Collaboration, community and consortia in the digital provision of art images

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Abstract:
A convergence of technologies is bringing about a fundamental shift in the way in which art and cultural resources are being accessed. I will describe some of the image databases and delivery systems which have been developed, how collaborative and consortia ventures are distributing cultural content beyond traditional boundaries and how standards developed by the visual resources community have facilitated systems interoperability and helped to create the possibility of a massive growth in the availability of resources online. I also examine implications for the wider library and information management community, especially as they relate to education.

INTRODUCTION

The networking and licensing of shared cultural materials, the emergence of standards in visual resource management/art librarianship and the development of sustainable digital assets using the next generation of visual technology are bringing about a fundamental shift in the way in which art image and cultural resources are accessed. In this paper I will discuss some of the background to, and examples of, this convergence in technologies which I had the opportunity to see during my VALA supported study tour of North America in January/February 2003. I will then examine implications for the wider library and information management community, especially as they relate to education.

As librarian at a TAFE art school, I have the daily challenge of keeping up with the demand for images that provide inspiration and substance for students and teachers in their teaching, learning and creative endeavours. The traditional way in which we have provided images for the teaching of art history and theory, as well as studio practice, has been via slide transparencies, prints and reproductions from books and journals. However, we are challenged by issues such as space, the number of staff (a single librarian operation), opening hours and the looming obsolescence of equipment.

A practical illustration of the emergence of a new generation of image technologies is that Kodak has "confirmed plans to discontinue the manufacture and sales of slide projection products and accessories in June of 2004" (Prince 2003). While technologies do not become obsolete until they have been superseded, once they have become "old" their demise can be rapid.

We thought that by starting to provide images digitally we could offer more blended learning opportunities for our students and ease the demand on the physical library. We had some ideas about how to do this but the VALA Travel Scholarship allowed me to explore and ask questions about image database and delivery systems, what impact they were having on teaching and learning and what data standards and systems interoperability existed among the visual resources community in North America. I will refer to our progress in implementing some new approaches at the end of the paper.

MDID

Developed at the James Madison University (JMU) in Virginia, the James Madison University Digital Image Database (MDID) is a client server application which combines an image database with a classroom presentation delivery system. (1)

Christina Updike, Visual Resources Curator in the Department of Art History, has been a key initiator and driver of MDID. The idea for the system arose with the proposed introduction of a new general education program. It was anticipated that this would increase demand on Art History's image resources, at that stage mostly held as slides, which needed to be manually retrieved and loaded into a projector. As a solution, the University's Center for Instructional Technology (CIT), Art History staff and Updike collaborated to develop a system which stored digital images, allowed for their retrieval and enabled them to be projected in the classroom using data projectors.

I was invited to accompany a lecturer in the process of preparing images and delivering a lecture using MDID. I observed how she selected images from a database of over 50,000

images, sequenced them, added annotation to the metadata accompanying each image and saved the presentation. In the classroom the lecturer downloaded the presentation. She was able to project images through a data projector, tile (split) the screen to either zoom in on detail (while retaining the overall work) or move on to another image to continue comparison.

At the end of the class, students were reminded that they could access the images, as well as their accompanying descriptive data, for revision and self-paced study.

The design of the database is based on the data structure developed by the Visual Resources Association's (VRA) Core Categories. (2) The VRA Core defines common elements that can be used to create records to describe works of visual culture as well as the images that document them.

MDID allows for Boolean and free text searching and retrieved images can be grouped for personal and /or shared review.

Content for the system was obtained both by high resolution scanning from resources in the Visual Resources (VR) collection and a subscription to the Art Museum Image Consortium Library (AMICO). (3) AMICO is a collaborative, non-profit consortium of some 39 art institutions in North America and the United Kingdom. Members contribute fine art images and multi media files with the corresponding cataloguing data and documentation. AMICO provided master tapes of their image library and MDID was populated rapidly.

MDID is available for download from the CIT site at no charge. It has two components, the database which has administrator, staff and student levels of access and the presentation feature, Image viewer, which installs separately. Both components need either an Internet or Intranet connection.

MDID has been implemented in over twenty educational institutions. It has received the support of the Mellon Foundation's art image project ARTstor, including development funding. A new version (MDID2) is currently being tested. Among the new features will be the capacity for teachers to add their own images to a presentation and support for cross platform searching and data exchange through Extensible Markup Language (XML) (Knab & Hegg 2003).

FADIS

Across the border in Canada, Gordon Bell at the University of Toronto (UT) has developed the Fine Art Digital Image System (FADIS), another impressive web-based fine art courseware tool. (4)

The system has evolved from a static web site and uses Apple's WebObjects. Its database design is loosely based on the VRA Core and is searchable by various criteria such as course, date, artist, title, country of origin and visual art media. Seachers can create digital "carousels" to group and save images. Lecturers can save their carousels for further consultation and classroom projection. The projection mode in FADIS has single and dual images, text toggling (hidden or displayed), thumbnail navigation and zooming. QuickTime movies and sound files can also be played. Students can also go online to access the system and can view images, site links and class notes.

UT's Fine Art library contains 200,000 slides of which 10,000 have been digitised. Interest has been expressed from other departments and it may be adapted for teaching in departments such as Geography and Medical Imaging.

UT is moving towards a wider distribution of FADIS. Rather than developing a digital collection for each institution, Bell supports the philosophy of a central shared repository. The University of Ottawa and Carleton University have expressed interest in becoming part of a pilot project with UT to use FADIS to implement this idea. Bell would also like future versions of FADIS to incorporate more digital video.

No decision had been made with regard to licensing the software. While the FADIS software could be licensed and installed locally, the database is more complicated because of copyright issues.

Art History and Architecture Database

At Columbia University, Andy Gessner, the then director of the Visual Media Center (5) explained how, with funding from the Federal Government and the Mellon Foundation, they were able to kick start the development of a number of digital products including the Art History and Architecture database. This database has grown to over 20,000 images, partly drawn from the Art History Department's VR collection of half a million photos, 65,000 lanternslides and half a million 35 ml slides. As "the process of education has become more interactive, personal, and accessible to learners across disciplines" (Kadlecek 2002), interest has been generated from other schools, such as Engineering and Journalism, and, in collaboration with the Columbia Center for New Media Teaching and Learning, they are hoping to be able to offer it across the University in the near future.

The Art History Library is developing the metadata standards for the project. The librarians create and house the content. The Structured Query Language (SQL) database is written in PERL, which they favour because it is easily exported. However, they feel that it could be more robust and faster for presentations. Images can have separate links so they can be exported into XML format for interoperability with other systems. The database consists of a presentation and delivery system, which includes individual course websites and a space for the creation of public and private image portfolios. The Center aims to create learning objects that can be used both within and outside the classroom, which are reusable and flexible enough to undergo modification as technology advances.

The Media Center also produces digital projects to support the curriculum and has developed over 50 Web resources, found under "projects list" at their website. (6) While many of the projects are password protected due to copyright laws, some are accessible.

The more elaborate projects employ media products such as MrSID (7) Stitcher (8) QuickTime, QuickTime VR (QTVR) and Flash.

MrSID uses wavelength compression and sub-regional extraction to zoom only that portion of the image which the mouse points to. This makes the operation much faster as only the relevant portion of the high-resolution image is retrieved. Stitcher creates one image file out of a number of smaller images to create a panorama effect.

QuickTime and QuickTime VR are multimedia technologies which allow the playback of moving images, sound, text and animation created in the one file. (9)

Flash is a vector graphics-based animation program for creating animation and special effects, including sound and interactivity, which downloads smoothly across different browsers and platforms. (10)

Used separately and together these products create interactive 'learning objects' which can immerse the viewer into 3D worlds. These trends in interactivity and functionality will provide more blended learning opportunities for students. In the recreation of the Alhambra in Spain, for example, the viewer can roam rooms in the palace, open doors, spin around in 360 degree panoramas, zoom in on specific details and hear music and sound effects.

Visual Resources Collection Online

The Visual Resources Collection, Art and Architecture Library, Yale University (11) is another vast collection with 190,000 photos, 350,000 transparencies and 90,000 lanternslides. Rather than develop a "home-grown" image database and courseware system, they are building a digital library using Luna Imaging's Insight. (12) Insight is a tool which manages collections, creates access, and allows the high quality presentation of digital collections in the classroom. It can incorporate hundreds of thousands of images and multimedia. Like MDID, the client software is downloaded and installed on the user's computer.

Users can search a digital library collection, save images into groups and store them on or offline. These images can be repurposed and reordered. The metadata from different collections can be mapped to a common standard and objects from different collections can be grouped together. It allows multi-directional views and facilitates image comparison by showing relative sizing, allowing tiling, zooming and hyper linking to other images and external web pages.

It also allows for multiple collection searching across other Insight collections such as the Beinecke Digital Library, (13) the Museum of Modern Art Digital Design Collection (currently available as part of an ARTstor trial), AMICO and The David Rumsey Map Collection (a publicly accessible showcase of Insight's display capabilities.) (14)

Digital technology helps to transcend boundaries within institutions. This is indicated by the expressions of interest that have come from other schools in the Humanities also interested in using high-resolution digital images in teaching.

Susan Jane Williams, the VR Curator, emphasised to me that the real impact of digital assets is not in using them to create PowerPoint presentations or static webpages (webpages where content cannot be grouped or reorganized), but rather in users being able to group, organize and present materials according to their own needs.

Insight's zooming feature is impressive when applied on high-resolution images.

I met with Luna representatives at the exhibition stand at the American Library Association's Mid Winter conference in Philadelphia. The entry-level version of the software based on the VRA Core, which they flagged at that time, has since been released. They have also since announced a new partnership with Endeavour's ENCompass system for managing and searching collections. (15)

Williams further explained to me that among the “building blocks” of sustainable digital projects are quality cataloguing and high-resolution images. Rich and consistent textual cataloguing records ensure in-depth searching and retrieval. The Yale project aims to capture the maximum amount of information possible from their digitising process. The copystand photography is carried out by Yale’s Media Services Laboratory and the slides are then scanned and processed by the Kodak PhotoCD process. (16) This results in an 18-megabyte file in the raw scanned format (PCD). They then process each image as a “master” TIF file averaging 17 MB and from this file create delivery derivatives intended for inclusion into Insight using Luna’s batch processing function.

Williams (2003a) calculates that the unit cost of creating a slide and digital image from the slide and entering it into Insight, is US$11.38 and 31.05 minutes of labour time. The most expensive part of this process is creating the text information that allows the image to be found in a meaningful way (metadata record).

Commercial vendors and cooperative distributors can beat this cost. On this basis, it is cheaper to obtain images from such sources. Logic also dictates that only those objects in a collection that are culturally unique and distinctive should be digitised.

Collaboration, community and content

Only a tiny part of any collection of analogue (non-digital) resources held by cultural institutions such as museums, galleries and universities is ever accessible. Educational institutions want access and permission for the “fair use” of all of these resources. “Fair use” is generally taken to mean educational use, guaranteed in electronic systems by password-restricted access and other controls. The “rights holders”, the owners of the rights for the reproduction of those resources, generally want their images to be used appropriately and without economic loss.

A number of consortia and collaborative models for digitising and distributing unique cultural content are trying to make content available at an accessible, yet sustainable, price while balancing the needs of the different stakeholders.

AMICO

AMICO’s collection, with its strong focus on supporting arts education, now holds over 100,000 objects. Thumbnails and some basic descriptive data of the collection can be viewed and searched on the public catalogue.

Bringing large collections together and making them accessible through one interface requires content standardization and data mapping. AMICO’s Catalog Record is based on the Categories for the Description of Works of Art (CDWA) and the Media Metadata record (17) is based on the Dublin Core. In discussing the future of the digital provision of art image resources, AMICO’s David Bearman mentioned the need to continue to address interoperability issues such as different image formats, the normalization of measurements so that images can be brought into the same frames and facilitation of zooming to the actual size of an object.

ARTstor

Similar, but distinct to AMICO, is ARTstor, an initiative of the Andrew W. Mellon Foundation. (18) ARTstor's mission is to use digital technology to enhance scholarship, teaching and learning in the arts and associated fields. It intends, on an ongoing basis, to build, develop and distribute "in the relatively near term" a web-based library of "perhaps 300,000" digital images and information (Marmor 2002, p. 70).

The Mellon Foundation is funding the digitising of a number of significant collections. It has announced that it will work closely with both providers and users of cultural content and collaborate with existing projects such as AMICO. ARTstor is especially focusing on educational and not-for-profit institutions. It has the potential to develop into a single database with millions of images and related metadata representing many time periods and cultures. This could eliminate the need for educational institutions to create their own core archive of art images. Presumably they will have the option to select which material they need for their curricula and incorporate it into local databases.

Testing is currently being carried out and further announcements will be made in 2004. ARTstor will be distributed under licence, the cost of which will be set according to the nature of the institutional user. It will be available initially in the US. International distribution is an eventual goal. However, this is complicated by factors such as organisational options for distribution and legal questions.

Access to collections will be provided via a browser on the ARTstor website, or through a downloadable client application. Marmor says that they want people to feel comfortable using ARTstor and not to have to undergo a steep learning curve. With their own software tools they can change them as needed and offer user support. ARTstor also plans to facilitate content delivery through platforms such as MDID and Luna Insight.

Max Marmor, the collections development director, explained to me that ARTstor and other "not for profits" have occupied the space left free by the collapse of the "tech bubble" and many of the Internet entrepreneurs.

Research Libraries Group

The Research Libraries Group (RLG) (19) is another example of an organization adopting a collaborative approach to the provision of resources, expertise, and operations in the online environment. RLG is an international alliance of over 150 libraries, universities and cultural bodies which promotes cooperative solutions to information sharing. RLG Cultural Materials, one of their products, provides "online access to the materials that document civilization and define global culture" including image, sound and video from 51 participating institutions. (20) RLG is also a distributor of AMICO.

In a recent initiative, RLG Cultural Materials has started to apply the XML-based Metadata Encoding Transmission Standard to its digital objects to allow the linking of related objects across systems. RLG has also formed an advisory group looking at ways to better incorporate materials into classroom presentation systems.

Consortia collaborations and the public domain

Consortia collaborations are another way in which digital content can be widely distributed. Significant collections of art information, and cost savings, are available to members of OhioLINK, a consortium of 80 libraries in Ohio. AMICO, for example, is available through OhioLINK's Digital Media Center Databases. There are also open access art collections from the University of Cincinnati and the Akron Art Museum. (21)

Another example is the California Digital Library (CDL). In an experiment currently underway, VR curators across the University of California (UC) were invited to pool their image resources in the CDL Image Demonstrator**.** (22) Collections such as the Library of University of California Images have been able to expand their access from 5,000 images to almost 200,000. Content includes material from UC libraries, supplemented by images licensed from commercial vendors, and delivered using Insight (Burns & Zimmerman 2002).

A number of slide vendors have also made the shift to digital and some display their content through online thumbnail galleries and even via delivery systems such as Insight. The various vendors employ different licensing models and cost structures depending on factors such as the number of users.

Public domain or "information commons" image sources are available. However, the public domain is under pressure in the United States (US) due to factors such as the extension of copyright from 50 to 70 years.

One exception to the trend is the Art Images for College Teaching (AICT) site, developed by Allan Kohl, the VR curator at the Minneapolis College of Design and Technology. (23)

Creative Commons provides software to find and credit, for example, photographs and songs donated to the public domain. (24)

The Library of Congress's American Memory Collection also supports the public domain and it delivers high-resolution images using MrSID.(25)

Community of practice

The community of practice created by VR curators through their management of huge collections has also resulted in professional tools which have helped the shift from analogue to digital.

The way in which print resources are described in a catalogue is different to the way in which an image is described. Nonetheless, there is a common commitment to helping users find, identify, select and use resources.

Various art related thesauri, standard vocabularies and guidelines add to cataloguing consistency and further facilitate the sharing of data across collections. "The key to the interoperability of digital cultural content is consistency, when digital collections are highly consistent they can be processed quickly and cheaply" (Gill & Miller 2002).

The VRA Core data structure is another important common standard achieved. It is a data structure, not a set of rules. It aims to foster a data-sharing environment. Flexibility allows for additional fields to be included if the element sets do not fully describe a collection. The VRA has also recently released the first draft of "Cataloguing Cultural Objects: A Guide to Describing Cultural Works and their Images". (26) I discussed the implications of the VRA Core with Ann Whiteside, one of the authors of the Guide and the Fine Arts Librarian at the

Fiske Kimball Fine Arts Library at the University of Virginia (UV). The key aspect she emphasised was interoperability.

Breaking boundaries and interoperability

In a fully collaborative community, the original cataloguing of images would, theoretically, only need to be done once. That original cataloguing would only need to be carried out for unique local resources, such as an institution's collection of original art works.

There is little point in multiple institutions duplicating effort and creating multiple copies of poor quality digital images derived from secondary sources (copy stand photography or slides) when high-resolution images can be photographed directly from the original. Apart from the question of image quality, the metadata accompanying original image processing can be expected to include information such as provenance, rights holders, colour calibration and attribution.

Of course, once an object is brought into the system it can be recatalogued many times as thought necessary. The RLG, for example, is creating a union catalogue which will not only unite the holdings of its member institutions but will make it possible to for researchers to distinguish between multiple or annotated records of the same item. This would be especially useful for print collections which have multiple runs of the same image, but with potentially significant slight variations.

XML is the "digital plumbing" over which art information and cataloguing are shared. In addition to setting the position of words and graphics on a web page, XML assigns meaning to information and, provided the protocols are established, it enables databases to talk to each other.

One of the tools used by the Open Archives Initiative (OAI) to facilitate data exchange is XML based on the Dublin Core (DC) Metadata standard. (27)

However, specific communities, such as the visual resources community, may also choose to use their own unique additional standards.

For example, work is underway to map the VRA Core, which is based on DC, to an XML schema. Once written and housed on a server, each participating institution can use this XML protocol to collaborate and share resources. Participating institutions, would only have to provide a spreadsheet which maps their database and which indicates those resources and fields they want to make available to the databases of other institutions.

Once the protocol has been tested, the server, which hosts the OAI processor or "harvester", only has to interpret the requests and ensure that the information is provided according to the criteria specified in the protocol. For example, which institution's servers are able to have access and which fields are available to them.

By this means, data can be exchanged through automatic "harvesters" which will glean records from multiple institutions participating in the arrangement.

At UV, Thornton Staples, the Director of Digital Library Research and Development at the Alderman Library, has been overseeing a digital object repository management system based

on the Flexible Extensible Digital Object and Repository Architecture (Fedora). (28) It uses XML-based hierarchical metadata to build a foundation for constructing interoperable web-based digital libraries. In collaboration with six other institutions, and funded by the Mellon Foundation, they are aiming to develop a repository, built on open source software, that can handle one million objects (text, video, audio, maps and images). It will provide users with a search interface which will bring together a diverse range of resources in different formats and from different physical locations. The first phase, the American Studies Information Community, has been released and provides an open resource on American studies. (29)

When applied to VR collections, the implementation of these systems will further open up the resources of museums, libraries and other cultural institutions. We could see an exponential growth of image databases similar to the way in which library catalogues are now available.

Williams (2003b) insists, "The expense, infrastructure, and degree of technical support required by any (successful and sustainable) digital image delivery system will absolutely demand that these endeavours transcend traditional department borders." This implies the need to build collaborative alliances between VR collections, libraries, Information Technology sections, infrastructure mangers, Knowledge Management facilitators, administrators, teaching staff and students. Building digital systems also involves becoming acquainted with these technologies, helping users to understand them, and educating administrators in what is required to sustain them.

The use of high-resolution images is the beginning of an increasing trend towards using the multimedia capabilities of the web in new and different ways not previously possible with "traditional" media.

Geographic Information Systems process high-resolution photography from satellites and cartography to capture, display and analyse spatial information. This can be used to create the sensation of flying through the earth's terrain and geography in 3D. (30)

On the other end of the scale, the inner world is accessed and recreated by digital microscopes, which allow web users to collect and distribute images of microscopic specimens at light microscope resolution. (31)

High-resolution images demand high resolution display technologies and this contributes to blurring the boundaries of the CPU-mouse/keyboard-monitor paradigm. Charlton (2003) in comparing the monitor to the "frame" of a painting describes the monitor the "interface between the spatiality of the screen, the interior, and the …exterior".

Data projectors, electronic web-compatible interactive whiteboards or "SmartBoards", PDAs, mobile phones and Organic Light-Emitting Diode (OLED) based "monitors' are all transforming this "interface". OLED technology is already promising "flexible, ultra-thin …displays that can be bent and twisted without distorting the screen's picture or causing loss of brightness" (Pope 2003). Perhaps the holograms we see in science fiction movies, and which are already being demanded by consumers, are not far off. (32)

The nature of Internet browsing is also changing. The automatic multimedia presentation generator searches for mixed media on the net and can "combine and present results as knowledge-enhanced intelligent multimedia presentations" (Hunter, Little & Geurts 2002). Tim Plaisted's Surface Browser creates an experience of "flying inside a swirling tunnel where images wrap, creating the sensation of being inside a digital snake" (Machan 2003), while Mann (2003), in a discussion on computer mediated environments, speculates that "with small portable devices that function as if they were a true extension of our minds and bodies, we all become cyborgs".

These trends in the content, presentation and perceptions of new media technologies will also help to facilitate responses to individual learner differences and present a richer online experience to all, including those with disabilities. (33)

User studies

While you can find a mass of images with a quick search of any of the automated image search engines, the results will most likely vary widely in their quality, data, copyright status and relevance. The British Technical Advisory Service for Images has observed that this is because these search engines use “indirect textual clues” to guess at their images’ visual subject content and that many engines’ commercial associations can even be “skewing their result towards commercial ends” (TASI 2003).

The expanding scope and positive feedback received by the digital library projects I witnessed is perhaps anecdotal evidence that these systems have been successful. We are in the early days of the evaluation of learning outcomes resulting from the development and implementation of these new applications. However, some initial work has been undertaken.

A survey of students at JMU who had used MDID found that 85% responded that it has had a positive effect on learning content. 77% of users considered that quality of images in the database was at least satisfactory and 74% found it helped in their academic success (Pitt, Updike & Guthrie 2002, p. 44).

There have also been positive assessments of FADIS. During the Fall term in 2002, FADIS had 200 users per day, to reach a total of 20,000 site visitors. Just prior to final exams the average rose to 1,000 users per day (Fong 2002).

One major study which has found enthusiasm for image delivery was that carried out at Penn State University. The visual image user survey found that of those interviewed, over 62% of Faculty staff and 56% of students, responded positively. Teachers also indicated that they would like to be able to incorporate their own images into the system and wanted Internet speed and reliability in the classroom (PSUVIUS 2002, p.1-1).

Implementing MDID locally

I started by mentioning some challenges facing our small arts and media library. We are now in the process of using MDID to build a digital image library. We have the database loaded on a high capacity server, which will give us the potential to run the system wider, for example, to any of the fourteen Hunter Institute campuses. (34) Hopefully, it will also allow us to incorporate any new system demands which MDID2 may require. For copyright reasons, we limit password access to currently enrolled students and staff. We have a good infrastructure with fast Internet access and access to data projectors and staff who, partly thanks to two LearnScope projects, are familiar with, and keen to explore, the digital terrain. (35)

We are populating the database from a variety of sources; our own images, initially historical photos of our campuses, and possibly also images from our own art collection (once the rights situation has been clarified), downloads from the AMICO library (within the guidelines of our subscription) and from the public domain. We have also purchased perpetual rights to

several hundred high-resolution images from a commercial vendor in the United States. We are learning as we go as we upload the images and their metadata into MDID and we hope to have it ready for classes in 2004.

Nonetheless, this does not satisfy all our image needs, as Australian content is an issue for us. As far as we know there are no distributors of Australian digital content that have what we need at a reasonable price.

Most of our images are acquired externally because of copyright and cost. We add our own content where it is unique and original. We would also like to involve other faculties in our project. Botanical illustration images can be useful for horticulture, architectural images for Building and Construction and Design Theory courses and fine art images in Information Technology, Marketing and Design. We will have to figure out how these images will sit in a fine arts database. Perhaps ARTStor and other consortia arrangements can, in the not too distant future, provide a gateway to accessing hundreds of thousands, if not millions, of high-resolution digital images and multi media at a price which we can all afford.

This is the certainly the vision of the Digital Promise legislative project in the US, whose proposal to the US Congress states in part that "large scale digital libraries and online museums could offer a mind-boggling array of multimedia information for objects and digital artefacts for student, teacher and scholarly use, and for building engaging curricula and learning experiences" (Green 2003).

Conclusion

As a librarian, I am intrigued by the fact that VR curators think to integrate classroom presentation modules into their collection management systems. Perhaps this evolved out of the close relationship which exists between VR curators and teaching staff. This may be because VR collections, at least in many of the institutions I visited, are located close to where teachers and students learn and teach and this tended to involve the curator or librarian in the pedagogical process. The introduction of new technology can be an opportunity for our profession to develop such relationships and facilitate the breaking down of institutional boundaries.

I was recently discussing this database/catalogue/presentation tool concept with a languages teacher who would like to use more blended learning in her teaching.

For example, she would like to be able to search for songs which, say, have good examples of the past perfect tense in Spanish. From a list she might choose "Gracias a la vida" by Violeta Parra, the Chilean artist and songwriter. She downloads the lyrics and various recordings of the song and previews a video documentary of Violeta Parra's life and work and she selects a brief clip for downloading. Hyperlinks lead her to web sites, full text journal articles and print references as well as high-resolution images of Parra's artwork. Having selected a range of materials, she groups them and puts them into a logical sequence. The presentation can then be downloaded and cached into the OPAC's classroom presentation module, and parts of it into a student revision module. In class the presentation can be called up and the teacher can seamlessly toggle between "talk and chalk" (onto an electronic whiteboard) and streaming multimedia.

I have been impressed by people's generosity in sharing information and resources and feel that I have learnt as much about cooperation as I have about technology. Not all of the visits I made are mentioned in this paper, but this is in no way a comment on the quality of the work undertaken in those places.

The optimistic words of Allan Kohl when receiving an award from the VRA for initiating the AICT website are inspiring. He spoke of how he had received positive and unexpected feedback from places such as Latin America, the Baltic States and East Africa. People explained to him how they relied on resources such as AICT because their college had no library, let alone textbooks, in their native language. He concluded that it is important for us "haves" to not only produce for our "extended colleagues" but also the world's "have-nots" as well" (Kohl 2003).

Collaboration, community, consortia, breaking boundaries and interoperability are in many ways the same thing.

Footnotes

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