

## Pixus image portal

### Final Report Template JISC Information Environment Development Programmes

1.	<b>Project details</b> <ul style="list-style-type: none"> <li>- Project Director:</li> <li>- Project Manager:</li> <li>- Start Date:</li> <li>- End Date:</li> <li>- Reference number:</li> <li>- Names of any collaborating organisation:</li> </ul>	<p>Sandy Buchanan, Head of Operations, SCRAN</p> <p>Erin Jackson, Pixus project manager, SCRAN</p> <p>1 January 2003 31 October 2003</p> <p>n/a</p> <p>System Simulation Ltd</p>
2.	<b>Title of Project</b>	<p>Pixus image portal demonstrator</p>
3.	<b>Objectives</b>	<p>To develop an image portal demonstrator, which provides a suitable platform and basis to examine issues of implementing a full service.</p> <p>To consider how the portal can be integrated into the JISC information environment</p>
4.	<b>Highlights of project</b>	<p><b>Achievements</b></p> <ul style="list-style-type: none"> <li>• Project completed on time and on budget.</li> <li>• Fully functional image portal delivered, enabling users to search and view around 700,000 images, contained in seven image collections.</li> <li>• Enhanced potential for Pixus to add value to the learning and teaching process, through incorporation of:             <ul style="list-style-type: none"> <li>○ a 'lightbox' feature</li> <li>○ a content management system.</li> </ul> </li> <li>• Positive feedback received from large numbers of potential users.</li> </ul> <p><b>Findings</b></p> <ul style="list-style-type: none"> <li>• Users are convinced that Pixus will be a very</li> </ul>

	<p><b>Highlights of project</b> <i>continued</i></p>	<p>valuable resource. If anything, they have higher expectations of the image portal's scope than originally defined in the ITT. They expect not just to discover images, but basically to find everything to do with images.</p> <ul style="list-style-type: none"> <li>• A simple but key factor in the portal's success is whether it offers images relevant to the user's needs. Pixus should aim to integrate images and collections corresponding to a broad range of disciplines.</li> <li>• Pixus also has a role in: <ul style="list-style-type: none"> <li>○ raising awareness of the potential for using images in learning and teaching</li> <li>○ helping new users by communicating simple 'how to' information.</li> </ul> </li> <li>• Users identified a high level of synergy between the development of Pixus and the potential development of a moving images portal. Pixus could accommodate moving images quite comfortably.</li> <li>• To enable the different collections to participate, it is necessary to: <ul style="list-style-type: none"> <li>○ adopt a flexible approach to the technical integrations</li> <li>○ establish clearly the grounds upon which the collections allow their images to be accessed.</li> </ul> </li> <li>• The simple Dublin Core metadata schema developed for phase 1 was found to support quick and effective searching across collections.</li> <li>• A widespread unique ID search in Z39.50 would facilitate the addition of features such as lightboxes</li> </ul>
5.	<p><b>Project Progress</b></p> <p>(i) did the project proceed as expected and on time?</p> <p>(ii) was there any significant change to the project compared with the agreed project plan?</p> <p>(iii) were there any circumstances that</p>	<p>YES</p> <p>NO</p> <p>YES. We were not able to integrate all the collections planned for phase 2:</p> <ul style="list-style-type: none"> <li>• The Courtauld collection was not ready, so we</li> </ul>

	aided or impeded the progress of the project?	<p>substituted another NOF project: Resources for learning in Scotland (RLS).</p> <ul style="list-style-type: none"> <li>• Despite efforts to overcome licensing and data access issues, we did not receive the HELIX data/images on time to integrate this collection.</li> <li>• EDINA had no collections available within the timescale of the project. We did, however, manage to negotiate an agreement with the British Geological Survey to use their images, to which EDINA was able to provide access.</li> </ul>
6.	<p><b>Development</b></p> <p>(i) has the project led to, or is it likely to lead to, further development work</p> <p>(ii) has the project led to improvements to the range of services the JISC offers?</p>	<p>This demonstrator project has highlighted a number of ways that Pixus could be developed further to satisfy user requirements, leading to potential enhancements and a full service image portal. These opportunities are described in the detailed report.</p>

7.	<b>Project Staff</b>	<p>Sandy Buchanan Erin Jackson Ian Brooks Graham Clark Michael Selway Mike Stapleton Matthew Carey Graham Howard Andrew Craddock</p> <p>No additional training was provided to staff during the course of the project.</p>
8.	<p><b>Collaboration</b></p> <p>(i) did any other external body, organisation or person collaborate in the project?</p>	<p>YES. The following image collections were involved in the project, being invited to attend two project meetings, contribute the necessary technical information, and participate in our evaluation.</p> <ul style="list-style-type: none"> <li>• AMICO</li> <li>• Bristol BioMed</li> <li>• British Geological Survey (BGS)</li> <li>• Courtauld institute</li> <li>• EDINA</li> </ul>

		<ul style="list-style-type: none"> <li>• Helix</li> <li>• Resources for Learning in Scotland (RLS)</li> <li>• SCRAN</li> <li>• VADS</li> <li>• Wellcome Trust</li> </ul> <p>Mick Eadie of VADS also represented the work of the PICTIVA project, and Jill Evans that of FILTER. Karla Youngs of TASI also offered some valuable feedback.</p> <p>We are grateful to the many individuals and organisations who responded to our invitations to participate in the Pixus evaluation, both online and in person.</p>
9.	<p><b>Expenditure</b></p> <p>(i) has expenditure exceeded or fallen short of the total sum awarded under any particular heading?</p> <p>(ii) Were funds from other sources sought or used to support the project in any way?</p> <p><b>Please attach a separate final expenditure statement for the project</b></p>	<p>NO</p> <p>NO</p> <p>Attached.</p>

10	<p><b>Dissemination of project outcomes</b></p> <p>(i) list the following types of output arising from the project:</p> <ul style="list-style-type: none"> <li>- papers (refereed)</li> <li>- reports</li> <li>- articles (non-refereed)</li> <li>- conference</li> </ul>	<p>We have produced a final project report, and user requirements, functional and technical specifications for a full service image portal.</p> <p>An evaluation report from phase 1 was also produced.</p>
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	<p>proceedings - other</p> <p>(ii) Detail any other means whereby project outcomes have already been disseminated</p> <p><b>Dissemination of project outcomes</b> <i>continued</i></p> <p>(iii) Detail what publicity has been received for the project</p> <p>(iv) Did you refer to JISC as the provider of support?</p>	<p>We have presented Pixus at various stages of the project. Our evaluation activities also acted as a form of dissemination.</p> <p>YES. JISC has always been described as the initiator and funder of the project.</p>
11	<p><b>Records Management</b></p> <p>(i) will the project website be available for three years or more after completion of the project?</p> <p>(ii) Can the website and project outputs be archived by JISC or other institutions and made accessible?</p>	<p>YES. The project website will be updated with the full complement of reports and specifications, and will continue to be available after the project has completed.</p> <p>YES</p>
12	<p><b>Preservation Issues</b></p> <p>(i) Are there any preservation issues for materials arising from the project?</p> <p>(ii) Have any arrangements been made with your host institution for preservation or maintenance and updating of the project outputs with long-term value?</p>	<p>NO</p> <p>NO. But it may be worth developing an archive/preservation strategy if Pixus is to be developed further.</p> <p>JISC may opt to maintain the portal demonstrator for continuing evaluation. If so, the scope of that evaluation would need to be defined and communicated to each image collection, in order for the collections to agree the terms and</p>

		<p>conditions upon which Pixus could continue to access their images.</p> <p>A new license agreement would also have to be negotiated with SSL for the use of Index+.</p>
13	<p><b>Beneficiaries of the project</b></p> <p>(i) Who are the likely beneficiaries of the project outcomes?</p> <p>(ii) How will they benefit?</p>	<p>See detailed report for responses.</p>
14	<p><b>Detailed Report and Summary</b></p> <p>(i) Detailed Report</p> <p>(ii) One Page Summary</p>	<p>Attached.</p> <p>Attached.</p>
15	<p><b>Signatures</b></p> <p>Project Director</p> <p>Project Manager</p>	<p>.....</p> <p>.....</p>

## **Pixus image portal**

### **Final project report**

#### **About this report**

This report looks back at the Pixus project's background, its methodology and the team's key activities. It describes the project's principal output: the image portal demonstrator. The potential impact of the portal on users and other stakeholders is explored, and a number of options for taking Pixus forward are presented.

This project report should be read in conjunction with three other reports produced as part of the Pixus project: the user requirements, functional and technical specifications anticipating development of a full service image portal.

#### **Background**

The Pixus project was conceived by JISC as part of its strategy to bring together the wide range of dispersed electronic resources and improve access for its user communities. Portals are seen as one of the key elements in the information environment strategy, to fuse and present resources and knowledge. An opportunity was identified to create an image portal demonstrator, to test some of the assumptions inherent in the information environment and the portals and fusion programme.

An invitation to tender was published towards the end of 2002, and the partnership of SCRAN and System Simulation Ltd produced the successful tender.

#### **Methodology**

We decided to divide the project into two phases. The first phase was to produce a working portal, integrating a first wave of image collections. We would have then have an opportunity to test and evaluate the portal, enabling us to concentrate on developing the lightbox feature and integrate the remaining collections in the second phase.

Appendix 1 contains a diagram giving an overview of the project workpackages. This overview was prepared for the project plan, but fairly accurately reflects the actual sequence and processes of project activities. The collections integrated in phase 1 were: SCRAN, VADS, Wellcome Trust and Bristol BioMed. The phase 2 collections were: AMICO, Resources for Learning in Scotland (RLS) and the British Geological Survey.

#### **Activities**

##### **1 Project management**

Project management activities were focused on ensuring that the project ran to schedule and to budget:

- developing the project plan
- ensuring that we kept to the project plan
- maintaining communications within the project team
- establishing and maintaining contact with relevant third parties, especially the collection holders.

No real issues arose with regard to project management. The great majority of people we approached were happy to help us, though in practice it was

clearly sometimes difficult for them to make time over and above their day-to-day workload. This applied particularly when the image collection was from a JISC-funded project that had already completed.

We had to deal with image collections as a group. In future, it could be more productive to have individual meetings in which we can spell out exactly what is involved in participating in Pixus, and gather the required information.

## **2 Research**

The great majority of our research activities consisted of a form of knowledge sharing, in which we could benefit from the practical experience of SCRAN as an image collection and SSL as a developer of technical solutions.

We also contacted various individuals as issues arose, and consulted Chris Awre and the JISC website for references and information.

We were asked to look into the feasibility of implementing a number of features and functions. Here are some of our main findings:

### **Content-based image retrieval (CBIR)**

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The basic structure of a CBIR system consists of a CBIR processor into which all the images of a collection are pre-loaded. A CBIR request is a query to this processor, which returns a list of images that match the query. A CBIR query usually includes a reference to an image from the collection, and the result of the query is a list of images similar to the original image.

The Pixus project looked into architectures for integrating CBIR facilities into a virtual image collection, though not at how new CBIR processors could be built.

Adding CBIR to a virtual union collection such as Pixus poses several issues:

- Most of the images in the Pixus virtual collection aren't held locally at Pixus, so how can they be passed into the CBIR processor? This issue is discussed below.
- CBIR implementations rely on using references to images, and the Z39.50 and other remote searching protocols have severe weaknesses in this area.
- All participating collections need to agree to their images being passed through the CBIR processor, which need not be running on Pixus servers.
- CBIR engines are generally developed and used within individual collections; how well will they work across different collections, especially given the diversity arising from Pixus's domain-independence? This issue was not investigated during the project.

#### **Loading the CBIR processor**

In order to prime the CBIR processor, each image must be fetched from its collection and passed to the CBIR processor. There are three cases:

1. Collections whose images are harvested by Pixus. (As distinct from collections whose metadata is harvested by Pixus). The harvested images are held locally on Pixus servers, and so are already available for Pixus to pass to the CBIR processor.
2. Collections whose metadata is harvested by Pixus, but whose images aren't. In this case Pixus holds a list of references to the collection's images, and so is in a position to collect each image and pass it to the CBIR processor.

3. Collections neither of whose metadata or images are harvested by Pixus. In this case, Pixus needs to be able to find a list of all the images in the collection. In the same way as with unique IDs, there is often no way provided to list all available images. Although the underlying protocols such as Z39.50 have suitable mechanisms for providing this function, the function is rarely mandated by application profiles such as the Bath Profile.

Once a list of images is obtained, the images can be collected as in the previous case of harvested metadata.

Periodically, the CBIR processor needs to be updated with new and modified images. In the first two cases above, Pixus has all the information it needs to manage this process. In case 3, however, the remote search mechanism needs to be able to handle a search for recently modified images. In the case of the OAI protocol, this is an inherent feature, but although protocols like Z39.50 are very capable of articulating searches like this, the servers need to be configured to provide the feature. If no incremental update is available, a complete re-load can be run. But this is expensive in network traffic, load on the collection's servers and on the CBIR processor.

Of course, a collection may support several protocols, such as Z39.50 and OAI. Although a collection is queried by Z39.50 for Pixus search and retrieve, it could be harvested by OAI for the purposes of CBIR. An attractive architecture would involve running the CBIR processor as a harvester: the CBIR processor would insist on being able to contact any participating collection using a suitable harvesting protocol such as OAI; it would schedule regular harvesting of each collection, and thereby would be able to maintain its CBIR indexes and other data structures.

This approach would mean that non-harvestable collections would not be able to participate in CBIR. That is not a fatal flaw: it restricts the effectiveness of the cross-collection CBIR, but does not invalidate it.

### **Rich Site Summary (RSS)**

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Rich Site Summary (RSS) is well suited to publicising the non-image content of Pixus: RSS can highlight the CMS-hosted features on, for example, the use of images in learning, teaching, and research, or on some of the sources of images available through Pixus to the Pixus audience.

Beyond that, however, there is no obvious role for RSS in Pixus. RSS is designed for delivering pointers to key pages in a site, and generally the pages of a site that have changed recently. The classic application is in delivering a set of news headlines, each with a pointer to a web page containing the news article. Pixus lacks both of these features: there are a very large number of images in Pixus; there is no small set of key images to point out with RSS. Similarly, there is no analogue of the "news headlines" in Pixus. Although images change and new images arrive, these new images are not necessarily worthy of highlighting, and images may arrive in thousands rather than the dozen or so which RSS would more-normally deal with.

However, there are possible, less conventional, roles for RSS in Pixus.

During the project we have investigated how cyclic profiled RSS feeds could be used as a vehicle for "pushing" data from Pixus to users. Pixus could offer RSS feeds that highlight a small set of images matching a particular search.

Although the search might identify 10,000 records in the union database, the RSS feed would highlight perhaps ten images from that set. Each day, the highlighted set could move to a different ten images from the search result. Anyone watching the feed will see a selection of images each day that match the search.

RSS feeds could be created for each user. The searches behind such feeds could be set explicitly by the user, or could be derived from recent Pixus searches carried out by that user. A hybrid approach is also possible. In addition, RSS feeds can be made by site maintainers to highlight particular content, by domain, by source collection, or by other theme. This can be done alongside the existing "sample search" mechanism, which has the similar function of "showing off" the union collection.

Pixus would have the opportunity to set the standard for RSS image publishing, and could become the single point of contact for image-oriented RSS feeds within the JISC community. Providing RSS feeds that highlight specific collections, Pixus would remove that responsibility from individual collections, centralizing, and reducing the total cost of providing these feeds. Our investigations have not determined whether anyone would use this sort of service, and if this approach is of interest, further work is needed to establish what sort of users would be interested in it.

## **Unique identifiers**

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During the Pixus project, several additional services were considered. Some were researched and some fully implemented. Several of these services called for the ability to identify a record within a collection in such a way that the record could be found at a later date. For example, the lightbox facility allows users to ask the system to remember particular images in named sets. When the set is recalled, the system needs to be able to locate the image and its metadata within the virtual union collection. If the image comes from a Z39.50-served collection, the metadata is stored on the collection's own server. Remarkably, there is no standard within the Bath or several other commonly implemented Z39.50 profiles to return to a particular record within a database. There are two possible solutions:

1. Insist that Z39.50 collections have the ability to return to an image. This requires two facilities:
  - there needs to be an identifiable unique reference within the metadata returned during record retrieval. This is not an uncommon feature.
  - there needs to be a way to search for a record using this unique reference. This is surprisingly uncommon.
2. Make a local copy of an image's metadata whenever an image is added to a lightbox or equivalent operation. This is a complete, consistent solution, but creates an uncomfortable complication so that an otherwise un-harvested database begins to be copied locally. This also raises the issue of whether and when such data should be refreshed, if the remote database is modified.

## **Digitisation on demand**

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*Report following a telephone conversation with Geoff Laycock, HEDS consultant*

In the context of this discussion, digitisation on demand was defined as meeting individual user requests for digital images of particular items to be created.

It appears that significant difficulties would be associated with implementing digitisation on demand within Pixus. These difficulties relate to:

- management: how to keep track of any number of digitisation activities, monitor turnaround times, and control the costs
- physical location: how to source and co-ordinate the digitisation of widely dispersed items
- quality assurance: how to ensure the highest quality images and the security of the original items.

A more efficient and cost-effective alternative to digitisation on demand would be to build a mechanism into Pixus for capturing user requests for particular items to be digitised. Once a critical mass of requests was reached, or consistent themes became evident, the decision could be reached to digitise items in a batch.

### **3 Metadata**

Our plan from the outset was to create a simple Dublin Core-based baseline metadata schema during phase 1, to enable us to get a working portal up and running quickly. We asked the collections to provide their schemas and produced a crosswalk, which we mapped to Dublin Core. This was then implemented in the phase 1 portal.

We expected that we would then refine the phase 1 schema during phase 2. In fact, we found that the simple Dublin Core schema was highly effective in supporting the cross-searching and decided to stay with it for the duration of the project.

Implementing a more complex metadata schema would also have been hindered by the diverse nature of the collections, resulting in some highly domain-specific cataloguing.

### **4 User interface design**

We prepared a UID brief during phase 1. This referred to the requirements set out in the ITT, and the various specifications provided by JISC. It set out the key design and functional elements that we knew the portal had to have, and proposed a very clean, uncluttered look & feel.

SSL designers quickly came up with a design direction, which evolved as the portal was developed and new functionality was implemented.

They identified a potential issue in that different collections were likely to present thumbnails of different sizes, but managed to create a successful solution. This may seem like a minor issue, but we feel that the consistency and balance inherent in the design is a very strong factor in its appeal to users.

Having said that, we are also aware of quite a number of areas where we can still improve the usability and accessibility of Pixus.

## 5 Portal build

A key feature of the Pixus system design is the use of a unified local data model in the centre of the system. This important abstraction allows much of the Pixus system to be built without needing to pay regard to the complex distributed and heterogeneous nature of the underlying resources. Features such as the lightbox, the interactive web site, etc., were built largely as if they were searching into local homogenous data.

The system is constructed using the Index+ toolset from System Simulation Ltd. The major components are:

- **The Index+ Bridge**, a broker system encompassing metadata mapping and a multi-protocol channel architecture for remote database access. This carries out the Z39.50 dialogue with remote systems and handles data mappings to a unified local data model. Queries and retrieval requests are directed by the broker to the appropriate databases. When necessary the Bridge works in tandem with local searches and the result sets are merged.
- **The Index+ Harvester**. This is a metadata harvester, principally designed to carry out OAI-PMH harvesting. In Pixus the harvester picks up a Dublin Core record and stores it into a suitably configured local database. Queries and retrieval requests for harvested databases are directed at this local database.
- **The Index+ CMS**, a full-featured Content Management System, has been used to manage non-brokered content. This content is traditionally managed in ad-hoc ways in systems like this, and the management can become quite onerous. By including a CMS, we were able to demonstrate the potential for easing this maintenance task, encouraging timely and relevant information to be maintained for Pixus users. Examples of the sort of content managed in Pixus by the CMS are
  - Pages of information to help users to understand how best to use images in their learning, teaching, and research work.
  - Information about the collection holders.
  - Pixus help pages.
- **The Index+/Web Gateway**, a configurable template-engine-based server for building web sites published live out of Index+ databases. The user interface designs were turned into templates and stored locally for the web gateway to use at run time. Templates are HTML with embedded instructions as to how to insert dynamic content. Because of the underlying use of the Index+ Bridge, the templates are only aware of the distributed nature of the application where it directly impinges on the user interface.
- **A User Register**, a local store of user names and personalization data. In Pixus the standard user self-registration facility was augmented with an interface to Athens to allow Athens users to gain access automatically. In this way, the system knows who the user is and can mediate access to different collections based on the user, the user's subject area or institution type, etc. This sort of mediated access was not further explored in the Pixus Image Portal Demonstrator project.

Remaining Pixus facilities are either derived from standard mini-modules or built for the project:

- **The lightbox feature** provides the ability for users to structure their image finds into named sets and add notes and annotations. These and other personalization features are built onto the basic structure of local user register. Because of the Unique ID problem discussed elsewhere in this report, a copy of any Z39.50 metadata record has to be kept when an image is inserted into a lightbox. This metadata is stored in the user register and later is accessed as if it is a remote database using the Bridge.
- **Saved searches.** These are also stored in the local user register.
- **Image harvester.** An ad-hoc image harvester was built to allow images to be harvested from collections where necessary. An image arena was configured to store the images which were served by a standard web server.
- **Sample searches.** To help users understand the virtual collection, we devised a system for showing off sample searches. Using the CMS, maintainers can enter a search which produces interesting result, along with a sample image from that search. Visitors to the interactive web site are presented with this image on part of the home page. Clicking on the image executes the search, showing the user what kind of things Pixus can do.

Portal development was carried out at SSL's offices and then transferred to servers at SCRAN. The transfer and hosting presented no particular problems.

## 6 Integration of collections

During the Pixus Image Portal Demonstrator project, seven collections were integrated into Pixus. An integration report for each collection is provided here. The service descriptions are included as an appendix to the technical specification.

SCRAN and SSL drew up a questionnaire, which was distributed to collections. The response to this was used to construct draft metadata mappings and also to begin the process of choosing how to integrate each collection, what protocols to use, whether to harvest, etc. In consultation with the collection holders, the Bridge and Harvester components of the system were loaded with service profiles schema mappings.

The use of Z39.50 between the collections was not very uniform and each collection using Z39.50 needed a specific configuration. Z39.50 performed well for Pixus in that the basic nuts-and-bolts of remote searching and retrieval was done to a known standard high-level protocol. However, some of the Z39.50 promise of delivering searching and retrieval to a known high level of semantic interoperability needed some by-hand configuration to achieve. Although OAI-PMH is a far simpler protocol, the same complaint holds within the Dublin Core records delivered through OAI. One collection's DC record is different from another's and manual configuration of mapping software is necessary to make the system operate effectively.

During testing a particular problem was identified to do with precise search semantics: the meaning of quoting of search terms, and of and/or/not operators, and whether word-proximity searching was the default, i.e. does New York mean "New" next to "York" or does it mean records with "New" and

“York” in them? This was tightened up considerably for the phase 2 evaluations.

Date searching is carried out in the demonstrator using a naive string search, and a production system would benefit from improving the date searching. During phase 2 of the project it was planned to introduce a more sophisticated metadata record, beyond the Dublin Core used in phase 1. However, the unexpected success of the DC record uncovered during the phase 2 evaluations led us to stick with DC in phase 2. The effectiveness of DC searching in the Pixus Image Portal Demonstrator is one of the key findings of the project.

## **SCRAN**

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Scran already provided a z39.50 interface to their database, this worked fine but unfortunately a very large proportion of the records returned by this interface were without accompanying images. It was necessary to install an edited version of their z39.50 interface together with an index that only listed records with images.

It was also necessary to edit the z server so that quoted groups of terms in searches were treated as proximity searches while terms separated with boolean operators were treated using the correct boolean operator.

## **VADS**

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VADS served up their data via an OAI Repository this is harvested once a week by a harvester program running on the Pixus machine.

The initial OAI mapping of the VADS data did not give enough information to generate a unique url to retrieve an image. An additional DC-Identifier field item was added to provide this.

The identifier portion of the OAI header provides a reliable unique ID for the record, this is used locally in the harvested database.

The data used in Pixus comes from the “vads” set from the VADS OAI repository.

## **Wellcome**

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Wellcome served up their data via an OAI Repository on their MedPhoto database, this is harvested once a week by a harvester program running on the Pixus machine.

The identifier portion of the OAI header provides a reliable unique ID for the record, this is used locally in the harvested database.

The data used in Pixus comes from the “contemporary\_images” and “historical\_images” sets from the Wellcome OAI repository.

Images are served from a machine at Wellcome using an Image Server that guarantees that only those images that Wellcome wish to be generally available will be presented.

## **AMICO**

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AMICO via SCRAN already provided a z39.50 interface to their database, this worked well, but a few amendments were needed. We had to edit the z server so that quoted groups of terms in searches were treated as proximity

searches while terms separated with boolean operators were treated using the correct boolean operator.

## **RLS**

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RLS via SCRAN already provided a z39.50 interface to their database, this worked well, but a few amendments were needed. We had to edit the z server so that quoted groups of terms in searches were treated as proximity searches while terms separated with boolean operators were treated using the correct boolean operator.

## **Bristol BioMed**

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We used the Bristol Biomedical z39.50 server into their database. We retrieve the records using the Marc21 record syntax.

Images are served from an image server at Bristol Biomed.

## **BGS**

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Edina provided a very comprehensive description of the z39.50 service they provided for the BGS. The images available from Edina were at sizes not acceptable to the BGS for publication. We harvested the BGS images from Edina resized the larger images down to 200 pixel maximum at the same time generating enlarged thumbnails at 150 pixels, which suited the Pixus design scheme better than the 90 pixel thumbnails held by Edina.

## **7 Technical infrastructure**

PIXUS is hosted on a Sun Fire V100 rack server at the SCRAN offices. The server runs Sun Solaris 8 and is configured with our default options: Apache 1.3, MySQL, Perl and Index+.

Installation of PIXUS involved copying the website files and configuring the web server to point at the files. Backups are performed by our dedicated backup server to tape. This server is stored offsite.

Since PIXUS would not be expected to hold large content databases locally, the current system should be more than capable of hosting a fully operational PIXUS server in the future.

## **8 User evaluation**

The potential user base for Pixus is very large. We realised that the best way to reach a large and well-distributed sample of users was by enabling on online evaluation. We built an online questionnaire, which invited evaluators to carry out a number of tasks in Pixus before telling us what they thought. We felt that tasks would help evaluators engage with the portal, and enable us to direct them towards the key areas where we wanted their feedback.

The approach was not risk-free. We knew that some people would visit but not have time or feel inclined to give much in the way of feedback. We could also stand accused of directing users too much, rather than leaving them to manage on their own, as real users would have to. On the whole, however, the approach was very successful. In phase 1, we had detailed responses from 26 online evaluators, and in phase 2 around 70 evaluators gave constructive feedback and comments.

The feedback from phase 1 was fed directly into our phase 2 activities. Feedback from phase 2 offers a wealth of material that could influence the development of Pixus as a full service.

In addition to the online evaluation, we held two group evaluation sessions with members of EDINA, a number of sessions with participants at SCRAN events, and three in-depth face-to-face sessions with individuals.

We found real value in observing people using the portal, and having time to really explore its potential with them. Our evaluation activities have had to end along with the project, but there could still be many opportunities to learn from the experience and requirements of others, eg the X4L projects and the LTSN subject centres, before or alongside work to develop Pixus as a full service.

### **Outputs**

The Pixus project has produced a fully functional image portal demonstrator, enabling users to discover around 700,000 images held in seven separate image collections.

The portal has a simple search, which searches all fields, and an advanced search, which enables the user to search fields mapped to four 'who', 'what', 'where' and 'when' criteria for whichever collections they specify. Boolean operators are enabled for both means of searching.

Pixus also enables authenticated users to access and run previous searches. Search results are presented as thumbnails. From these, the user can opt to refine their search or to select individual images in order to either access additional image information and a larger image if available, or add the image to a 'lightbox'.

The lightbox feature enables users to save sets of images for future reference. A range of functions are available to help users manage their lightboxes. Some of these are fully implemented, such as the ability to annotate lightboxes. Others are illustrated, such as how users can download or email lightboxes.

A content management system has been incorporated into Pixus, to enable the portal to offer help and guidance, specifically to support a section of the portal dedicated to helping Pixus users develop their use of images in learning and teaching.

### **Impacts and beneficiaries**

#### **Users**

The image portal demonstrator was intended for a very broad audience: learners, teachers and researchers in further and higher education. We recognise that this user base is by no means homogenous, but we would perhaps go against expectations by suggesting that within these different groups the user requirements for an image portal are not particularly diverse. Speed is a priority for FE teachers, given their relatively high teaching load. But all the other users want Pixus to be fast too. High performance is a general user requirement that directed our demonstrator build throughout. HE researchers need access to a very detailed metadata and, to the extent that collections make it available, we have reproduced it in Pixus's image info. But all users benefit from this level of detail – as they should, because they could be searching for images that match any number of specific criteria. When it comes to what users actually do with the images once discovered, the range of options is much the same for different user groups. We have not

yet identified any obvious demarcations between the ways that learners, teachers and researchers go on to use digital images; HE or FE, they might all be creating PowerPoint presentations, websites or print-based documents. They all need clear information on copyright. They are all likely to need help at some point.

For these reasons, it would seem redundant to propose that differentiation be built into Pixus in order to cater for the needs of different user groups. Rather the portal should maintain its clear focus, on images, and guarantee the best quality user experience for all.

The feedback received from users has generally been very positive and constructive. They can certainly see the value of having an image portal, and have fairly ambitious expectations of it acting as a one-stop shop for images. That is, they expect it to deliver quality images, and support them as they go on to actually use those images.

### **Image collections and services**

The impact that Pixus might have on existing image collections and services is worth exploring further. There is likely to be some concern that Pixus would absorb users, to the extent that image collections may feel their role and profile is diminished. Many services need to collate user statistics in order to manage their service and track user activity. Pixus needs to balance this need with the user requirement for Pixus to deliver a seamless experience, without multiple logins or registrations. This issue should also be addressed in the context of embedding.

### **JISC information environment**

It seems that the Pixus project has confirmed many of the assumptions underlying the information environment strategy. The portal would sit successfully within the presentation and fusion layers of the IE architecture, in order to facilitate the provision of images content to the end-user. It would also appear capable of interfacing successfully with the shared services infrastructure.

### **Future priorities**

We believe that there is a sound case for taking Pixus forward, and developing it into a full service image portal that offers users unrivalled access to images – and the information and guidance they need to use those images to enrich their experience of learning and teaching.

Pixus is fully compliant with the form and substance of JISC's information environment strategy. And there certainly seems to be a clear demand from users.

We have produced a series of specifications for the Pixus image portal, which provide a very sound basis for planning and developing a full service portal. The process of turning the demonstrator portal into a service would be fairly straightforward. Though a definite prerequisite would be to establish clear contractual agreements with the image collections participating in Pixus. This would ensure clarity on licensing, rights and terms of use. Licenses for SSL's software would also have to be agreed.

There are, however, a number of other ways in which we feel delivery of the image portal could be enhanced further. Some of these enhancements could be planned into the development of the service. Others should perhaps

precede the planning phase, since their potential impact may need to be taken into account early on in the plans. Decisions on timings are, of course, totally subject to JISC's assessment of these enhancements' value, but we would present the following options for discussion:

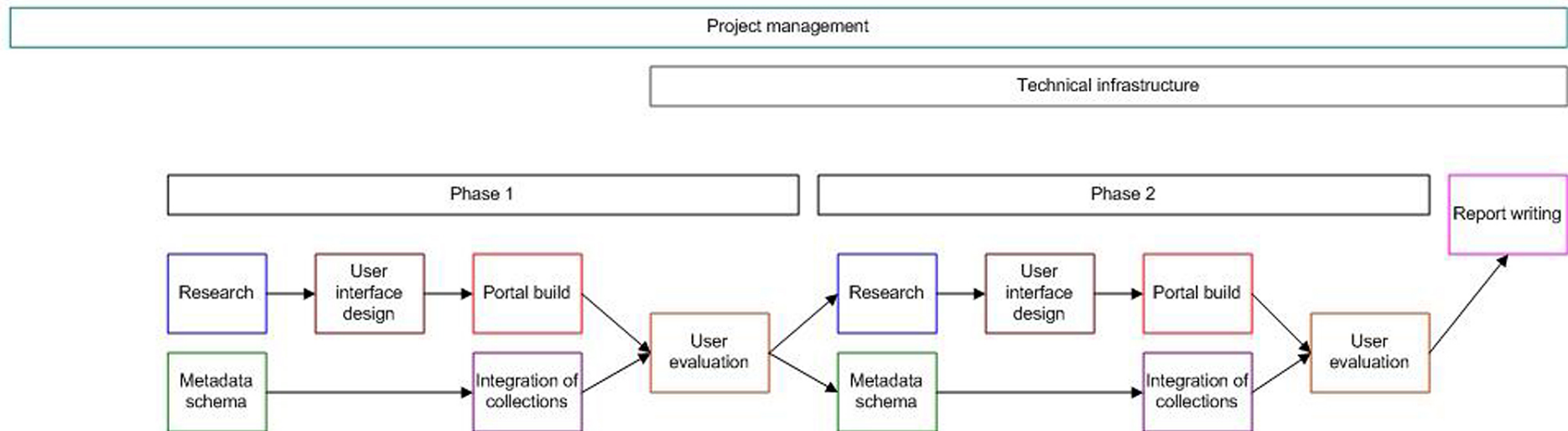
- Continue our evaluation with users, key stakeholders and other interested parties.
- Develop a strategy for learning and teaching content within Pixus.
- Implement the ATHENS single sign-on.
- Trial embedding Pixus in an institutional portal.
- Integrate more image collections
- Add a more comprehensive system for selecting which collections to search. Introduce a hierarchical subject classification (perhaps based on LOM standards), which would provide the scalability needed in this area if the number of collections is to grow. Add an interactive browser for this classification to the interactive web site.
- Allow collections to be split into overlapping sub-collections, for example, SCRAN might contribute 10,000 geographical images, 20,000 urban history images, 50,000 social history images, and 10,000 art history images; many of the urban and social history images may be the same. This will allow finer-grained access to different subject areas.
- Trial a personalized RSS service (described on page 4 above)
- Provide a guaranteed reference service, like a persistent URL service, to allow images to be cited through Pixus.
- Develop the non-image data, perhaps by being a delivery channel for other image services within JISC.
- Develop a service for hosting otherwise orphaned image collections both from inside and outside JISC.
- Add additional protocols for integrating image collections, such as SRW.
- Develop a CBIR module and trial with one or more CBIR services.

The final word of this report is addressed to all the people who helped us complete and enjoy the Pixus project: the image collection holders, Chris Awre and colleagues at JISC, our own colleagues at SSL and SCRAN, and – last but not least – all those who took the time to help evaluate our work: thanks!

## Appendix 1 Overall project structure

<b>Go-pix! image portal demonstrator</b>		
Overview of workpackages		Version 1 22 Feb 2003

*This overview is intended to show how the project work packages relate to each other. It is not an exact representation of the project timeline, or of concurrences and critical paths.*



**Pixus image portal**  
**Final expenditure statement**

The Pixus project had a total budget of £100,000. This was split between SCRAN and SSL as follows: £40,000 to SCRAN and £60,000 to SSL.

**Breakdown of SCRAN's expenditure**

Categories of expenditure		Value
Staff	<i>Sandy Buchanan:</i>	£10,000
	<i>Erin Jackson:</i>	£20,000
	<i>Ian Brooks:</i>	£3,000
	<i>Other SCRAN staff:</i>	£2,000

	Total:	£35,000
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Travel & subsistence, dissemination and evaluation	Total:	£5,000
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	Total expenditure by SCRAN	£40,000
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## Pixus image portal

### One-page summary

***The Pixus image portal demonstrator project was initiated and funded by JISC, under the portals and fusion programme managed by Chris Awre. The project partners were SCRAN and System Simulation Ltd, and the project ran from 1 January to 31 October 2003.***

So what has the Pixus project achieved, in its ten-month duration? Our most important achievement is the Pixus image portal demonstrator itself. The portal allows a wide range of image searching and viewing functions, to enable users to discover images from seven separate image collections.

As a Pixus user, you can target your searching, to find images matching specific criteria or to exclude certain image collections. You can refine your search based on your results. You can also revisit searches you carried out earlier. Pixus also enables you to store and annotate sets of images in 'lightboxes', which are designed to support learning, teaching and research activities.

So not only does Pixus give you access to an enormous virtual collection, currently containing in the region of 700,000 images, you can also create your own mini collections.

We built the Pixus demonstrator to investigate the issues and validity of a full service image portal. Evaluation was therefore one of our critical project activities. We had two evaluation periods, one mid-way through the project and one at the end. Both times we set up an online evaluation questionnaire, and held a number of face-to-face sessions.

We were very pleased with the response to our evaluations – over 125 people registered for the second online evaluation – and the quality of the feedback was excellent.

Our interpretation of evaluators' comments and suggestions, and our experience of working directly with images and image collections, has led us to propose that the development of a full service image portal is certainly valid.

The project did reveal a number of issues that an image portal service would face. The Pixus demonstrator already addresses some of these issues, with solutions implemented. Others are addressed in the reports and specifications delivered at the close of the demonstrator project. None of the issues would seem to present barriers to future development of the Pixus service. In fact, they could almost all result in enhancements.

Further information on the Pixus project is available, in the form of a detailed project report and user requirements, functional and technical specifications for a full service image portal. Visit [www.scran.ac.uk/jisc](http://www.scran.ac.uk/jisc) for details.

# Pixus image portal

## User requirements specification

### About this report

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This report outlines the user requirements that we identified in the course of the Pixus project. Requirements are grouped into the following sections:

- A one-stop shop
- Sense of security
- Responsive, powerful searching
- High performance
- A seamless experience
- Delivering quality
- Clarity on rights, and terms of use.

Bullet points at the end of each section identify the key user requirements, with an indication of which corresponding features have been implemented within the Pixus demonstrator, and which features are for future development.

Comments and feedback from our second evaluation phase are reproduced in an appendix.

### But first...

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#### ***Who are the Pixus users?***

Our users were defined as learners, teachers and researchers in further and higher education.

This is a very broad user base, and each group of users has somewhat different priorities. We've learned, for example, that the relatively high teaching load experienced by teachers in FE means that these users need systems that are particularly intuitive – and fast. HE researchers, by comparison, may have more time to become familiar with a system before they need to use it in-depth.

New and experienced users of digital images also have different requirements.

So the initial focus of many new users is simply on how to discover images.

While many experienced users take the discovery functionality in their stride, and are more interested in the value that Pixus can add after they have sourced their images.

#### ***And can a single portal cater for their needs?***

Our experience shows, however, that it is very possible to design an image portal that can cater for all users. This is down to the fact that the portal itself is very focused, dealing only with images. Users can immediately identify the purpose and potential of the portal, so they are not faced with barriers to entry by having to ask: what is this, and why would I use it?

We have shown that Pixus can be highly intuitive – so that both inexperienced users and users up against time pressure can easily grasp the portal's key concepts and functions. We have also demonstrated how very complex functionality can be presented in a way that satisfies the requirements of experienced users, and of researchers wishing to perform analytical searching, without compromising usability for new users.

The content management system within Pixus enables detailed help text to be included, to introduce the scope and potential of the portal to new users, and to support others if they experience difficulties. The content management system can also provide the basis for Pixus to disseminate a wealth of relevant information on using images in learning and teaching. This information can be structured and graded to cater for the requirements of all types of users.

## **Pixus user requirements**

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### ***A one-stop shop***

Pixus as an image discovery tool offers much value to users. But they expect the portal to be more than this. They want it to direct them not just to images, but to tools, help and advice enabling them to make the most of the images in their work.

This applies to new users, who need basic 'how to...' guidance, and to experienced users who need to ensure that they remain within the law as their use of images evolves over time.

Increasing number of learners, teachers and researchers are starting to use images in learning and teaching, but there is a need to provide training and outreach to encourage uptake among the far greater numbers of potential users. Pixus has clear potential to address potential users' lack of awareness and (perceived) lack of know-how, and to promote sources of training, guidance and inspiration – TASI, FILTER and PICTIVA being obvious candidates.

Pixus could even function as an effective forum and test site for new technologies and new research, such as visualisation techniques. This by virtue of the portal's potentially large user-base and its exclusive focus on images.

### **Key features required**

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- Clear how to information  
*To be expanded in future development*
- Information on relevant training and professional development courses  
*For future development*
- A forum for research information and potentially research studies  
*For future development*
- Tools to help bridge the gap between finding and actually using images  
*Lightbox implemented*

### **Sense of security**

Users need to feel that they're in control. They need to feel that they're managing their search, and that their criteria and needs are driving their use of Pixus.

This requires Pixus to have a very clear, user-friendly interface, and to support straightforward navigation around the portal. Each page must be labelled, so users know where they are, and clear routes should always be available for moving forward and back.

Feedback on the look and feel of the Pixus user interface has been particularly positive, with appreciation for the uncluttered screens, and the design treatments of elements such as buttons and icons. Even when users stated that a certain function could work better, more often than not they were observed to be using it correctly.

Several improvements could nevertheless be made to the user interface design of Pixus. For example, we should introduce a clearer distinction between tools and content, to group tools and give them consistently greater prominence. Other usability issues presented by evaluators are listed in an appendix.

The inclusion of relevant help text, and clear labelling of text fields also promotes users' sense of security. Some users will always have a slight concern that their searches may be missing the best images for their purposes. An educational slant to improving search techniques, and clarity on the results and scope of the search are required to address this concern. There may also be value in investigating the potential for Pixus to support a greater degree of browsing, perhaps via Yahoo-type categories.

### **Key features required**

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- Clear navigation, with page titling and breadcrumb trail  
*Implemented, but to be improved in future development to clarify status of trail and ensure consistency to page titles*
- A high degree of accessibility  
*To be improved in future development*
- Clear and supportive help text and error messages  
*Implemented, but future development would improve structure of help text as well as access to it*
- Clear page layout, with logical groupings of tools and content  
*To be improved to reduce need for scrolling and locate priority tools consistently and prominently*

### **Responsive, powerful searching**

Most users will come to Pixus with a clear purpose: they know what images they're looking for and they expect Pixus to deliver them. The first thing they need, therefore, is immediate access to the search functions.

Our experience is that the great majority of users will use a simple search in the first instance. Pixus is therefore designed with a simple search box prominent and accessible on every page. This search covers all fields of all collections, and enables Boolean operators (AND is the default).

Access to the advanced search is also provided on every page, and the advanced search page opens automatically when users opt to revise their search on viewing the results. Advanced searching gives users a high degree of precision in selecting specific fields and identifying which collections they want to

use. More experienced users, and users searching for images that match very specific criteria may begin here. Certainly, we can expect all users to use the advanced search function eventually. The page format, layout of fields and supporting help text must therefore be as clear and immediate as possible. All users observed did manage to use the advanced search function reasonably effectively. Feedback suggests, however, that we can still help people understand more clearly what and how they are searching, for example, by explaining how the search fields are mapped to the collections. The challenge here will be in communicating some highly complex information, varying across different collections, in a way that supports rather than confuses the user. We need to balance the need for Pixus to appear straightforward and simple to use, with the need to provide occasional insight into the complex processes going on below the surface.

A view was expressed that the scope of searching across Pixus could be extended, to enable content and lightboxes to be searched. It is also worth reviewing the potential for features such as: advice on next steps if no results are produced, response to potential misspellings, help text to promote effective search techniques.

### **Key features required**

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- Global and immediate access to search functions  
*Implemented*
- Intuitive, user-friendly search functions  
*Implemented, but to be improved in future development to improve the layout of the advanced search page*
- Ability to revise searches, and to revisit saved searches  
*Implemented*
- Help text around search functions  
*Implemented, but to be improved in future development to respond more helpfully to unsuccessful searches*
- Mappings of who, what, where, when fields to collections' metadata cataloguing  
*For future development*
- Ability to search for content within site, and for images within lightboxes  
*For future development*

### **High performance**

Pixus should be fast. Users want a speedy response to whatever they ask of the portal. This applies particularly to the return of search results, but also to the use of lightboxes and, to a degree, to the ability to access other help and content within Pixus.

Users expect to see almost immediate results and, if they don't, may start to doubt that Pixus is working properly. Since Pixus uses different means of accessing the collections integrated, the performance of the portal is to an extent subject to the performance of the individual collections.

There is certainly scope for Pixus to communicate better with users on performance matters. For example, we can warn users if collections are temporarily unavailable. And, we can give some guidance on how the user's own search techniques may be adjusted to ensure a better performance. We know that some users will be using Pixus from home, so as a general rule we should design all areas of the portal to be as streamlined and economical as possible.

### **Key features required**

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- Quick (if not instant) response when user:
  - enters search requests  
*Implemented*
  - adds images to the lightbox, and generally manages lightboxes  
*Performance to be improved in future development*
  - moves from thumbnails to image info to collections  
*Implemented*
  - moves around Pixus's CMS pages.  
*Implemented*
  - Information on causes of delays when they occur, and how to minimise them.  
*For future development*

### **A seamless experience**

When people are using Pixus, they do not want to be stopped in their tracks. Not when it comes to finding images, and not when they want to actually use the images in some context. They want the experience to be seamless, with Pixus managing to source and deliver images fit for their purpose.

At present, Pixus delivers thumbnail images as search results. Each thumbnail can be selected to show more detailed image information and, for some collections, a somewhat larger image. If the user chooses to go on from this point, to view and possibly download the best image available, or to access the full record information, they are handed over to the relevant image collection. How this transition is managed currently depends on the collection. For example, SCRAN requires a subscriber log-in but then presents the relevant image. VADS requires a local registration, after which the user must perform a new search for the relevant image.

During the evaluation, some users accepted that this was a typical problem of accessing resources via a portal. These individuals would perhaps be more likely to use Pixus as a means of discovering the most relevant image collections – in future choosing to go direct to the collections.

Other users considered this a serious barrier to potential users of Pixus, particularly since the lightbox is set up to collect thumbnails. Making use of a lightbox containing thumbnails from a variety of collections could presently require several separate log-ins and new local searches.

The ATHENS single sign-on will present a partial solution to this problem. Some relatively minor modifications to Pixus can enable authenticated users to access the ATHENS services/collections directly.

Local registration at the image collection level serves another purpose, however. Several collections use this as a way of collecting user statistics, which can then be used to monitor and plan their service.

To meet the needs of users and of collection holders, Pixus should eliminate the need for further log-ins or registrations, but enable user statistics to be collected to give all parties clear information on who the users are and where they are going. Depending on how each collection is integrated into Pixus, this can be done with Z targets, and locally within Pixus.

### **Key features required**

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Single registration/login to access all areas of Pixus and all collections

*Implemented up to the point when users need to link to the individual collections.*

*For future development:*

- *implementation of the ATHENS single sign on*
- *strategy for seamless linking to non-ATHENS collections*
- *strategy for collecting and disseminating user statistics for individual collections.*

### **Delivering quality**

Users expect to come to Pixus and find high quality images, delivered in usable formats. This is the main reason why they will use Pixus rather than alternatives, such as Google image search. They can be confident that the images delivered by Pixus come from reputable sources, that they meet certain quality standards, and that they are accompanied by reliable and detailed metadata records.

One evaluator noted the value of a clipart.com feature that enables users to view certain features of the image, such as file format and size, before downloading. This capability could be considered for Pixus, to support users downloading images for use in a VLE , or home users with limited bandwidth.

For some users, quality will be closely related to relevance. The images supplied by Pixus will only be considered of value if they offer a means of enhancing the user's particular learning or teaching output. It will therefore be important for Pixus to aim for breadth and depth in the image collections that it links to.

Relevant images and relevant content will be the key success criterion for many users.

### **Key features required**

---

- A reliably high standard of image quality  
*Implemented, but subject to quality standards maintained by image collections*
- Access to detailed metadata  
*Implemented*
- Images from a broad range of disciplines and subjects  
*Implemented to a degree, but future development should be according to an agreed strategy for sourcing and integrating new collections*

### ***Clarity on rights, and terms of use***

Users need to know what they can do with the images they've sourced. Finding a suitable image may be the first step, but the point lies in what happens next.

Clear rights information must be available for each image: who owns the image, how they should be cited, what uses are permitted and within which contexts.

At present Pixus does provides detail on the ownership and copyright of each image. But when it comes to using the images, we refer users to the image collections for their rights statements and terms and conditions of use. There could be scope to increase the amount of information offered by Pixus, but this would be subject to legal approval by the collections.

From the user's point of view, they simply want a quick and straightforward answer to whether or not they can download the image and use it in their work. Providing this answer may not be as simple, but would certainly add a great deal of value to the image portal.

### **Key features required**

---

- Information on copyright and terms of use:
  - general, within Pixus  
*Implemented, but more detail required as well as greater prominence*
  - per collection  
*Implemented, but more detail required as well as possibly a more specific interpretation of the terms and conditions for Pixus users*
  - per image  
*For future development, but high priority*

## Appendix Phase 2 evaluation

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Our phase 2 evaluation activities mirrored phase 1 in combining use of an online evaluation questionnaire with face-to-face group and individual sessions.

The online questionnaire was basically unchanged, in order to allow for comparisons between results at the two stages, though we included more open-ended questions for evaluators to give us their thoughts.

We had a great response to the online questionnaire, with over 125 individuals registering as evaluators. Detailed comments were received from around 60 individuals.

Precise numbers are difficult to give, as evaluators were not obliged to answer any questions or give any information about themselves, but of the numbers registered:

- 76 were HE, 30 were FE and 20 were 'other' (eg, museums, industry, RDN, government)
- 21 were teachers, 5 were learners, 29 were researchers and 63 were 'other' (eg, trainer, teaching resource support, librarian, project manager, user support, developer, website manager)
- 61 used images frequently, 58 occasionally and 8 rarely/never.

Three in-depth sessions were held with individuals, 1 group session was held with members of EDINA, and several other group sessions were held during SCRAN workshops. Feedback from these face-to-face sessions is not reported separately, but has been incorporated throughout the project's final report and specifications.

## ***Agree/disagree statements***

### **Phase 2**

Although the majority of the phase 2 results are generally positive, this table shows that Pixus must still work harder to:

- explain to users what their next steps might be
- provide help, support – and inspiration.

Pixus image portal...	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Is easy to navigate	13	52	7	1	-
Has a pleasant look & feel	32	37	4	-	-
Helps me find relevant images for my purposes	15	31	9	1	-
Retrieves images quickly	31	31	6	3	1
Presents search results in a usable form	17	39	5	1	-
Shows where images come from	25	38	8	1	-
Explains what I can do with images once I've found them	10	36	20	5	-
Provides help when I need it	8	33	29	2	1
Inspires me to use images in my work	11	31	30	1	-
Will be a valuable resource for me	13	38	19	1	-

Note: once again, total figures do not always tally, since some evaluators did not answer all questions.

### ***Comments and feedback***

#### **Which aspects of Pixus do you like best?**

##### **Design & usability**

---

- The interface design, colours and layout are clean.
- It feels very "clean", with navigation neatly sitting back from the main point of interest, the images, yet remaining consistent and clear.
- I think the help links are very useful. For example I wasn't too sure what the "who, what, where, when" links were for but the help was good. The back links are good - avoiding that back button confusion. Icons are clear. Links to rights is helpful.
- Good clean interface - very usable
- Clean layout of lightbox
- Nice typographic design, very clear. Thumbnails not too small
- The design of the site - very crisp. The colour scheme is very simple with good use of white space. The icons are simple yet effectively convey their meaning. The quick search bar at the top.
- Generally very impressed with ease of use and searchability
- The simple, clear layout of the results displayed. Breadcrumbs good
- Clean interface
- Clean design and easy to use
- Reasonably simple to navigate
- Nice clean up-to-date interface

- Simplicity
- Clear layout - uncluttered
- Clear uncluttered layout.
- Straightforward and clear to use - however, I am a very experienced user of the web and am not phased by things that happen so my comments might not be as negative as they would be if they had been made by an inexperienced user.

### **Searching and lightbox**

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- Easy search
- Cross searching of collections
- Ability to compartmentalise searches quickly and reasonably intuitively.
- The search facility is particularly good
- The search is very good and reasonably quick
- Speed
- The ability to narrow my search. maybe you would like to work on that in the future to make it possible to narrow the search even more. e.g. provide the ability to narrow the search based on specific features (color etc) of the image.
- Lightbox does work well, good searching facilities
- Ability to easily collect images of interest in a lightbox. Ability to cross-search different image collections.
- Search mechanism and the speed of retrieval of images as well as the ease of storage in the lightboxes.
- Reasonably quick search using information technology and computers as search criteria, the idea of a lightbox to collect images is good
- Lightbox facility. Ability to narrow and widen searches quite easily
- Lightbox concept; cross-collection searching
- The ability to save into a lightbox that can be renamed and a new description added
- Ability to add text to a lightbox to annotate the images.
- The "lightbox" concept is brilliant - an easy way to collect possible images before final selection for download - AND stores the selection if you want to refer back in future
- The idea that images are collected - like a shopping basket, and can be compared
- The lightbox is very useful
- Lightboxes
- Images are centrally stored in one area (ie each time i find an asset i dont need to download it to my local PC)
- The ease of collecting images into lightbox folders

### **Access to images**

---

- That resources are available at the touch of a button.
- Good quality images

- Provides easy access to a range of images
- Very useful locating images but I am not sure that my colleagues will be able to pay £3:00 per image. We are looking for multiple images to use in web based courses but it looks like it would be expensive to have the number we would need. I note Wellcome only talk about within PowerPoint. What about in web based materials for multiple students to access?
- Access to many images, searches seem pretty relevant
- Variety, range

### **Portal/one-stop shop**

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- The ability to cut through the endless trawling of the other sites and have a "one-stop shop" for finding images. The display is a lot less cluttered than say the interface on scan
- Fact that it is a portal
- Good to be able to use one interface and be able to search many image sources at the one time. Good interface. Useful links to other image sources (e.g. FILTER)
- User friendly Single resource for quality pics from good sources

### **Combination of aspects**

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- Fast response! Very pleasant professional design. Very easy to use.
- Power, range combined with simplicity. Like the "lightbox" metaphor Would be good for particular types of research - perhaps link to research methods with visual images might be worth having a link to.(Have lots of suggestions for these and there is a digital course on this at RGU)
- Very clear and easy to understand/use - The "Recent searches" option is particularly helpful - "Lightbox facility"
- The layout and structure is easy to use. I liked the fact that you could see thumbnails of the images found and their source. The search was fast but there again, I don't know how many images are currently in the bank.
- Speed "lightbox" complex searching"
- Clear, useful images. Fast, easy searching.
- Good collections, and the lightbox. Simple to search also.
- It is very restful to look at. Very clear. Easy to use. Nice "clean" look to it. The additional information you get when you click on the picture is useful and interesting. I wasn't always sure where the circles were physically located. Is this to avoid too many visitors?
- Cross-searching a range of image resources, easy to use interface, uncluttered display
- Very simple and easy to use. High quality images. I like the fact that the interface has been kept simple and uncluttered.

### **Other**

---

- All of it
- The questions do not relate to the exercises/tasks. Thank you for making me aware of Pixus - I will explore further.

- It's free!

## **Which aspects of Pixus do you like least?**

### **Design & usability**

---

- Could maybe do with a little more colour (not too much), the site is a little grey. - Just a personal preference.
- The interface is OK but not great could do with some work
- At the introductory page it seems odd that text should be written into a gif - this could do with being moved outside as the text isn't that legible. Text through out it could do with being made fractionally larger. The menus for amending the light box would perhaps be better place towards the top of the screen.
- Small size of some text on screen
- The layout could be more efficient, and there should be a (short) description of each of the collections rather than simply an acronym (many users will not know what they should expect to find in AMICO or SCRAN.)
- Fairly plain presentation - due to accessibility criteria?
- It seemed to me that the positions of the buttons were variable - perhaps there should be a stronger visual centre of interaction. In particular, if you set the width of the browser to match the width of the image layout in the case of advanced search, I lost the "search" button until I thought to open the browser window wider. I suggest that a drag and drop system would be great, and that there would be a window containing the images separate from the "context" window so that images might be looked at without clutter. I dont like the amount of scrolling - I always seem to get lost in scrolling when there are tasks required to reach a useful end! As I noted, the search button got lost, although it was there lurking.
- Controls split across bottom and top half of page. When it was suggested in the instructions that I select recent searches, it was not immediately obvious where this was, since it was at the bottom of the page and not next to the other "controls".
- I'm going to have to get used to an unfamiliar interface
- Too many clicking on things - i.e. number of screens

### **Searching & lightboxes**

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- The advanced search was good, but when I went back to revise my search the "science collections" and "arts and humanities" tick boxes no longer selected the correct collections (VADS had to be selected manually!)
- When selecting an image to add to my personal lightbox the fact that the page refreshes. I would have also preferred the option to "check" a number of boxes so that all images chosen where added to my lightbox in one go (with no page refresh, rather than pick one, refresh, pick another one etc. Also its not perhaps intuitive that you have to click on the image to get the metadata.....

- The little window that comes up when you want to change the lightbox description!
- Help notes don't word wrap and are a bit thin - maybe have a printable version as well with a downloadable pdf file. Maybe a couple of worked examples might help for novices maybe link to help and user materials etc Need a generic help link on each page that takes the user to a searchable or indexed set of help notes Not to keen on the absence of the button bar. I was using a Mac G4 under OS 10.2.6
- The "My lightboxes" tab on the navigation bar at the top of the page doesn't actually take me to my lightboxes!"
- Can't seem to select more than one image at a time to save and no way, once back to the images found after a search, to see which ones I've already selected and saved to the lightbox. Would also help to have the Search button under the search fields instead of Advanced Search Tips. More intuitive.
- A couple of pieces I looked for, I couldn't find.
- If I add an image to the lightbox, the "Add to lightbox" icon should change to "added to lightbox"
- When selecting an image for the adding to the light box the set resets back to the original position so if you have scrolled down to find something you have to scroll again
- Each time click add to light box it resets page and goes back to the top to reload
- The lightbox's function wasn't too clear
- Unable to add to lightbox from the more detailed data screen Had to keep going back to the home page to find my lightbox - or did I miss something?
- Without the instructions I wouldn't know what a lightbox is (but that's what user guides are for!)
- I found it very disappointing when after browsing to other sections of the site...collections/teaching and learning etc that when I clicked on "my lightboxes" that the current lightbox was not displayed as an option"
- The "my lightboxes" page is a bit confusing. It seemed that I should be able to view my lightbox from the bottom of that page but that was not possible.
- Nothing that I didn't like but I would have expected to add images from the full image page as well as thumbnail page. I also expected the "My Lightboxes" link at the top to go to my lightboxes rather than information about lightboxes.
- The section that said edit description
- Searching needs more functions (see below)
- There is not enough feedback to the user. Example when an image is added to the lightbox there was no indication on the search results that that specific image was already added to the lightbox. I think this would be useful because if I plan for example to add 3 images to my lightbox I would like to know if those images are already in my lightboxes.
- Was very slow when I tried it and I had to give up trying to add images to my light box

- The way it refreshes the "search results" page when an image is added to the lightbox. on a slow BT phoneline connection it was interminable.
- Did not like the screen refreshing completely after adding an image to lightbox, time consuming and unnecessary, annoying in fact. My search brought up pictures of Princess Margaret and Lord Snowdon and some other nice looking ladies - not what I expected.

### **Access to images**

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- On returns page there is no indication of facility to view larger scale images and further information (nor an alt field over images). Larger scale pages do not sit very comfortably on an 800 by 600 screen.
- Information on use of pictures once obtained - copyright clearance, ed use, commercial use, place on website etc needs to be highlighted.
- It was not obvious how one or two of the images linked to the keywords, though I must say the results were much more relevant than those you get from Alta Vista's very weird image search.
- Content - not specialist or in depth enough for our lecturers. it's the problem of all on-line digital collections....one lecturer summed it up by explaining that she never used them as "you spend all your time searching to find out what they haven't got".
- I can't access larger images but this is probably because I'm not a member of the supported network.
- followed an image and was refused access to it - no time to chase this further so might have been my fault
- Limits of subject specialisms

### **Portal/one-stop shop**

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- The teaching and learning page could use some revision perhaps incorporating some of the best advice from the other image sites in order to make this portal a one-stop-shop for image sourcing and use in teaching and learning.

### **Combination of aspects**

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- Small number of collections (just now, hopefully!) available for search. Authentication challenges for the larger images.
- Lots of scrolling required - menus at the top not down the side, not particularly quick to navigate. Also word menu at top, text is rather small. Second login necessary (SCRAN) to see the image any larger than an inch square - AND you have to start the search again. I understand why this is necessary, but it is still really annoying. Can you come to an agreement with the individual image resources?
- Would be good to be able to a lightbox as a website or a presentation. Could use some more descriptive data associated with each image.
- Slow to return search results. Slow to bring up detail view from thumbnail view and going to Next image. Descriptions on some records (SCRAN) are incomplete. Annoying page refresh each time you add to lightbox

- It is quite frustrating when the images don't load at all. If one of the searchable image sources is down it shouldn't search them. Help could be easier to find.
- 1)The lightbox and recent search box are not obvious to users, they are located at the bottom of the screen where users require loads of scrolling in order to find that two particular functions. 2) The term "lightbox" is not intuitive to users. 3)"Add to lightbox" option below the images should appeared like a button rather than the symbol which usually indicates that it is an "expansion" list when you click it. 4) Font size too small
- Cannot select more than one at a time for lightbox; advanced search returns to default settings for collections too readily; no browse facility say for a general term ..ie serendipity not allowed for.
- some of the descriptions in the tasks were slightly inaccurate - where functions were on page/screen

### **Other**

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- None so far other than occasionally a bit slow
- There was nothing really... honest!
- None of it
- Couldn't see anything I really disliked
- Hard to say. Need to explore more.
- Sorry - can't think of anything at the moment...
- Some things you go into are a bit general. What you go on to can have various subjects you don't need.
- Like most computer programs, the help files
- Nothing in particular

### **How can you see Pixus helping you in your work?**

#### **Access to images**

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- Good point of access to range of collections.
- Could be a good single source of copyright cleared images
- Yes certainly- however it is obtaining copyright free images that can be used on the internet that is of most use.
- Oh yes! getting images quickly and legally is a big plus
- Useful source of images although it does take a while to go through all the results, and there doesn't appear to be any kind of order to the results.
- Anything which makes access to images faster, cleaner and more efficient has to be welcomed

#### **Recommend to colleagues**

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- I don't use images in my work that much but I would recommend it to other people.
- I am subject learning resources adviser for quite a few subjects. I would like to encourage lecturers to use this.

## **Presentations**

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- It will provide images that I could use for presentations and for art history
- Presentations, pictures
- Using images in presentations more often
- Assembling images for use in talks.
- Very useful in presentations
- I might well use it in teaching or presentations to make them more visually interesting.
- Presentations, images for design inspiration
- Assisting teaching staff and students to find images to support seminar papers and lectures
- Images speak a thousand words - particularly for presentations (and for teaching and learning)
- A good source of "academic" images for enlivening presentations.
- Making us of images to incorporate into powerpoint or similar teaching aids

## **Teaching materials/learning packages**

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- Very much so - particularly if the images are copyright free in so far as I could use them in my handouts and interactive online materials.
- As a project coordinator tasked with persuading Art media and performance staff to incorporate JISC resources within their learning and teaching materials this portal represents a great advantage to my main bug bear of the resources I have seen so far, the end less links to different sites. As mentioned above staff are much more likely to use a quick and pleasant interface to find their images - and it is sooooo much faster and less cluttered than other portals.
- Providing access to valuable images for use in learning packages and for development with teaching and support staff.
- Yes. We're building something similar at ARCHES - the idea is to enable students to build learning objects using the lightbox feature and share these with each other and with the lecturer.
- I think the service will be an excellent "first port of call" for academics looking for illustrative material for educational use.
- Potentially build up teaching pack

## **Research**

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- Research for web images.
- Excellent research tool.

## **Inspiration**

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- Inspiration as well as information and links allows for new ways of researching and developing materials - can expand if you want
- Could be useful to art students for visual inspiration
- Linking to TASI!

## Other

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- Yes
- The learning and teaching portal will link to this as a resource
- It might
- May be useful for storing pleasant images for future reference, or searching multiple image databases simultaneously.
- Another search engine
- Yes - helping students to find images quickly
- Many aspects
- As an image source providing images are good, relevant to academic subject of interest
- The idea of collecting views reminds me of Google Image search - except that Google seems more immediate if not discriminating.
- It won't be directly relevant to my day-to-day work, but its something I would refer users to.
- Absolutely!
- Will give it another try next time I'm on the hunt for some images but will have to go a long way to beat google images!
- Not a lot at present but maybe its use will increase with time
- Maybe it could be used as a source of images for student design work.
- I don't work match with images in my teaching. But I can see how this can be useful for other disciplines in education.
- Easy to locate and reuse images.
- Will be useful if enough content is available and copyright clearance is not too onerous. I though everything in a JISC repository was already cleared for HE/FE use.
- Saving having to search multiple sites
- Has real potential for sourcing the striking images we need each month for our homepage; also provides handy scrapbook facility for the research/creative process
- Combines the collections from several different images libraries and users could form a nice catalogue of images under a specific area of interest, teaching or research area.

## How could we improve on Pixus for your particular needs?

### Design & usability

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- Make it like Google. It avoids all clutter. I prefer the way round it shows context at the top when the image is clicked on.

### Explain the scope of the portal/browse

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- It is imperative that, right from the start, such a portal gives the user some idea of what sort of images the system provides access to: perhaps a page outlining the subject matter of the collections with a few examples.

- See suggestions above. Also would help to categorise the images by subject/vocational area so can browse categories and get a feel of the types of images you have available for me to search.

### **Streamline and increase access to images**

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- Get everyone to agree to use the Athens login so multiple logins, windows open, searches are not necessary.
- By negotiating free usage rights on behalf of the community which mean individual users do not have to repeat the process each time an image is required. Something like the licence which used to exist for photocopying is necessary to avoid unnecessary delay and duplication of effort, though I realise this is probably a legal minefield. Access to the image resources of the BBC would also be a wonderful advantage.
- Keep improving the breadth and scope of the site
- It would be good not to have to log into each individual collection to see larger images
- Increase image bank
- Add image range
- Just add more images! Though the range seems very good.
- You'd have to add a lot more images of art, design, architecture, product design, performance etc.
- Include moving pictures and sound!!
- More collections and higher res versions for use in print applications and large screen projections ( some people are never happy!)

### **Differentiate sets of images**

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- More images division into photographs, paintings, line drawings, diagrams...
- Subject classifications across all the collections
- How about some themes (as SCRAN uses)
- Perhaps specialist collection areas - pre searched collections under academic themes, such as art etc, to remove some of the element of chance when searching for images.
- By sourcing images in themes - i.e. Tony Stone

### **Add tools**

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- I suspect many people will use these to fit into powerpoint slides for lectures (or similar). Some utility for this would be useful.

### **Add forum**

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- The exporting lightbox feature is the one feature that would be most useful. Also a forum so that students can discuss the contents of an individual lightbox.

### **Clarity on copyright**

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- Copyright details could be added to each image so that we need not check with the collections

- Maybe include copyright info / use restrictions on each record.
- Have a link to copyright restrictions for particular resources within the display for each image
- Possibly by adding a link to an image to give outline of copyright implications and identify if any of the images may be free for educational purposes
- Copyright advice with the thumbnails ... at least marking those that are OK to use for academic purposes .. rather than having to go to the Wellcome site (for example) to find that you then have to get their permission ...
- Improve access to the lightboxes from all screens.
- I'd have to be able to access the "subscribers-only" pages to give a fair evaluation."

### **Improve help function**

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- Hints given, for eg, on what does it implies when refining the search under "advance search", first time users might not understand "who", "what", "where" and "when" will help in refining their search. in particular "what" means?. It is very useful to have a content related search just by clicking the word "what" and obtain help and hints, but it is not obvious to users that by clicking that word, it'll be linked immediately to the help content.

### **Improve search function**

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- Better tagging of images, searching for computers should bring images of computers and not a collection of old pictures of Princess M"

### **Publicity**

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- Produce leaflets and a poster that I can distribute amongst staff.

### **Combination of aspects**

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- Darker and larger text please; What does "ALL" mean in advanced search? Can there be a button to untick all boxes in advanced search
- In the advanced search, could you expand the abbreviations for the collections. It will save a few clicks to go to the further information to find what the collection is. Print to PDF for emailing?
- I would like to have seen an "Add to lightbox" link on the page with the enlarged image. The "my lightboxes" link should have shown you your lightboxes rather than information on how to use the lightbox. In the advanced search page the "Advanced Search Tips" button should be to the side of the boxes

### **No change**

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- No improvements needed
- No it's good as it is
- Its fine if the prices are right.
- I can't see that you need to improve it for my needs
- I found it fine.

## **Any other comments or suggestions?**

### **Design & usability**

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- Personal - but not very keen on the page header - the orange does not work for me
- Menu bar looks a bit skewed as Search Tips is lower down the bar than the menu items to the left of it
- As I am a first time user the log in and registration page was a bit confusing and could deter new users

### **Accessibility**

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- No Alt text on each images displayed. Should address the accessibility issues.

### **Search issues**

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- Broker error: z39.50 channel: brisbio: error connecting \cs\_connect()" - possible address or port error in the configuration file Was recalled when I tried adding images to the light box
- Why did the "C. Darwin, The Formation of Vegetable Mould" image come up in a search for "stonehenge OR solstice"? at first glance it is neither, does the associated metadata make reference to the half-buried nature of the rock or whatever it is and associate it with stonehenge? is there a discussion of the meta-data used to describe the images available at the site?
- AMICO images didn't seem to display. Also slight problems with top menu bar using IE 5 on a Mac.
- When I searched for st paul's cathedral I went back to revise the search and the display showed st paul's cathedral. However, this will not produce a search result.
- It's not clear from search tips whether the advanced search is defaulting to an "AND" search or an "OR" search within AND between the fields. I assume it's an "AND" from the results I got.

### **Lightbox issues**

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- There was an error when I tried to open the default lightbox: Error in tag evaluation for <\_IXIF\_> Missing <\_IXENDIF\_>
- Not sure how well moving images and sound files would work with the lightbox feature. I'll have a play with Pixus more and get back to you.

### **Access to images**

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- The exercise didn't work past Task 4. I found no images. would that be because I logged on as an Athens user and I didn't have access to all the sites you used?
- Continue to Increase image bank. Ensure it offers more than a Google image search Ensure it can link to VLE's

## Image output

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- A pdf print-out however rough - of course with some sort of copyright overprint or watermark would be good. This would be a good reference method, and might include textual descriptions separate from images, again to help view the images unhindered.

## Uploading images

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- I'd like to see a facility whereby staff could upload pictures through this portal and make them free for use throughout the community. There also might be a useful opportunity to present a beginner's guide to tagging and a tagging template through such a mechanism.

## Combination of aspects

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- Is "lightbox" obvious terminology? Do lightboxes remain for ever until deleted? In the learning and teaching section would be better to summarise uses and copyright principles as well as the links. Will people want to follow lots of links, especially if there are more collections? Some sort of JISC standard statement/conditions? Is the All in Advanced search the same as Simple Search? If so is it needed? I assume fields cannot be combined in a search. Could Web image searching services be added (not for cross searching)? If users will maintain lightboxes then they might want to have images from lots of sources - could those non-Pixus collections be included?

## General/other

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- I need more time with the product to determine its usability
- Nothing more really. Liked it!
- Excellent resource. Very clean interface and easily navigable
- Keep up the good work, this could become a valuable resource, the help on images is a thoughtful and useful addition.
- I had to guess the value of the radio buttons on the evaluation form - I hope I got them the right way round (ie all positive!)
- I'm interested in knowing how Pixus actually works behind the scenes as I am leading a project here at Indiana University to develop or implement a similar tool for images of art and cultural objects.
- Opportunity to build in links relating to research and development on use of images in Research, Learning, Teaching and Assessment of kind developed by Prof Carole Gray c.gray@rgu.ac.uk on the first digital course on research methods for professional in visual practice (Am biased having worked there but still...!)
- A very well designed site and will prove to be excellent for cross-collection searching, something that has been needed for a long time!
- Overall, I think it is a very well designed and simple-to-use system. I have little doubt that it will be of great benefit to many and various folk.
- This is very impressive.
- Too little experience to give very useful feedback
- Nice Work!

- I think it is a good service!
- Good job - well done
- A very useful and worthwhile teaching and learning tool to incorporate into learning materials and packages.
- Thanx for providing a great site
- A very good site!
- Look forward to a next upgrade.

## Pixus image portal

### Functional specification

This specification describes the functionality delivered by the Pixus demonstrator, and areas where this functionality could be enhanced, or new functionality added, to create a full service image portal.

This document should be read together with the user requirements specification, which outlines the content, design elements and usability standards that should wrap around the portal's functions.

#### 1 Enter

1.1	Accessing Pixus	Comments
	The user can access Pixus quickly and easily from their workstation	Pixus is currently only accessible via the online evaluation, or by a url provided by the project team Future development: cater for different ways of accessing Pixus, particularly in light of the potential for embedding
1.2	Logging in	Comments
	The user can log in with their ATHENS username/password	Authenticated users can access their lightboxes and saved searches Future development: implement the ATHENS single sign on
1.3	Registration	Comments
	The user can register at the portal and use this locally registered username and password as an alternative to ATHENS authentication	Locally authenticated users may be working within a limited 'landscape' once single sign-on is implemented Future development: explore value of and potential for requesting further info from users, eg on their subject area. This could be used to serve up information on searches (or actual results) carried out by people working in the same field
1.4	The current landscape	Comments
	The user can see which image collections are accessible via Pixus	The landscape does not currently alter dependent on authentication Future development: show users which collections they can access depending on their authentication route

## 2 Survey

2.1	List of collections	Comments
	The user can browse descriptions of the image collections accessible via Pixus	Not yet implemented. Future development: follow progress made by IE service registry project and establish means of presenting a searchable database of collection descriptions Future development: investigate implementation of RSS. See page 4 of the project report.

2.2	Modify current landscape	Comments
	The user can select categories of collections to search across, and select/deselect individual collections via the advanced search	Future development: investigate potential for saving selections between sessions, and for making these configurations available to others

## 3 Discover

3.1	Searching collections	Comments
	The user can search across the collections in their current landscape, by using Z39.50 or by gathering and storing metadata from OAI repositories	Future development: investigate value of and potential for implementing CBIR. See page 2 of the project report. Future development: follow progress made by IE service registry project and establish potential for sourcing service descriptions

3.2	Simple search	Comments
	The user can type in a word or series of words in the simple search field in order to search all fields of all collections	Future development: search could be expanded to cover content and lightboxes

3.3	Advanced searching	Comments
	The user can access a more complex search function that enables them specify search criteria and search particular fields of particular collections	Future development: allow collections to be split into overlapping sub-collections

3.4	Help with searching	Comments
	The user can get help in constructing appropriate search	Not yet

	requests	implemented
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3.5	Sample searches	
	The user can view the results from pre-set sample searches	

3.6	Restricting searches	Comments
	The user can search across a single collection, multiple collections or categories of collections	Future development: add a more comprehensive system for selecting which collections to search

3.7	Targeting searches	
	The user can use Boolean operators to target their search more precisely	

3.8	Revising searches	
	The user can narrow and broaden searches after an initial request	

3.9	Saved searches	
	The user can return to a previous search and either adapt it or run it again	

#### 4 UseRecord

4.1	Viewing thumbnails	
	The user can view the results of searches as thumbnails.	

4.2	Search results	
	The user can view integrated results sets across collections.	

4.3	Accessing image info	
	The user can link to a more detailed record and a larger image if the collection provides one.	

4.4	Image origin and copyright	
	The user can see the image's origin and any statement of rights attached to the image as a part of the search results.	

4.5	The lightbox	
	The user can save search results in 'lightbox' held at the portal	

4.6	Managing lightboxes	
	The user can access a range of functions to help them manage their lightboxes: rename them, annotate them with a description, delete an image, delete an entire lightbox	

4.7	Using lightboxes	Comments
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	The user can access a range of functions to use and share their lightboxes: view them, print them, email them, download them	Not all functions implemented yet
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