not a good thing. (Teacher Mixed Group, Male)*

The study found that teachers searched for the following materials when using the internet:

- Information for planning excursions;
- Lesson plans and materials for developing their own lesson plan;
- Hands-on activities., interactive games and activities for use in the classroom;
- Printable copyright free images;
- Printable activities.

It also emerged that download speeds, plug-ins and firewalls were major issues when using the internet in schools. On school computers, a majority of sites were inaccessible, or applications were inoperable. These problems affected the ways students searched for online resources, as in many schools major search engines, such as Google, were filtered out.

In general, the students in this sample stated that they only access "educational" websites when undertaking research for school projects or were instructed to by their teachers.

Internet use at home

Participants in all focus groups stated that they spent a couple of hours on the internet each day. Most students had access to the internet at home, but usually they needed to share computers with siblings. The use of broadband and dial-up varied between participants, but the use of broadband has greatly increased in Australia over recent years, and this trend is expected to continue. Students reported that the internet was the first resource accessed for school assignments. Most felt that it was easier to find the information they needed using the internet, as searching through books was often more time consuming and more difficult to

find the relevant information that they needed. When students undertook research via the web, the preferred method they used was to start with a search engine such as Yahoo or Google. Once the user search was undertaken they would often access the first site listed.

At home teachers used the internet primarily for planning excursions; planning lessons and activities for the classroom; email and hotmail as well as banking and other personal activities.

Students used the internet mostly for games; entertainment; shopping; email and hotmail; chatting; downloading music and for homework assignments. The internet served a social purpose for many of the participants by engaging them in two-way communication through:

- MSN Chat (primarily);
- Massively-Multiplayer Online Games (MMOG);
- Virtual Reality Communities;
- Special interest websites with two-way communication capabilities such as forums/message boards; chatrooms and blogs.

What makes a good website?

From the data the following factors that contribute to making a good website for teachers and students were identified:

- Concise information;
- New and relevant information/up-to-date;
- Easy to access and download;
- Glossary;
- Interactive games and quizzes;
- Webcam;
- Multilingual;
- "What's New" sections;
- Copyright-free images;
- Short, sharp and attractive information;
- Notice of special exhibitions and up coming events;
- Ability to subscribe to e-newsletters.

Overall, for teachers, the content needed to be closely linked to the curriculum in an easy-to-follow, attractive and interesting format. For students, the design, layout and presentation were major factors in deciding whether to go further on a site or not. This next section looks at some of these factors in more detail.

Design, layout and presentation

The study found, very strongly across all groups, that the first reaction to whether they liked or disliked a website was how it looked. The design (including colour and movement), layout and presentation often determined whether they would explore further. Participants commented that the use of large print and images enhanced a website's presentation and usability. Also, they considered websites to be more effective when the homepage allowed the user to view all of the contents without having to scroll down the page. Participants often liked simple and clean designs, as websites with too much information presented on a page were too distracting. The students determined the quality of the content based on their initial reaction to the appearance of a websites:

> *I didn't find that website very interesting. The colours and stuff just didn't interest me at all. I basically go on first impressions for websites. Just after seeing it kind of looks like its not going to be really interesting. (Student Year 7-8, Male)*

> *It almost needs a "wow" factor, doesn't it, to get them in, and then once there in you can probably give them more information or things like that. But if they don't have*

that initial "wow" then it's sort of hard to get them back in after that. (Teacher Year 7-8, Male)

Use of interactive materials and multimedia

When assessing sites, participants in the focus groups felt that a high quality website engaged the audience beyond text in the following ways:

- interactive games and activities for learning;
- moving images;
- music;
- videos;
- quick polls;
- quizzes;
- interactive maps and timelines;
- audio;
- content creation;
- two-way communication;
- virtual worlds;
- live webcams.

Although participants stated the site must engage beyond text, they also emphasised that a website must have strong content to complement the interactivity. The content must be educational and stimulate the user's interest:

I reckon it's a different way of learning, because, like, on the Web like they've got all the pictures and that and there's multimedia as well. Like, you don't pick up a book in the library and open it and press a button and like a video starts playing on it. So I think multimedia also helped learning a lot. It's a whole visual kind of way. (Student Year 9-10, Male)

Two-way communication

There was a mixed reaction concerning the educational value of online forums, blogs, chat and message boards. Some students felt it would be beneficial to be able to communicate with experts on the site for research purposes, while others felt it would be a waste of time. Participants showed interest in educational blogs and forums for debate, although the context and content must take precedence in order to stimulate interest. In relation to two-way communication applications, the teachers were concerned about monitoring the information posted on websites:

I think forums are a bit like, I think they've died a bit. Initially we had them in our system, we had a teachers' forum and I found it just too much. I am too busy, sometimes I find a lot of garble up there, people go on and on and personally, I switched off. I just found it too much. I'd rather be short and succinct and therefore, no. (Teacher Mixed Group, Male)

Podcasts

Teachers expressed enthusiasm for using podcasts as an educational tool, whereas students reported that they were unlikely to download podcasts onto their personal portable players. Podcasts need to be relevant to a topic of interest or study and presented in a way that stimulates interest otherwise they will be ignored. It was suggested that podcasts be short and sharp in order to hold people's interest; that a text version be provided; and that podcasts should be indexed for quick reference. Students seemed to prefer media that offered visual elements, so this may be a consideration with this format. At this stage, podcasts may be more suitable for older audiences such as those involved in post-secondary studies or special interest groups. It would be advisable to follow trends in this media application, with further research conducted as it develops:

My sense is that podcasting will be used by teachers with the students in an instructional way. So you say okay guys we're researching x, let's listen to this snippet from scientist b and that's sort of thing. And now in the computer lab I want you to go and listen to another excerpt and answer these questions. Kids won't tend to stop on it unless they're made to. (Teacher Mixed Group, Female)

I liked it. You know how they talk to you on this. It gives a break of reading for a bit because I'm not that good of a reader. (Student Year 7-8, Male)

Interactives and multimedia

Students and teachers felt that interactive games and multi-media served an integral role in learning by providing an educational tool that engages different learning styles. Again, they stated that it was important that these elements relate to the curriculum; as well as being entertaining and engaging. Participants seemed to especially like quick polls and quizzes, because it provided them with something to do immediately that was both fun and informative. It was also felt that moving images, music and sound, interactive games and activities, videos and animation be integrated into websites:

I think if you put animation in it kind of draws you in a bit more and makes you more interested. (Student Year 9-10, Female)

I've been other sites where they have science-type games to learn, and I think that's a better way to learn instead of just reading text. (Student Year 7-8, Female)

I think it would be a nice bonus to keep the kids interested but they'd have to have a good education reason for being there. It's not like you have enough time to just say go to the museum site and play the frog game. (Teacher Mixed Group, Female)

Wikipedia

The popularity of wikipedia is growing and further research needs to be undertaken to assess the value of wikis and they can be integrated websites. Some of the students currently use wikipedia frequently for school work:

I also find it, um, pretty good because I go to, like, a Catholic school, and I usually can never find like good information about, like, a subject or something, and when I go on that, it, it looks really professional. So I think, well, that must be right type of thing. And usually it is because a lot of the teachers say to go on to that website. (Student Year 9-10, Female)

Personalisation

Participants had difficulty comprehending the concept of personalisation and ways it could be implemented for educational purposes. Students commented that there were not many sites that they would access constantly for educational purposes, so the application would serve little value. Students stated that if they used a site constantly for education, it may serve a purpose as a depository for information to be retrieved at a later stage. One website critiqued by students that offered some form of personalisation through the "My Collection" section (the Eternal Egypt site www.eternalegypt.org) found the purpose confusing and felt that they wouldn't have used this function.

Conclusion

Overall, findings from this study suggest that that a good website should:

- **Look good:** The audience's first impression determines whether they will explore the site further. Therefore, primary importance needs to be placed on presentation, colour, layout and design to enable users to explore the content in more detail.

- **Have a well-developed search engine:** When searching for educational materials on websites, participants generally preferred to use the search engine as opposed to browsing through it. Participants really liked sites that allowed multiple search options within the search engine. Teachers often have difficulty finding materials for specific levels, so the search function should also allow users to search by level and subject.
- **Contain concise content:** In relation to appearance, most participants were usually disinclined to investigate websites that were text-heavy. They appreciated websites that offered a brief synopsis of information with hyperlinks to more detailed information. This enabled more detailed research to be conducted if required, as the user is not initially bombarded with information.
- **Contain a glossary:** Most participants commented that when a glossary of terms is provided it improves the useability of the website. They felt that museum websites often used jargon that was above the level of comprehension of students, therefore, incorporating a glossary of terms would assist them in their studies.
- **Contain copyright-free images:** Teachers expressed a strong interest in having access to copyright free images that could be used for school activities. This may be difficult to implement, but would be beneficial to many users, not just educators.
- **Possibly offer a text-only version**: Teachers reported that school computers were often limited by their technical compatibilities. If feasible, it would be useful to offer the option of a text only version of the site.
- **Have well-developed curriculum links**: Teachers were particularly enthusiastic about a website that offered a search engine specifically focused on curriculum materials with a user-friendly design enabling multiple search options. Teachers preferred search options that allowed users to search by keyword, subject, and level.
- **Be easy to navigate**: Some participants expressed difficulty navigating through some of the sites they were given to critique, therefore consideration should be taken to make it more user-friendly. Although there has been a growing trend towards navigation based on exploratory designs, participants in this study seemed to prefer a directed and simplistic approach. They stated that the navigation of a website should allow the user to easily get back to the homepage and "know where they were" on the site at all times. Participants also commented that they did not like having to scroll down the homepage.

Recent research (Kelly, 2007) found that the internet was an important place where learning happens. Participants in that study reported that the internet was the first place accessed when learning something new as it was fast, immediate, usually accurate and something that they controlled. That study also highlighted synergies between how participants viewed the internet and the principles of constructivist learning in museum exhibitions (Hein, 1998), particularly in the area of choosing many pathways and being user-controlled with a range of viewpoints able to be presented.

The internet has the potential to change how people learn and their expectations of museum learning experiences for all types of visitors, especially students. This current study revealed that these issues could be further explored across a range of users who access museums both in their physical and virtual forms.

References

Australian Bureau of Statistics. (2006). *Household use of information technology.* Canberra: Commonwealth of Australia.

Chadwick, J. (2003). *Virtual Space/Physical Space: Where Are We Going?* Paper presented at the Canadian Museums Association Annual Conference, Winnipeg.

Haley Goldman, K., & Haley Goldman, M. (2005). *Whither the Web: Professionalism and Practices for the Changing Museum.* Paper presented at the Museums and the Web Annual Conference, Vancouver.

Haley Goldman, K., & Wadman, M. (2002). *"There's Something Happening Here, what it is isn't exactly clear".* Paper presented at the Museums and the Web Annual Conference, Boston.

Hein, G. (1998). *Learning in the Museum*. London: Routledge.

Kelly, L. (2007). *Visitors and Learners: Adult Museum Visitors' Learning Identities.* University of Technology,

Sydney.
Witcomb, A. (2003). *Re-Imagining the Museum: Beyond the Mausoleum*. London: Routledge.

Kelly, L. And Breault, K.(in press). *Developing educational websites: investigating internet use by students and teachers*. In Nardi, E. (ed) Proceedings of *Thinking, Evaluating, Rethinking*, ICOM-CECA Conference, Rome 2006.