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D5.1 Evaluation of the first PATHS prototype

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1. Executive Summary

The aim of this report is to present the results of evaluation of the first PATHS prototype. Three strands of evaluation activity have been coordinated across the project, involving Field –based demonstration sessions, Laboratory testing and Project wide evaluation of technical aspects of PATHS. The results of these evaluation activities have enabled identification of a set of recommendations that will be used to inform the functional specification of the second PATHS prototype and to improve the PATHS system.

Groups of target users were invited to take part in field-based demonstration evaluation sessions, which were hosted locally sessions at cultural institutions and other venues. These sessions provided an opportunity for the collection of qualitative data from focus group discussions and quantitative feedback through questionnaires. Another group of target users were invited to take part in laboratory-based evaluation sessions, which allowed for testing of the efficiency and effectiveness of the PATHS software under controlled conditions, and in-depth feedback to be captured from participants on usability and satisfaction. Evaluation of the prototype system is also being conducted by the technical development partners; i-Sieve, Avinet, The University of the Basque Country and The University of Sheffield. These evaluations are concerned with the system architecture, content processing and enrichment and user interface design and focussed on systematic, objective evaluation of the building blocks of the system as standalone entities.

The results of these activities have provided evidence that the first PATHS prototype was well received by participants of both the Demonstration and Laboratory evaluations. Overall the response was positive responses with participants finding PATHS mostly *easy to use*, *interesting* and *useful*. It is also seen as offering novel functionality that could be useful in a number of different user scenarios.

There were negative responses in two areas; usability issues that can be easily rectified, and content issues which are unfortunately outside the scope of the current project. However these negative responses also present opportunities. The usability issues provide us with very useful pointers for improving the PATHS user interface in the second prototype, and the content issues inform recommendations that can be fed back from the project to supplier organisations and the wider cultural heritage community. A small number of suggestions for additional functionality were made. These will be invaluable in informing the second prototype.

The results of the evaluation of the first prototype have enabled us to extrapolate a detailed set of recommendations for development of the second Prototype based upon clear empirical evidence. This not only forms a sound basis for developing the PATHS functional specification, but also realises the PATHS vision of a system that enables enhanced information access to cultural heritage collections through novel forms of user interaction supported by appropriate and personalised adaptability. These recommendations are presented in section 6.

This work will continue in the next cycle of development and evaluation where we will continue to work with expert and non-expert users to evaluate the second PATHS prototype.

2. Introduction

The focus of this work has been to assess whether the technical outputs of the first prototype of the PATHS system are fit for purpose and to inform the development of the next prototype system. To achieve this we have:

- Engaged with users to verify user requirements are being met in both field settings (demonstrations with users) and in laboratory conditions (laboratory evaluations).
- Evaluated PATHS against objective measures to assess accuracy, reliability and scalability (project wide evaluation)

This has enabled us to provide feedback to the technical development partners and will ultimately allow us to demonstrate the feasibility of integrating PATHS into existing cultural heritage digital library services.

2.1 PATHS Evaluation Methodology

Overall, the PATHS evaluation effort needs to meet several requirements:

- to ensure that the system developed is fit for purpose;
- to evaluate PATHS against objective measures to assess accuracy, reliability and scalability;
- engage with users to verify user requirements are being met;
- provide feedback to partners after each Prototype has been released; and,
- demonstrate the feasibility of integrating PATHS into existing cultural heritage digital library services.

The project defined a broad approach to evaluation, which incorporates laboratory testing along with demonstrations and focus groups.

In this section, we define the specific methodology that has been employed.

2.1.1 Objectives of the evaluation

A number of objectives have been identified as the cornerstones of the PATHS system evaluation at its various stages of iteration, including:

- 1) To confirm that the user requirements expressed within the most recent functional specification have been met
- 2) To ensure that system performance falls within acceptable limits
- 3) To assess the design of the system and its interface against best practice guidelines
- 4) To assess the design of the system against other systems supporting similar functionality
- 5) To measure the usability of the system from the perspective of key user groups in support of simulated and natural (real-life, user-defined) tasks including domain-specific work tasks
- 6) To assess the quality of the system and user experience from the perspective of key user groups
- 7) To assess and further describe the validity and utility of the PATHS user interaction model in support of domain-specific work tasks

- 8) To examine and further explore the information behaviour of different user groups with regard to exploratory search and path creation
- 9) To test hypotheses relating to users' information behaviour in using the system, with regard to their cognitive styles
- 10) To examine changes in information behaviour and use of the PATHS system over time
- 11) To identify areas for improvement in future iterations of the system

These are clearly over-arching objectives, and within each area there may be additional specific objectives and/or hypotheses that will be clarified within the detailed documentation of the evaluation instruments.

2.1.2 Development of the evaluation methodology

The evaluation methodology will be developed in two phases, coinciding with the delivery of the two prototypes of the PATHS system.

- Phase One, months 10-16
The initial methodology for the evaluation of the first PATHS prototype was defined by MDR and USFD based on the user requirements identified for the system in the initial research and includes validation criteria, objective measures and defined test tasks and queries for the database
- Phase Two, months 25-27
Further development and refinement of the Evaluation Methodology will take place during months 16-25

2.1.3 Strategy

The purpose of this work is to evaluate the PATHS system as a whole, to aid the on-going iterative user-centred development of the system, and to provide overall evaluation of the success of the system against the defined objectives.

Evaluation of PATHS has largely followed a strategy derived from the interactive information retrieval paradigm, incorporating a mix of system and human-centred evaluations in both laboratory and field-based settings. These evaluations will vary somewhat between the stages of the project as different functionality will be available in each prototype.

- The first Prototype (P1) includes the core functionality to support the PATHS user interaction model. Evaluation will relate to objectives 5-8 and 11.
- The second Prototype (P2) will incorporate updated core functionality based upon feedback from P1 plus additional personalisation and recommendation features, and support for collaborative work. At this stage, evaluation will be extended to cover objectives 9 and 10 in addition to continued evaluation of objectives 5-8 and 11 (including comparison between P1 and P2 results).

2.2 Field-based evaluation, Demonstration sessions

PATHS committed to using demonstration sessions with groups of invited potential users at both prototyping stages, (P1, and P2), for evaluation purposes. These sessions provide an opportunity for the collection of more qualitative data from focus group discussions and

quantitative feedback in the form of questionnaires from users, especially with regard to the position of PATHS within specific domains/markets and may also be used as a forum for discussion of possible system refinements in the light of results from the laboratory evaluation.

Evaluation carried out in field-based settings in order to provide insights into the use of PATHS in the users' own environment, and to enable a degree of longitudinal analysis. Suitable approaches include controlled beta release, measured via either log file analysis and/or diary studies. Formal field-based evaluations are not currently planned until the P2 stage when the full scope of the system has been implemented, as it is felt that releasing a semi-completed system, even to restricted audiences may prove damaging to overall perceptions in the target markets.

2.3 Laboratory-based evaluation

Evaluation of the first prototype in a laboratory setting allows for testing of the efficiency and effectiveness of the Paths software under controlled conditions, along with in-depth feedback from test participants on usability and satisfaction. A user-centred methodology has been employed, based upon the Interactive Information Retrieval (IR) paradigm, originally developed by Borlund (1997), and widely adopted in the IR community for more complex systems with functionality going beyond simple search.

Interactive IR evaluation utilises simulated and natural work tasks typical of user information needs, as an aid to system interaction in a controlled environment. In this way it is possible to evaluate to what extent the system supports the user in their specific context. Extensive data capture via observations of user activity (e.g. screen capture, eye-tracking and transaction logs) is complemented by quantitative and qualitative data about the users, their information behaviour and their experience of completing the tasks and using the system in general, collected via questionnaires and interviews.

2.4 Project-wide evaluation

Whilst activities undertaken via demonstration sessions and laboratory testing constitutes the main work of PATHS system evaluation, it should be recognised that further more specific and localised evaluation of the different elements of the PATHS system has also been conducted by the technical development partners, i-Sieve, Avinet, The University of the Basque Country and The University of Sheffield. These evaluations are concerned with the system architecture, content processing and enrichment and user interface design. These activities are specifically focussed on systematic, objective evaluation of the building blocks of the system as standalone entities.

2.5 Review against the Functional Specification

The functionality provided by the first prototype has also been evaluated by internal review against the functionality specified in D1.3 - Functional Specification. Results of this are presented in 4.4.

3. Implementation

3.1 Participants

User profiles and a user interaction model were developed early in the project and have been reported in *D1.1 User Requirements Analysis* (2011). This work formed the basis of several example use cases detailing typical use of the PATHS system in context and has informed the identification of participants for both the field-based demonstration sessions and the laboratory-based evaluations.

The PATHS system will need to support:

- Path creation - expert
- Path creation - non-expert
- Path facilitation (e.g. teacher/student)
- Path consumption

And it is these categories of participants with whom we have engaged for the evaluation activities. These use cases have also been used to inform development of the tasks, queries, and demonstration activities for both the field-based demonstration sessions and the laboratory-based evaluations.

3.2 Evaluation protocol

An overarching evaluation protocol was employed to ensure consistency of approach across the laboratory-based and field-based demonstrations, modified slightly in accordance with the environment within which the evaluation was taking place:

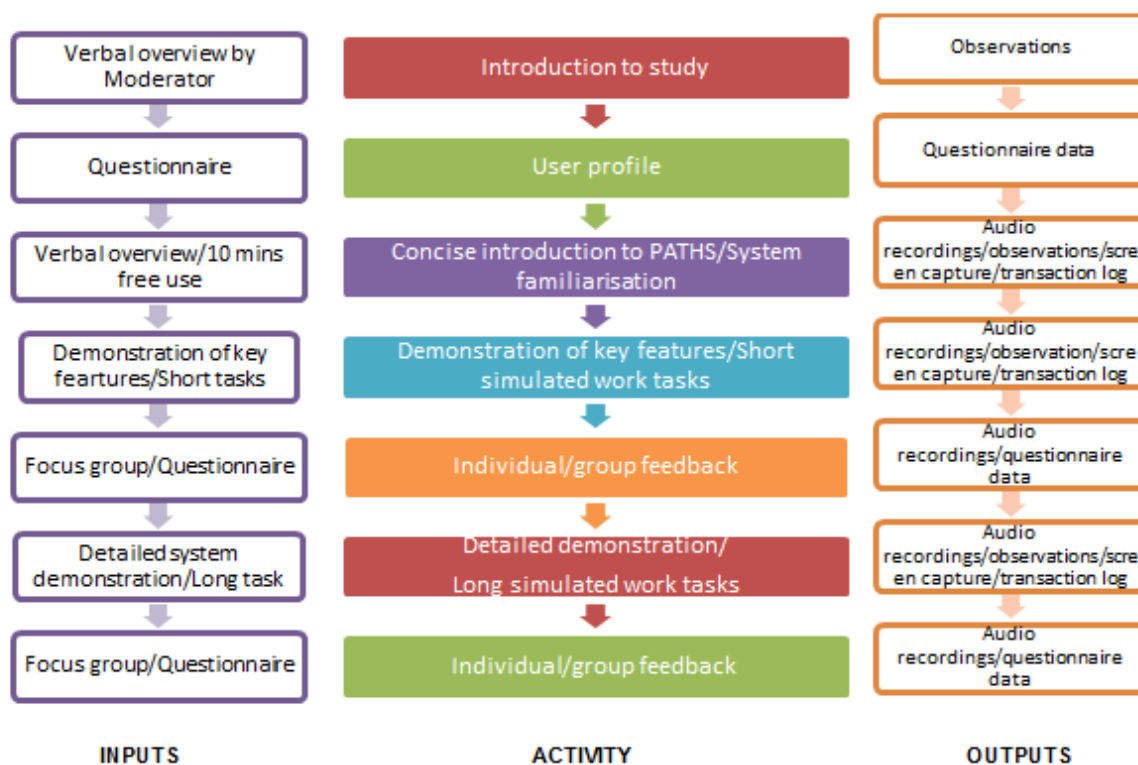


Figure 1 Overarching Evaluation Protocol

Additionally, questionnaires used by both the laboratory-based and field-based demonstrations were aligned, as were tasks used to demonstrate/interact with the system.

3.3 Piloting

A number of different data collection instruments and materials were developed in order to undertake the different evaluation activities:

- Overarching Evaluation Protocol (3.2), Demonstration Protocol (3.4.2) and Laboratory Protocol (3.5.3)
- Questionnaire for use in field-based demonstration sessions (Participant Pack, Appendix 1)
- Focus groups schedule for use in field-based demonstration sessions (Moderator Pack, Appendix 2)
- Questionnaires for use in laboratory-based evaluations (Appendices 3-5)
- Interview schedule for use in laboratory-based evaluations (Appendix 6)
- Tasks and demonstration activities for use in both field-based demonstration sessions and laboratory-based evaluations (Appendices 7-9)

These materials were extensively piloted by project partners, and with a selected number of external participants. These materials, tasks and demonstration activities were modified in accordance with this feedback.

3.4 Field-based evaluation, Demonstration sessions

MDR Partners, Alinari and the University of the Basque Country conducted a series of demonstration sessions with users to evaluate user responses to the prototype. A more qualitative approach was adopted to elicit user responses to the first Prototype. These comprised of a series of demonstrations of PATHS interspersed with focus group discussions and completion of individual questions to elicit individual responses to the system. Elements of the PATHS system were demonstrated in-line with the tasks employed within the laboratory-based evaluations.

3.4.1 Demonstration participants and sampling approach

User profiles and a user interaction model were developed in *D1.1 User Requirements Analysis* (2011), which then formed the basis of several example use cases detailing typical use of the system in context. The user interaction model supports the core tasks and roles that the PATHS system will need to support:

- Expert Creator
- Expert Facilitator
- End user Creator
- End user Consumer

Initially it was anticipated that 8 demonstration sessions with between 5-10 participants in each group (circa 40-80 participants in total) would be run. In total 9 demonstrations were undertaken with 53 participants, thus:

- 1 group of 3 participants in Spain (The University of the Basque Country)
- 5 groups with a total of 25 participants in Italy (Alinari)
- 3 groups with a total of 25 participants in UK (MDR)

A non-probability convenience sample was used (Bryman, 2012:202), with host partners (The University of the Basque Country, Alinari and MDR) each identifying potential participants as matched against the four use cases above. Invitations to participate in the project were sent out and local arrangements made to host each session.

3.4.2 Demonstration Protocol

An overview of the demonstration evaluation protocol was developed and modified from the overarching protocol (section 3.2) and is shown in Figure 2. This illustrates the main stages of the process, along with data instruments and other inputs, and an indication of the data collected as outputs of each of the demonstration activities.

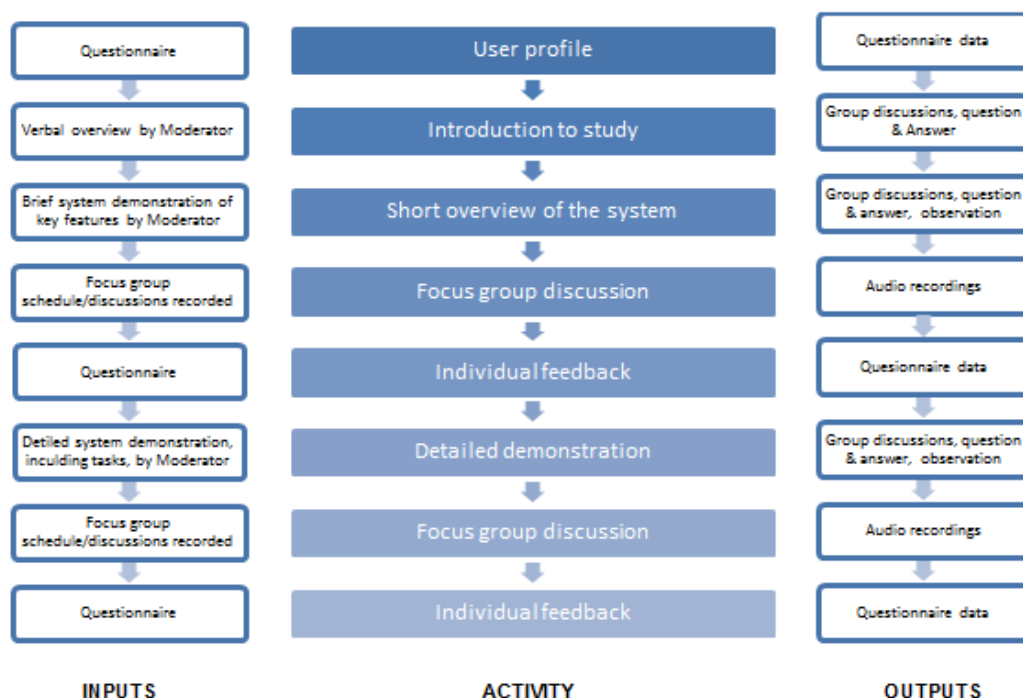


Figure 2 Demonstration Evaluation Protocol

Recording equipment was used to capture discussions and transcription of these undertaken locally by the host partner. Manual analysis of these discussions has been undertaken, whilst questionnaire data have been analysed using Excel and xlstat.

3.4.3 Measurement of Demonstration-based evaluation

A series of measures were developed for the demonstration based evaluation, these can be summarised as:

Instrument	Measures	Type
Demonstration: focus group schedule	Group discussion of PATHS concept and key elements of the PATHS system Explore Search Item Record Layout Item Record Content Finding a path Following a path Creating a path Preferred devices on which to use PATHS PATHS and social media Identification of improvements	Qualitative/subjective

Demonstration: questionnaire	Pre-defined questionnaires, collecting attitudinal (Likert Scale and Semantic Differential) data on: Usability/Ease of use/Usefulness/ Innovation and identification of improvements.	Quantitative/qualitative /subjective
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Figure 3 Demonstration evaluation measures

The Participant Information Sheet, Consent Form and individual questionnaire were provided to participants in the form of a Participant Pack (which can be seen in Appendix 1).

The focus group schedule, tasks to be demonstrated and protocol were provided to host moderators in the form of a Moderator Pack (which can be seen in Appendix 2).

3.4.4 Data collection

The focus of the data collection for the Demonstration evaluation sessions followed a mixed methods approach, that is, “employing the data collection associated with both forms of data [quantitative and qualitative]” (Cresswell, 2008). Specifically, the Demonstration sessions sought to explore the cultural heritage information behaviour of participants, to identify responses to the concept and first impressions to the PATHS system and elicit their reaction to PATHS through the demonstration, by a Moderator, of tasks and activities using PATHS. Data was collected via recording of discussions and by individual completion of hardcopy questionnaires.

At the beginning of each Demonstration session participants were welcomed by the group Moderator and provided with a Participant Pack. This comprised:

- a Participant Information Sheet (which each participant took away with them)
- a Consent Form (which was given back to the Moderator on completion)
- Questionnaire (which was also handed back to the Moderator on completion). The questionnaire contained a mix of closed questions, open questions, and semantic differentials and was split into several sections:
 - demographic and profile data (with identical questions to that used in the Laboratory-based evaluation)
 - feedback on first impressions of PATHS
 - feedback on individual elements of PATHS, such as Explore, Search, Finding and Following a path and Creating a path
 - thoughts on preferred devices on which to use PATHS and social media
 - final view of PATHS

The questionnaire made use of a set of usability semantic differentials to elicit first and final reactions to PATHS. Semantic Differentials (SDs) originate from the work of Osgood (1957) as a technique for attitude measurement, scaling people on their responses to adjectives in respect to a concept. Typically individuals respond to several pairs of bipolar adjectives scored on a continuum + to – and in doing so differentiate their meaning of the concept in intensity and in direction (in a ‘semantic space’). The adjectives used in evaluation of PATHS were informed by the work of Laugwitz et al (2008) who developed a set of 80 bipolar items

used to measure the user experience of software products in several empirical studies. A sub-set of sixteen of these was chosen for the evaluation of PATHS.

Additionally, a focus group schedule was employed in order to: 1) maintain consistency across groups moderated by different project partners and 2) to collect qualitative data to complement the questionnaire data. This was provided to each Moderator in the form of a Moderator Pack. Discussions were recorded and manually transcribed (and translated into English where necessary) by the local host partner.

3.4.5 Ethics

The demonstration evaluation work was undertaken according to good ethical practices which was in-line with the ethical procedures and requirements of the University of Sheffield. To this end participants were provided with an information sheet about the study, were required to give informed consent relating to the use of the data collected before their session began and were provided with the opportunity to withdraw at any stage if they so wished. All data has been reported in aggregate form, with no individual user identifiable from the results provided.

3.5 Laboratory-based evaluation

The University of Sheffield carried out a base-line evaluation of the first PATHS prototype in the laboratory and will carry out a similar evaluation of the second Prototype.

3.5.1 Goals

The laboratory-based evaluation of the first PATHS prototype aimed to:

- Evaluate the effectiveness of the system in supporting core information needs and work tasks
- Assess the usability of the interface
- Measure user satisfaction and engagement
- Gauge user reactions to the system in the context of the Paths User Interaction model
- Gain feedback on the functionality offered to date
- Elicit initial recommendations and requirements for ongoing development of the PATHS prototype
- Review the degree of impact of users' cognitive style on their information behaviour as a potential basis for adaptability
- Understand more about the nature of the types of paths that might be created, their characteristics and the contexts in which they might be employed

This work is also complementary to the demonstration and focus group evaluations, and is intended to provide a means of comparison between initial impressions of the system and actual use of the system.

3.5.2 Sample

A non-probability convenience sampling method (Bryman, 2012:202) was used to select participants in the laboratory evaluation study, who were recruited in two locations; the UK and Ireland.

3.5.2.1 UK sample

The main body of participants was recruited in the UK via the University of Sheffield staff and student volunteer email lists, inviting potential users who identified with one of three scenarios:

- Regular visitor to museums and galleries (general/leisure domain – path consumer/end-user path-creator)
- Users of cultural heritage collections in a work context (research/education domains – expert path creator/path facilitator)
- Users of cultural heritage collections in a study context (student/education domain – end-user path creator/path consumer)

Due to the length and intensive nature of the study (c. 2 hours per participant), and the need to complete the evaluations within a tight timeframe, a gift voucher incentive was offered to aid recruitment.

In total, 22 participants across the three scenarios completed the full evaluation protocol described below, using the iLab usability testing setup at USFD. Of these participants, 10 were classified as general users, 6 were classified as domain or subject expert users (4 researchers and 2 with professional cultural heritage experience, and most of whom also had some teaching experience), and 6 were classified as student users. The general and student users can then be classified as non-expert path creators, and/or path consumers, and the expert users can be classified as expert path creators and/or path facilitators.

3.5.2.2 Ireland sample

A further 9 participants were recruited by a USFD MSc student for the purposes of a complementary dissertation study. All of these participants are arts and humanities scholars based in Ireland, and known to the student undertaking the study. This group also constitutes potential expert path creators and/or path facilitators (in addition to the 6 expert users in the UK sample).

The participants in the Ireland sample completed a somewhat shorter protocol, including a reduced feedback questionnaire, and observation data from the transaction logs only, due to the non-availability of a full iLab setup off-site at the present time. Specifically, we did not collect screen-captures or interview data for the Irish participants. Furthermore, due to the reduced amount of data for the Ireland sample, these participants are excluded from the analysis of the task data.

3.5.3 Laboratory Evaluation Protocol

The laboratory evaluation protocol was developed and modified from the overarching protocol (section 3.2) and is shown in Figure 4. This illustrates the main stages of the process, along with data instruments and other inputs, and an indication of the data collected as outputs of each of the test activities.



Figure 4 Laboratory-based Evaluation Protocol

A core element of the laboratory evaluation protocol is the simulated work tasks that enabled us to assess user experience and behaviour in a relatively realistic, but controlled way. Four short structured tasks were developed (see Appendix 7) to simulate four of the main information-seeking modes:

- **Task 1: Simple fact-find** – locating a single specific piece of information, similar to known-item searching a library catalogue environment
- **Task 2: Extended fact-find** – locating several specific pieces of related information
- **Task 3: Open-ended browsing** – locating several unspecified items on a topic or theme, allowing for some degree of user interpretation of what is needed, similar to subject searching a library catalogue
- **Task 4: Exploration** – locating one or more items, where the goal is quite abstract or less-well defined, open to a high degree of user interpretation of what is needed

For each task, a time allocation of 5 minutes was allowed, after which they were prompted to finish, whether the task was completed or not. Each task also had multiple options, allowing the users choice to compensate for possible lack of subject knowledge.

The tasks were rotated in a Latin Square design as shown in Figure 5, with four variations of task order for each of the user groups in the sample. The tasks are alternated within each

sheet by fact-finding (tasks 1 and 2), and browsing/exploring (tasks 3 and 4) and rotated across the 4 instruction sheets so that 2 sheets start with fact-finding and two start with browsing/exploring. The purpose of this implementation is to eliminate learning and fatigue effects from the search results and to thereby ensure that tasks can be analysed on an equal footing.

	TASK A	TASK B	TASK C	TASK D
Sheet 1	1	3	2	4
Sheet 2	4	1	3	2
Sheet 3	2	4	1	3
Sheet 4	3	2	4	1

Figure 5 Task rotation order

Tasks were identified in the instruction by letters A-D and users were not informed which of these tasks corresponded to which type.

Participants were also required to undertake a longer unstructured simulated work task, with a 30-minute time allocation. For this task, users were given one of three scenarios, corresponding to the three recruitment categories, and were asked to create a path on a subject of their choice. This task is clearly much more complex, and makes use of a wider range of the PATHS functionality, as well as providing outputs in the form of paths which can be further analysed in order to better understand the type of paths that people might create in different contexts. A high degree of interpretation was allowed in this task, and minimal guidance was given on how to approach the task and what to produce.

3.5.4 Data collection

The study incorporates a range of complementary elements of data collection to provide insights into the users, their prior experience, their actual behaviour in completing the tasks, their opinions about the tasks, their experience of using PATHS overall, and more in-depth discussion of the main path-creation task. Data was collected in a typical iLab setup, utilising a PC enabled with the Morae screen-recording and observation software, plus online questionnaires, PATHS transaction logs, and audio recording at appropriate points in the schedule, as indicated in the protocol above.

The profile and session feedback questionnaires (see Appendices 3 and 4) contain identical questions to the demonstration protocol, split into two parts to fit into appropriate points in the laboratory evaluation schedule.

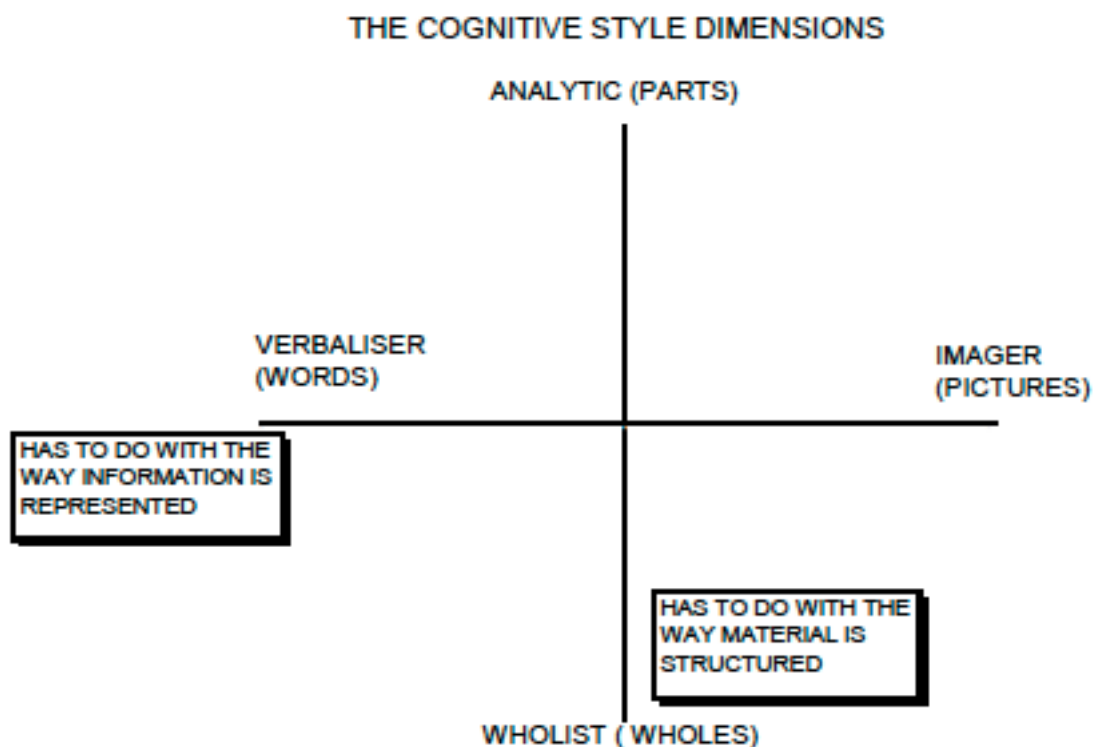
The task feedback questionnaire (Appendix 5) is unique to this part of the evaluation study and was also completed online, with questions answered in line, on completion of each of the tasks. As detailed above, the four short tasks were rotated in a Latin square sequence, requiring the data to be subsequently reorganised by task type for the purpose of analysis. Comprehensive observation data was collected of participants engaged in the tasks, using the Morae usability software which is specifically designed for this purpose, enabling the capture of for screen-recordings and observer notes, and the PATHS transaction logs for actions carried out and content accessed. This data was then analysed for key indicators of behaviour such as time taken on tasks, strategies and content used, and errors or difficulties

encountered. In addition we have a record of the paths created by participants, enabling us to compare path length, features used, subject area, organisation and contextualisation, etc.

The screen-recording observation of the path-creation task was also used as input to a post-task 'think-after' interview. During this part of the protocol, users were played back elements of their path-creation activity and asked to comment on what they were doing and/or thinking, and also to respond to some additional questions about their experience of using PATHS overall. This data provides a useful qualitative companion to the quantitative data compiled from the questionnaires and observations and gives the participants an opportunity to comment more freely on their experience of the evaluation session.

Finally, the Ridings CSA test is an off-the-shelf product, delivered via PC software, with data outputs calculated automatically according to the software presets. An overall CSA 'type' is given, from a matrix of 9 possibilities derived from two scales; Wholist-Analytic and Verbaliser-Imager. Numeric scores are recorded for each of the scales, along with time taken for each part of the test.

The CSA test was developed by Riding in the early 1990s and has been in use since as a means of measuring differences in cognitive style with regard to the effect on an individual's approach to information processing and learning. Riding measures cognitive style on two dimensions, each one represented by a continuum, and an individual will be attributed a place on each of the two dimensions, according to their 'scores' calculated on completion of the CSA test.



(Source: Riding, 1991:5)

Figure 6 Cognitive Style Analysis matrix

Each dimension is split into three zones, with the two opposing extremes and an intermediate or bimodal central position (Wholist-Intermediate-Analytic and Verbaliser-Bimodal-Imager). It follows therefore that there are therefore 9 different discernible cognitive styles, as listed below:

- Analytic-Verbaliser
- Analytic-Bimodal
- Analytic-Imager
- Wholist-Verbaliser
- Wholist-Bimodal
- Wholist-Imager
- Intermediate-Verbaliser
- Intermediate-Bimodal
- Intermediate-Imager

Riding describes the CSA types as follows:

Wholist-Analytic Cognitive Style

“When they consider information, Wholists will have a balanced view of the whole, while Analytics will separate it out into its parts, or sections.” (Riding, 1991:12)

Verbaliser-Imager Cognitive Style

“when people who are Imagers read, listen to, or consider information they experience fluent, spontaneous and frequent mental pictures. By contrast, individuals who are Verbalisers read, listen to, or consider, information in words... People in the middle tend to use either mode of representation.” (Riding, 1991: 12)

3.5.5 Ethics

The laboratory evaluation work was approved by USFD’s Information School Ethics Committee. In accordance with the University’s requirements for research ethics, participants were provided in advance with an information sheet about the study, and were required to give informed consent relating to the use of the data collected before their session began. All data collected was anonymised using Participant ID numbers, and data is reported only in aggregate form, with no individual user identifiable from the results provided.

3.6 Project-wide evaluation

Evaluation activities have also been undertaken by the technical partners of the project, i-Sieve, Avinet, The University of the Basque Country and The University of Sheffield, that is, Content Analysis and Enrichment, System Architecture and User Interface Design. The methods employed and results of these activities can be seen in sections 4.3.1, 4.3.2 and 4.3.3 respectively.

4. Results

4.1 Results of the Demonstration and Laboratory evaluations

A coherent and consistent approach to data collection was adopted across the field-based demonstration sessions and the laboratory-based evaluations in order to enable integration and comparison of results across these two settings. Thus, where appropriate, results from both demonstration sessions and the laboratory-based evaluations are presented together. Additional results from the laboratory-based evaluation are presented later in this section.

4.1.1 Participant profile

Results of the user profile questionnaire provide insight into the characteristics and information behaviour traits of the participants.

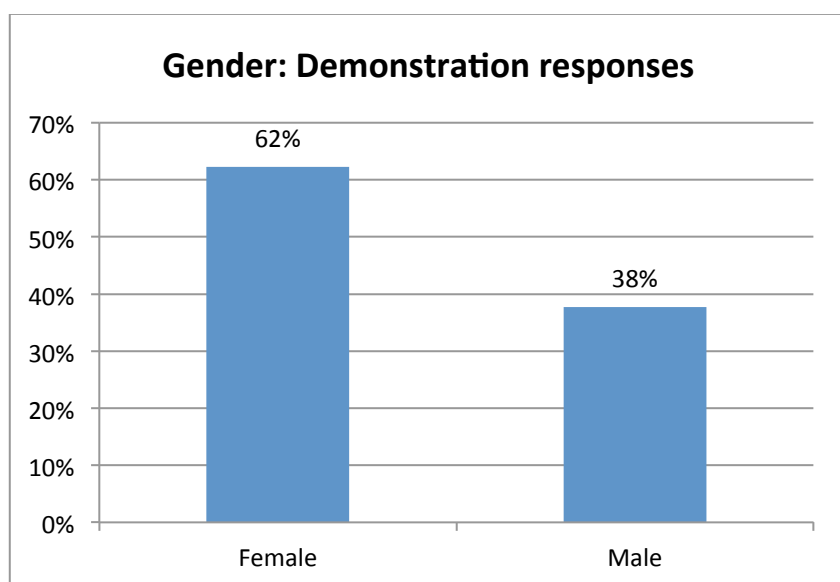


Figure 7 Gender: Demonstration responses

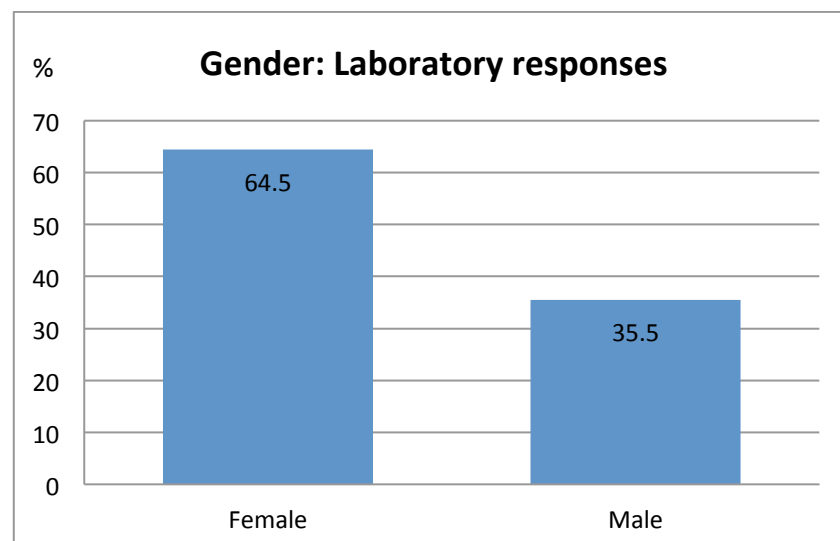


Figure 8 Gender: Laboratory responses

There were a greater proportion of female participants in both the Demonstration evaluation sessions and the Laboratory evaluations. Demonstration participants were recruited individually by open invitation and by organisation, that is, staff of cultural heritage organisations. Participants of the laboratory-based evaluation were recruited from the Arts and Humanities subject area. In both sample groups the proportions cannot be generalised to the overall cultural heritage user population as the sample was recruited on a convenience basis. However, from analysis run on the Laboratory participants, any concerns about bias from the predominance of female participants can be discounted as there were found to be no statistically significant correlations between gender and other evaluation data variables.

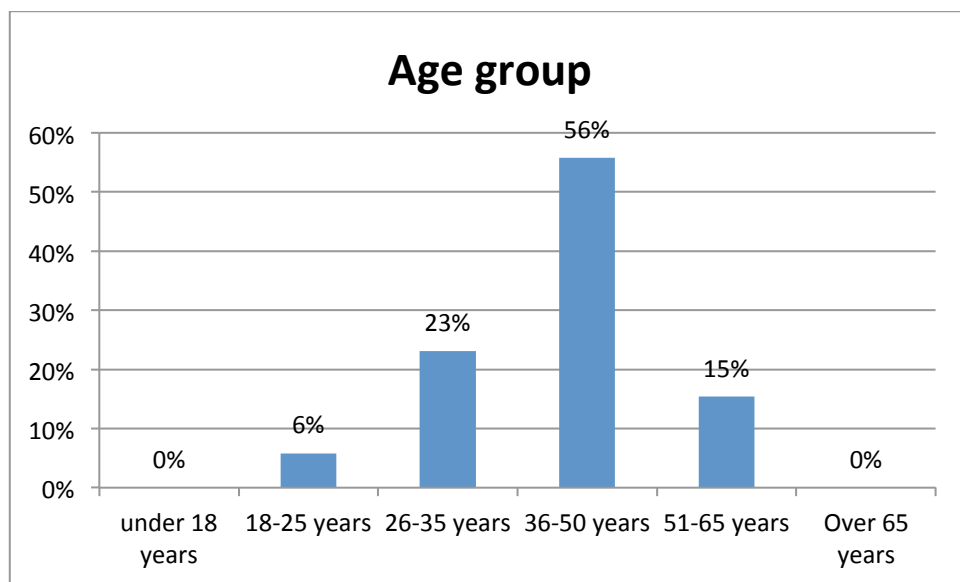


Figure 9 Age group: Demonstration responses

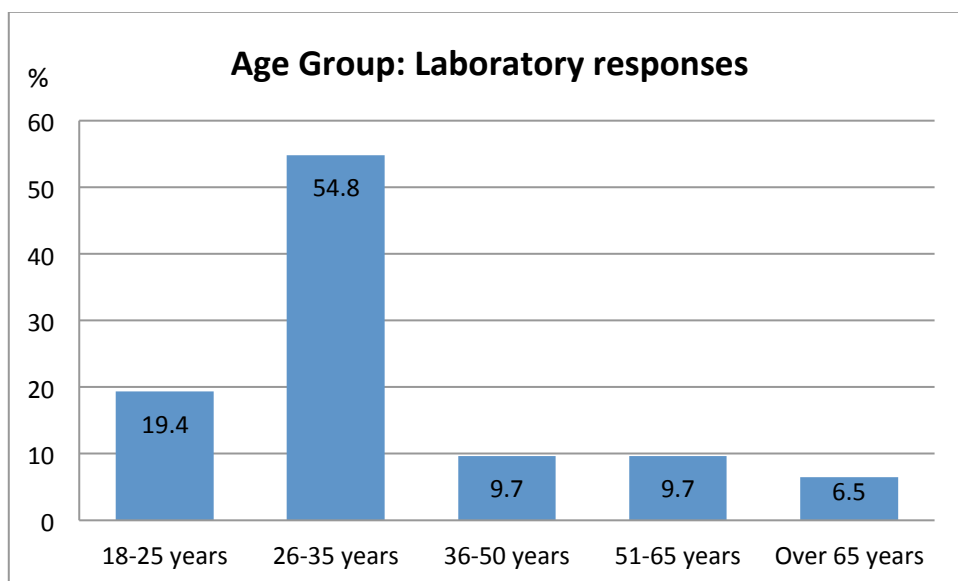


Figure 10 Age group: Laboratory responses

Differences in the age of participants across the two samples are evident. The majority, 56%, of participants of the Demonstration evaluations were aged between 36-50 years whilst

some 75% of participants of the Laboratory evaluations were aged 35 years or younger. Overall, all age groups were represented across the evaluation activities. 26-35 years is also one of the largest age groups of visitors of cultural heritage organisations indicated in national data. There are also a strong minority of older users represented, an important factor given the popularity of cultural heritage and related areas such as genealogy and local history within this target group.

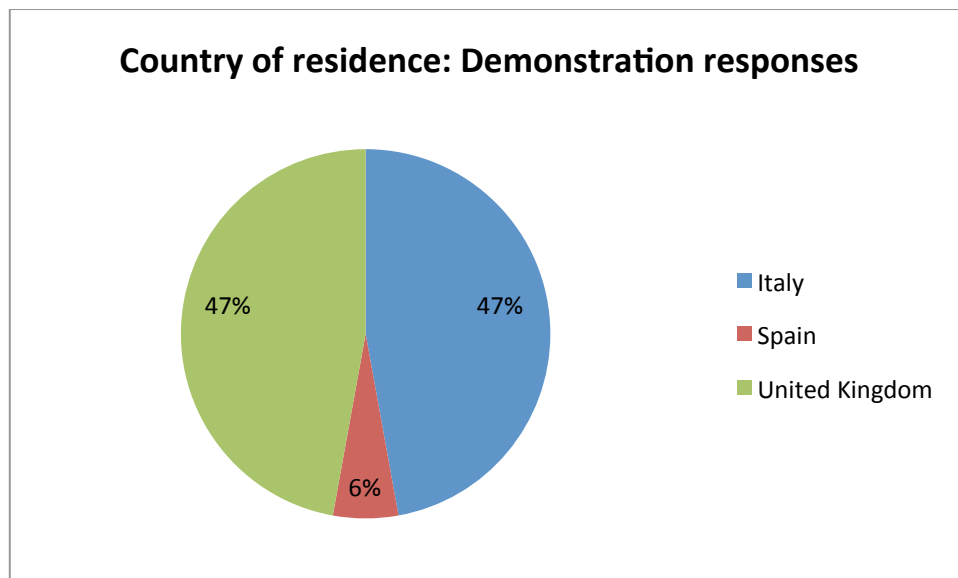


Figure 11 Country of residence: Demonstration responses

The country of residence of Demonstration participants was split across three countries, the UK (47%), Spain (6%) and Italy (47%). Initially Demonstration sessions were only planned in the UK and Italy but in light of the high importance of engagement with target users across Europe an additional Demonstration group was run in Spain.

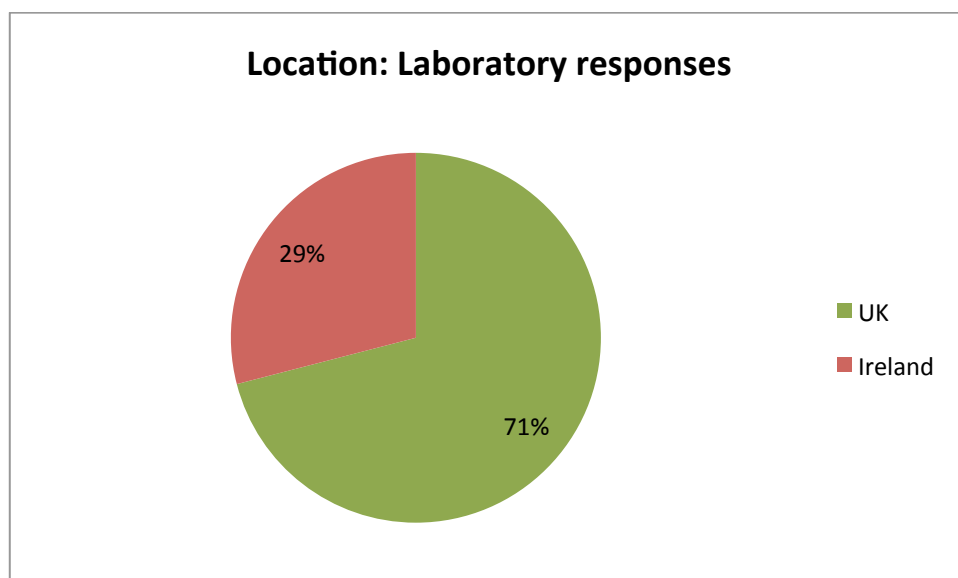


Figure 12 Country of residence: Laboratory responses

The country of residence of Laboratory participants was split across the UK (71%) and Ireland (29%).

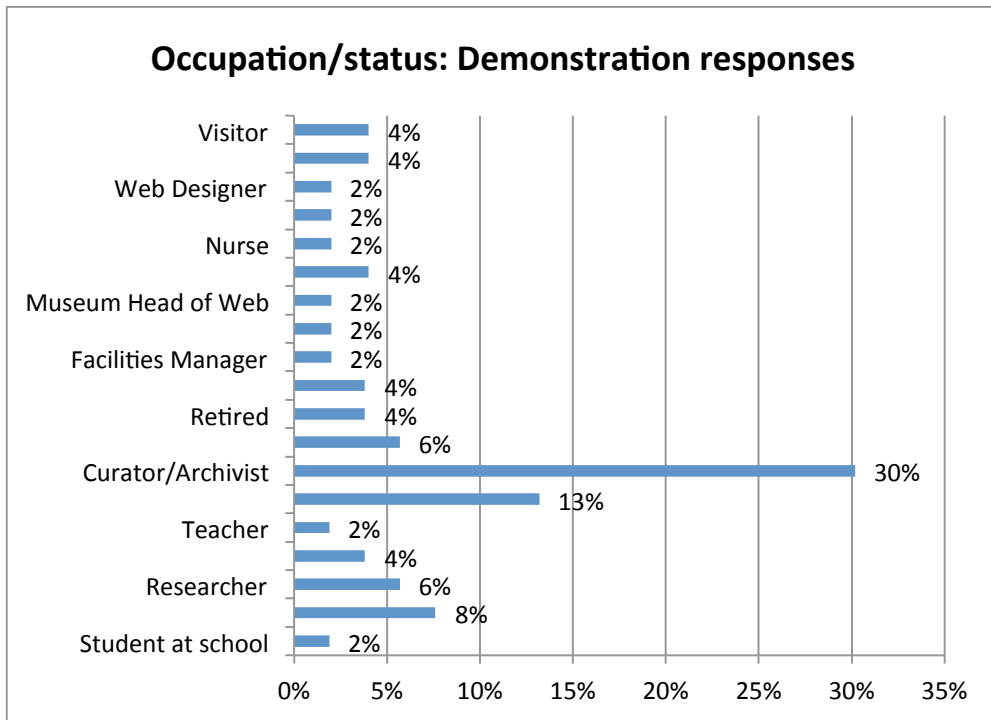


Figure 13 Occupation/status: Demonstration responses

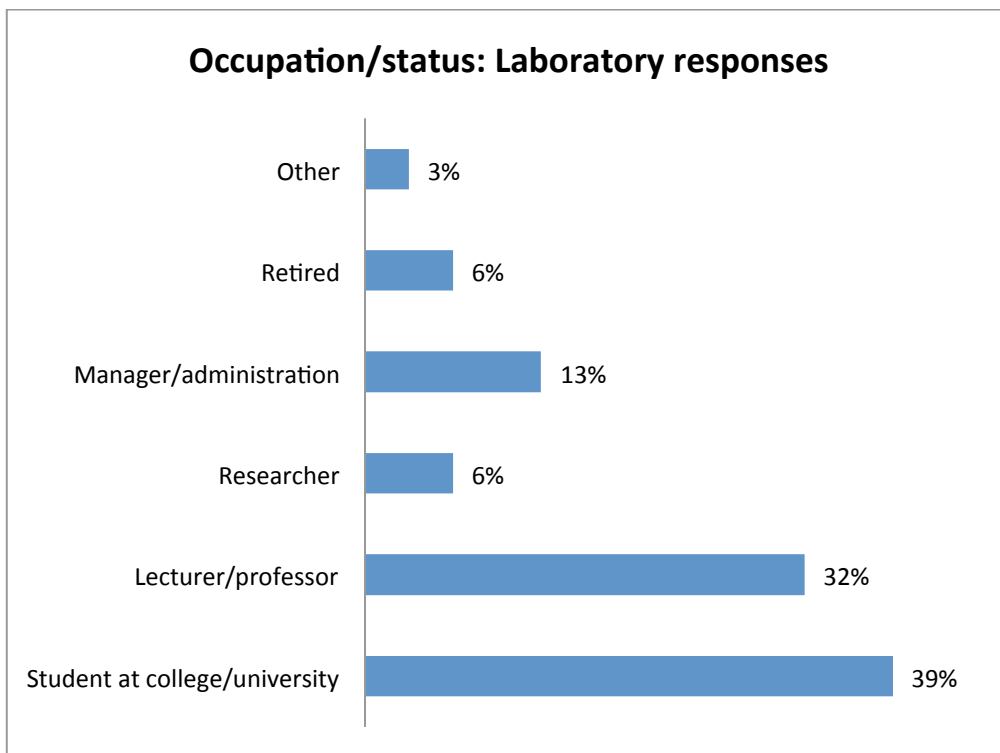


Figure 14 Occupation/status: Laboratory responses

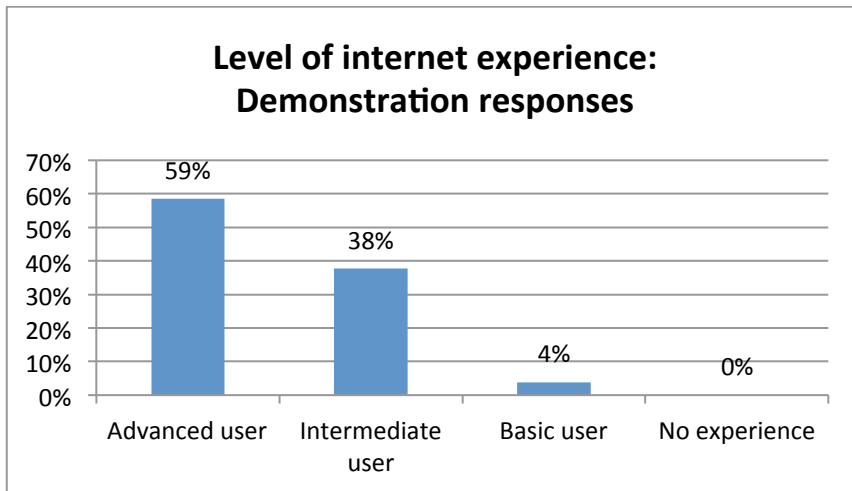


Figure 16 Internet experience: Demonstration responses

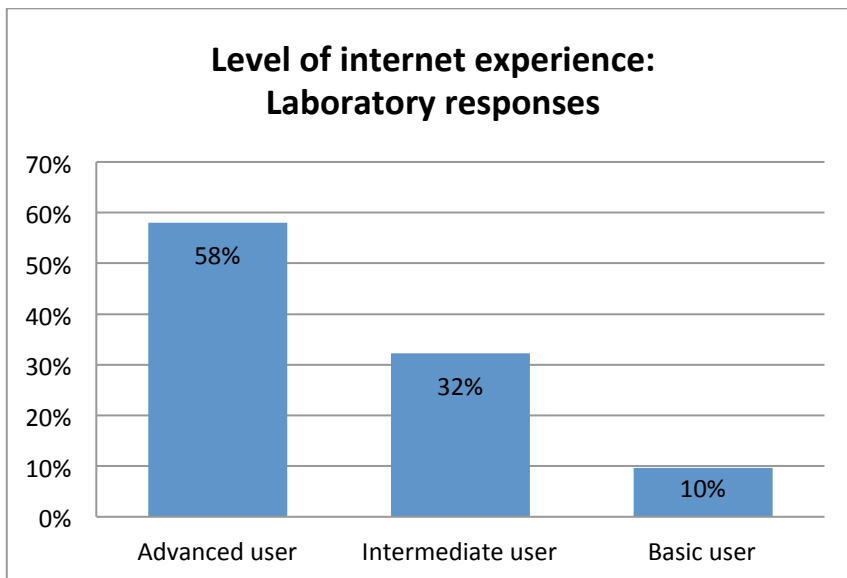


Figure 17 Internet experience: Laboratory responses

The level of Internet experience reported by participants is important as an indicator of confidence and ability in using online tools such as PATHS. In both samples, the majority of participants saw themselves as Advanced in their level of Internet experience, with only a small minority of participants identifying themselves as Basic users.

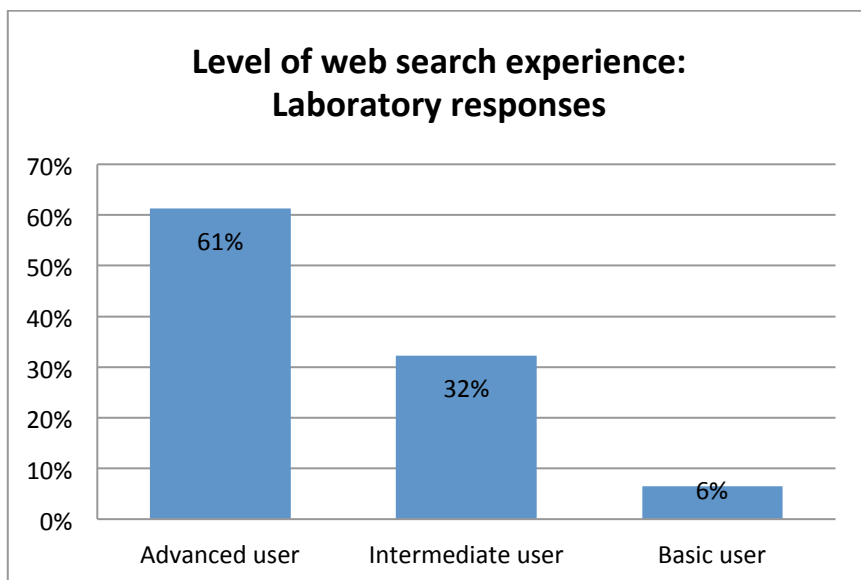


Figure 18 Web search experience: Laboratory responses

Similarly, the level of reported web search experience gives an indication of confidence and ability in the participants' information skills, in this case specifically relating to the successful use of search tools to find materials of interest in the digital environment. The data are broadly similar to those for general Internet experience.

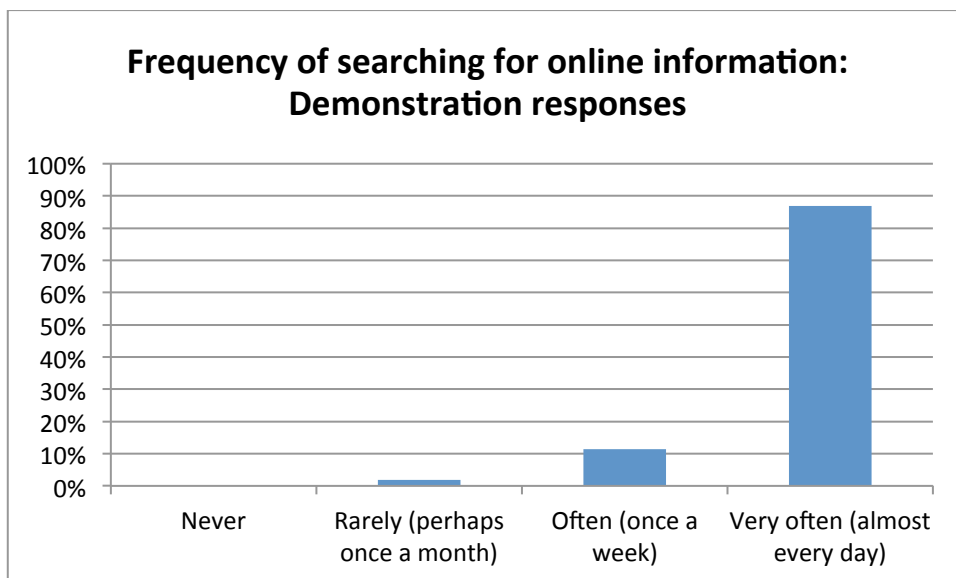


Figure 19 Searching online: Demonstration responses

Frequency of searching for information online was very high with 87% of participants of the Demonstration evaluation sessions reporting that they searched for information online very often (almost every day). 11% said that they only searched online once a week and 2% that they only searched once a month.

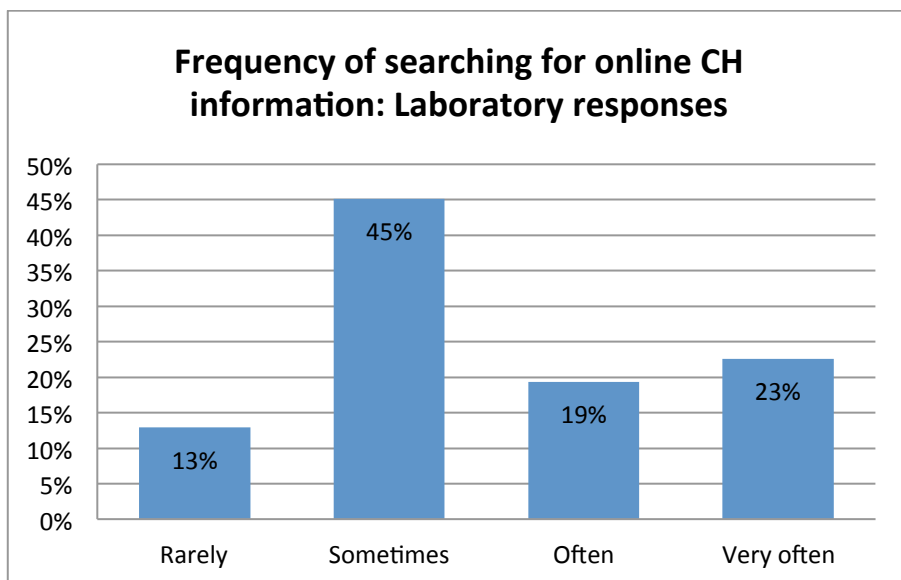


Figure 20 Use of cultural heritage information: Laboratory responses

The largest proportion of participants use cultural heritage information Sometimes (45%). 23% of participants use cultural heritage information Very often, 19% Often and only 13% reporting that they use it Rarely. This indicates that this is a group of relatively active cultural heritage information users, who should have some familiarity with the type of data available and may represent the type of users most likely to be more active users of PATHS, including perhaps the more advanced functionality.

4.1.2 User type

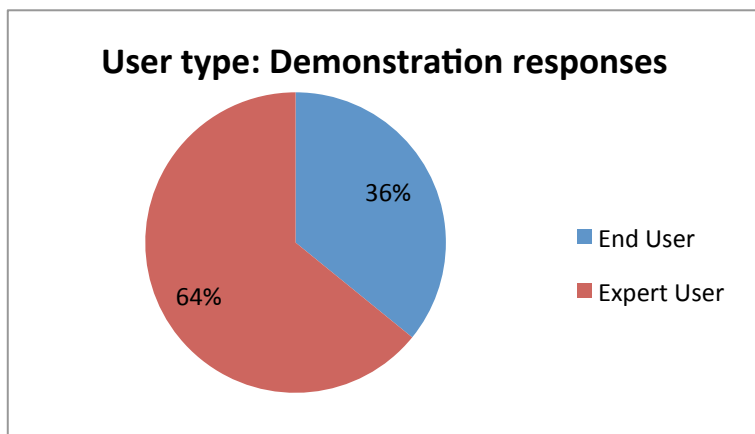


Figure 21 User type: Demonstration responses

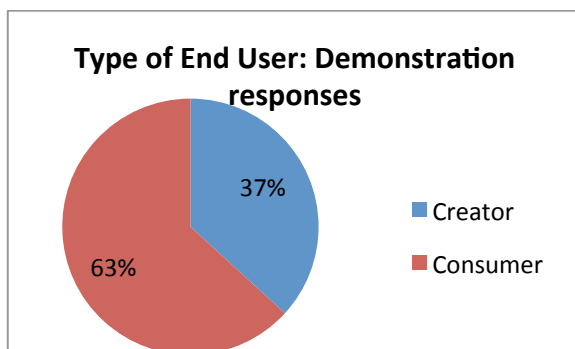


Figure 22 End User participant types

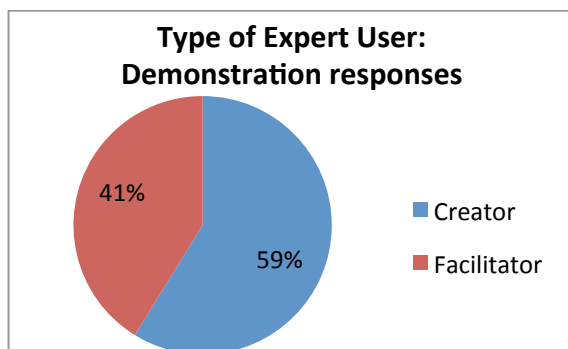


Figure 23 Expert User participant types

In accordance with the use cases and user types discussed in section 4.1 participants of the Demonstration evaluation sessions could be identified as being either End Users (36%) or Expert Users (64%).

Of the End Users:

- 37% were identified as being Consumers
- 63% as Creators.

Of the Expert Users:

- 41% were identified as Facilitators
- 59% as Creators

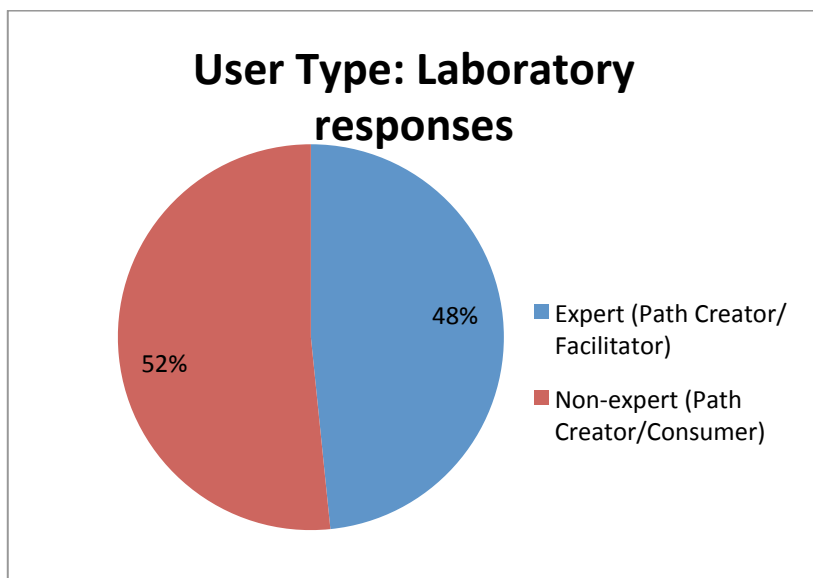


Figure 24 User type: Laboratory responses

As discussed in section 3.5.2 participants of the Laboratory evaluations consisted of 52% Non-expert users (Creators and Consumers) and 48% Expert users (Path Creators and Facilitators).

4.1.3 Use of cultural heritage information

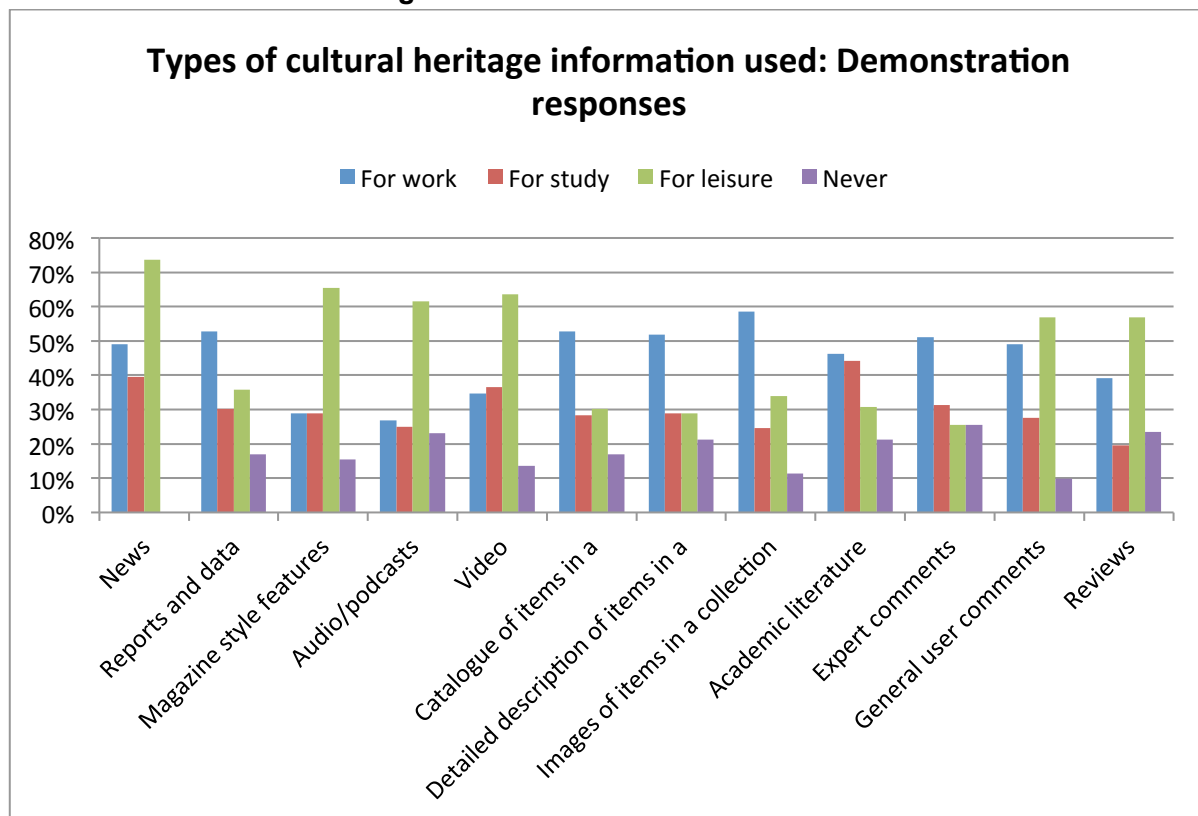


Figure 25 Types of cultural heritage information used: Demonstration responses

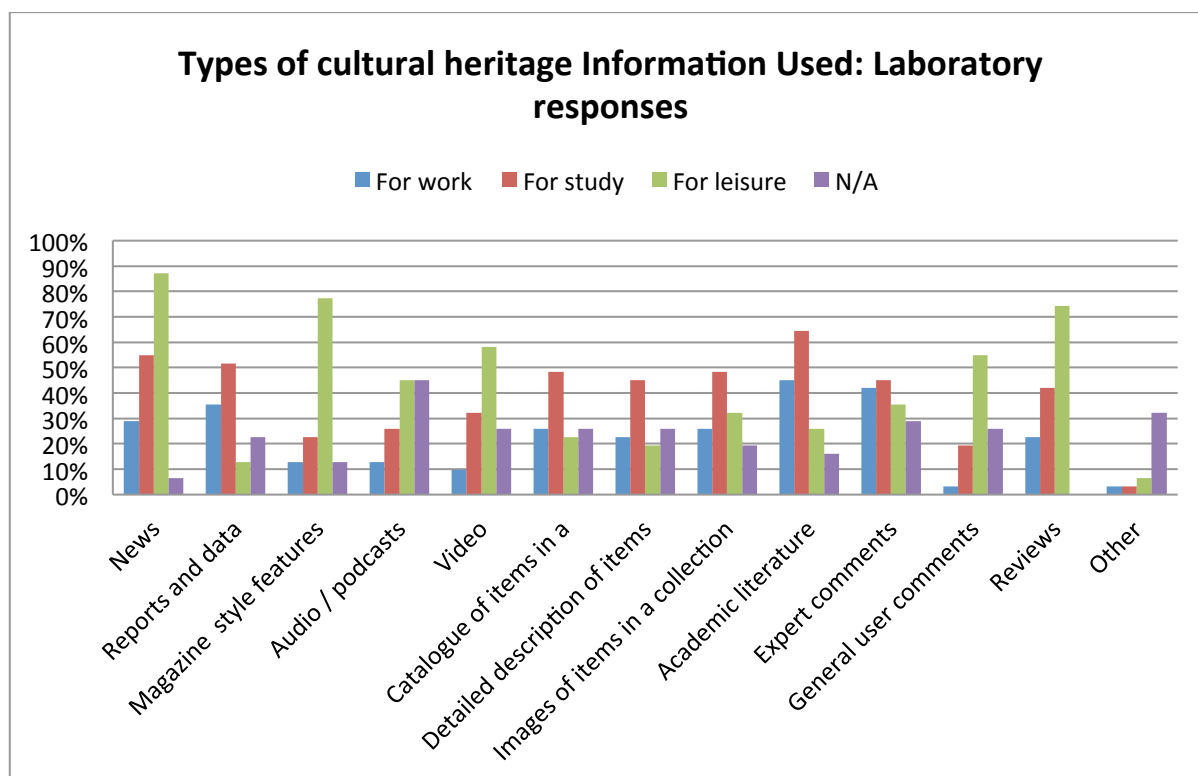


Figure 26 Types of cultural heritage information used: Laboratory responses

Use of information for work, leisure and study varied across the Demonstration participants, reflecting the diversity of their occupation/status.

For *work* purposes the most popular types of content are:

- images of items in a collection (59%)
- detailed description of items in a collection (53%)
- reports and data (53%)

For *study* purposes, the most popular types of content are:

- academic literature (44%)
- news (40%)
- video (37%)

For leisure purposes, the most popular types of content are:

- news (74%)
- magazine style features (65%)
- video (64%)

It is worth noting that Audio/podcasts (62%), General user comments (57%) and Reviews (57%) were also popular content types for leisure purposes, possibly indicating that social interaction features of PATHS would be used for this type of information activity.

When considering which types of content are used by participants of the Laboratory evaluation for each of the three main activity areas, there is some variation between what information is sought for work, study and leisure. For work, none of the information types are used by a majority of users, although these figures will be influenced by the fact that a significant proportion of the sample are students, i.e. potentially not in employment.

For *work* purposes, the most popular types of content are:

- academic literature (45%)
- expert comments (42%)
- reports and data (36%)

For *study*, the most popular content are:

- academic literature (65%)
- news (55%)
- reports and data (52%)

A large minority also used collection catalogues, detailed descriptions of items in collections and images of items in collections, suggesting that this may be one of the strongest potential user categories for PATHS.

For *leisure*, the content used is very different, with an emphasis on the more accessible areas of:

- news (87%)
- magazine features (77%)
- reviews (75%)
- general user comments (55%)

As with response from the Demonstration participants this latter point may indicate that this category of use may have the strongest inclination to use the social interaction features of PATHS.

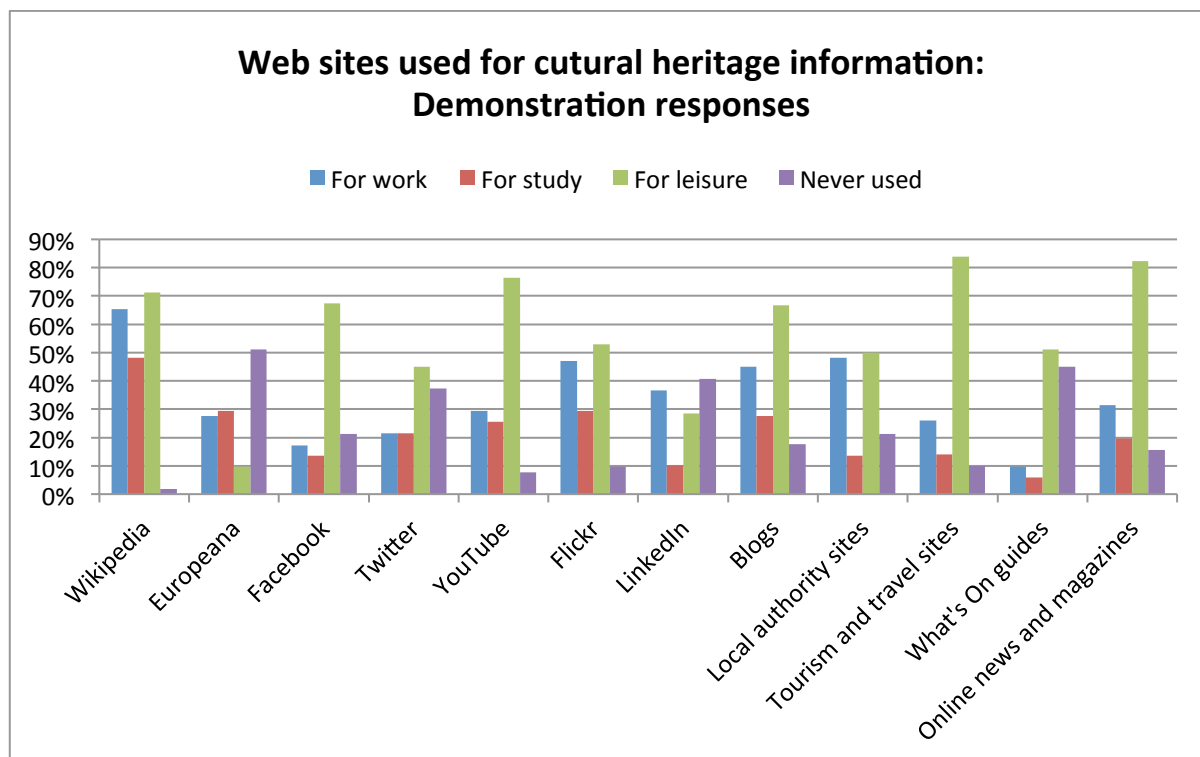


Figure 27 Web sites used for cultural heritage information: Demonstration responses

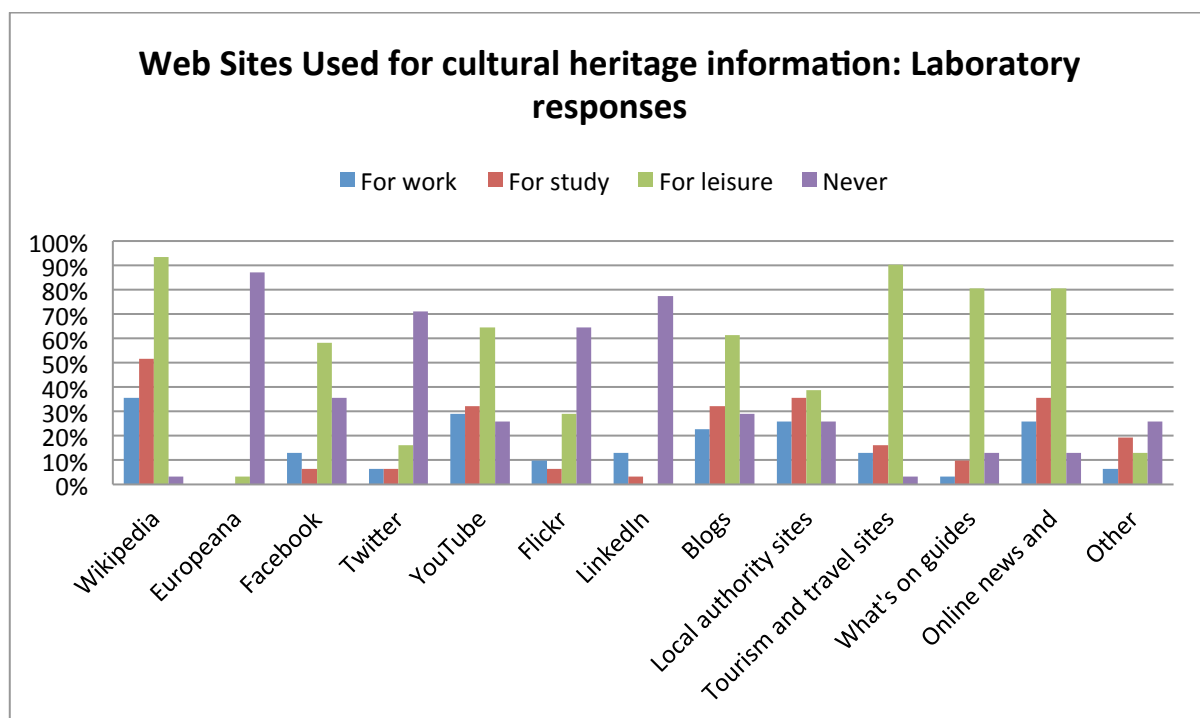


Figure 28 Web sites used for cultural heritage information: Laboratory responses

Despite the findings on frequency of use of cultural heritage information, few of the Laboratory participants (3%) have used Europeana, the source of content for the PATHS

prototype. Use was slightly greater amongst the Demonstration participants, with 29% of participants reporting that they have used it for study purposes.

The most popular site from those listed is Wikipedia, with 71% of Demonstration participants using it for leisure and 65% using it for work. Laboratory participants reported that 36% use it for work purposes, 52% for study and 94% for leisure, thereby providing strong support for the inclusion of links to related Wikipedia content in PATHS.

The most popular social media across all activities appears to be YouTube, with similar support for Facebook in leisure activities. Blogs, Flickr, local authority sites and online news/magazines are popular with a significant minority for work and study purposes, and a majority for leisure purposes, whilst travel and what's on sites are popular with a majority for leisure activities. These findings may indicate the type of sites relevant for wider connectivity for related content and/or sharing content created in PATHS.

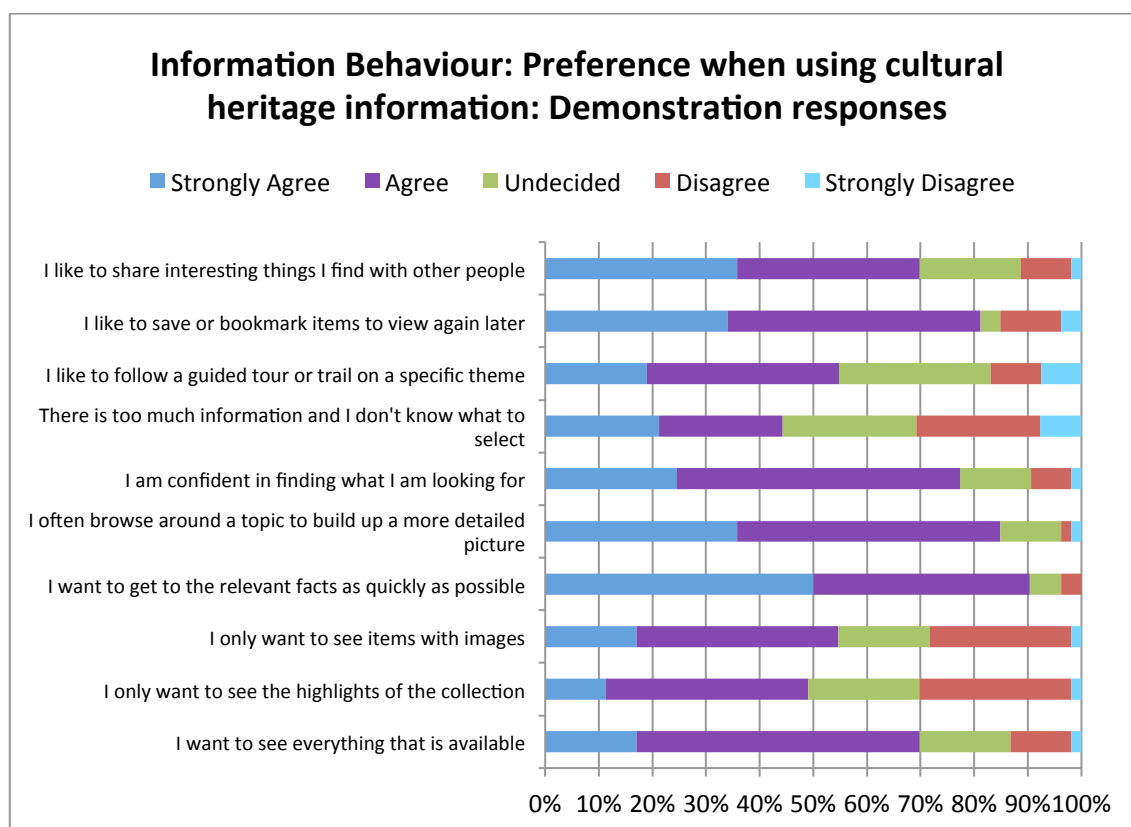


Figure 29 Information behaviour preferences: Demonstration responses

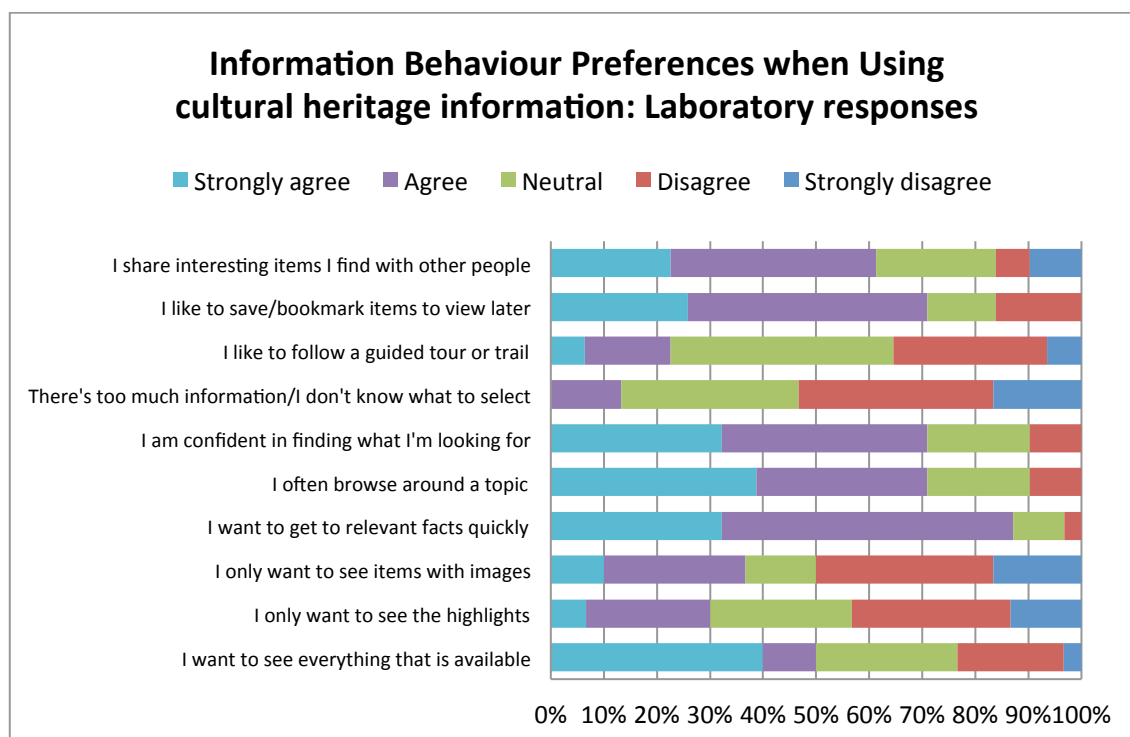


Figure 30 Information behaviour preferences: Laboratory responses

Findings on information behaviour preferences overall indicate that the participants have well-developed research skills with a high level of overall agreement (Strongly agree and Agree) across many of the listed behaviours. However, participants of the Demonstrations sessions seem to have a greater level of agreement across a wider range of these behaviours so that they:

- want to get to relevant facts quickly (90%)
- will often browse around a topic (85%)
- like to save or bookmark items to view later (81%)
- are confident in finding what they are looking for (78%)
- like to share interesting items with other people (70%)
- want to see everything that is available (70%)
- like to follow a guided tour or trail (55%)
- want to see items with images (55%)

There was less support for only seeing the highlights of a collection (49%) or the view that there is too much information (44%).

Participants of the Laboratory evaluation also want to:

- get to relevant facts quickly (87%)
- have confidence in finding material (71%)
- browsing around topics (71%)
- bookmarking items for later use (71%)

Based upon these results it is therefore to be expected that the strongest level of overall disagreement is being overwhelmed with too much information (52%), and only wanting to see items with images or just the highlights (48% and 42% respectively). High agreement for sharing items with other people (61%) seems to contradict somewhat the previous findings on low levels of communication activity with regard to cultural heritage content, although there is a nuanced difference between sharing and two-way communication.

These results seem to indicate that there is support in the already established behaviours for some of the key elements of PATHS, so that participants:

- want to browse around a topic (Explore)
- like to bookmark items in order to view them later (Collecting items, Adding to the Workspace)
- like to share interesting items they find (Publishing paths)
- want to follow a guided tour or trail (Follow a path)

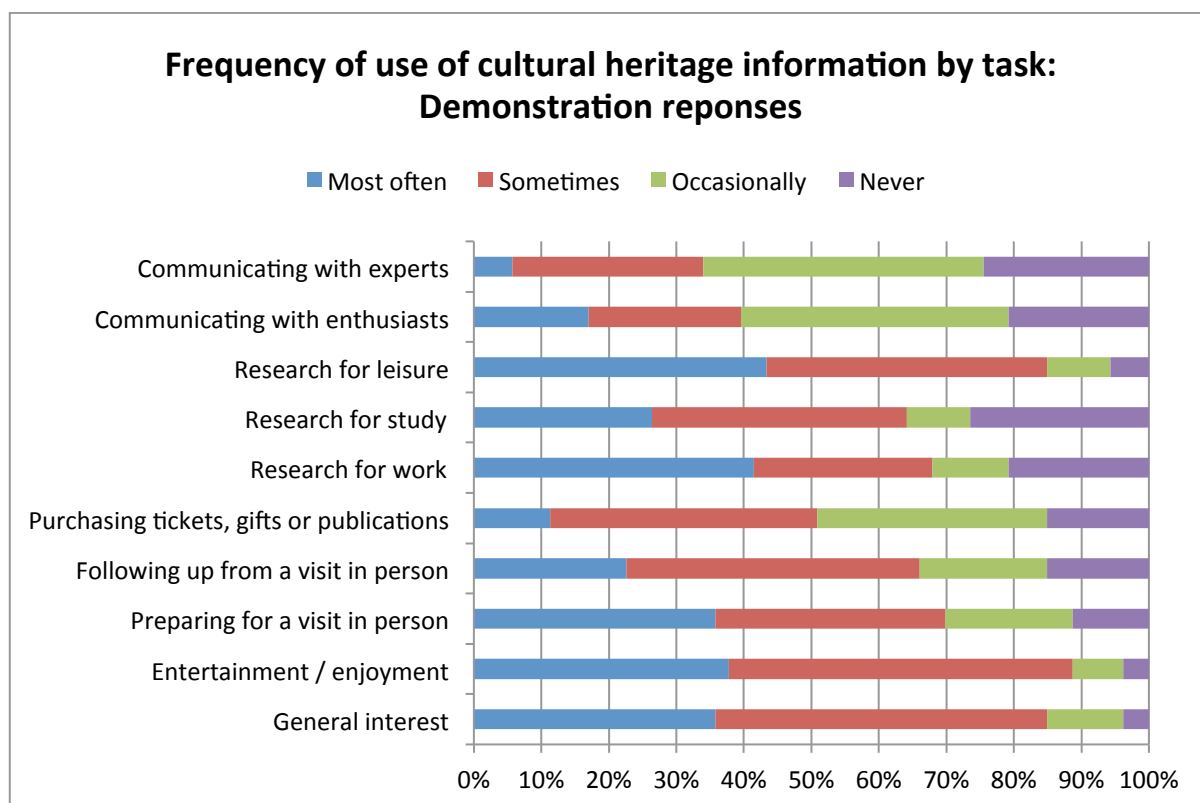


Figure 31 Frequency of use of cultural heritage information by task: Demonstration responses

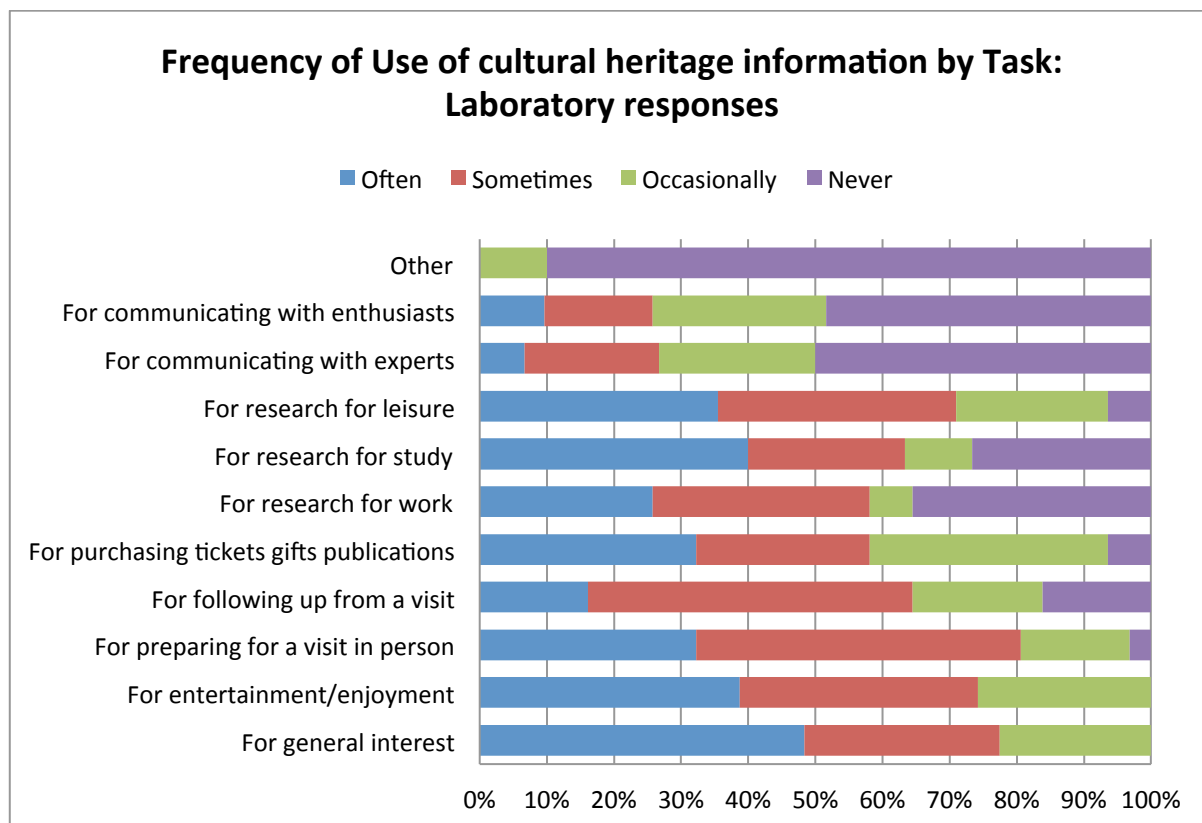


Figure 32 Frequency of use of cultural heritage information by task: Laboratory responses

In terms of more fine-grained activities, the top five activities undertaken Often and Often and Sometimes by Demonstration participants include:

Activity	Often	Activity	Often and Sometimes (combined %)
Research for leisure	43%	Entertainment/enjoyment	89%
Research for work	42%	General interest	85%
Entertainment/enjoyment	38%	Research for leisure	85%
Preparing for a visit in person	36%	Preparing for a visit in person	70%
General interest	36%	Research for work	68%

Figure 33 Top five uses of cultural heritage information: Demonstration responses

For Laboratory participants the most often activities include:

Activity	Often	Activity	Often and Sometimes (combined %)
General interest	48%	Preparing for a visit in person	80%
Entertainment/enjoyment	39%	General interest	77%
Research for study	39%	Entertainment/enjoyment	74%
Research for leisure	36%	Research for leisure	72%
preparing for a visit in person TIED WITH Purchasing tickets, gifts or publications.	32% each	Following up a visit in person	64%

Figure 34 Top five uses of cultural heritage information: Laboratory responses

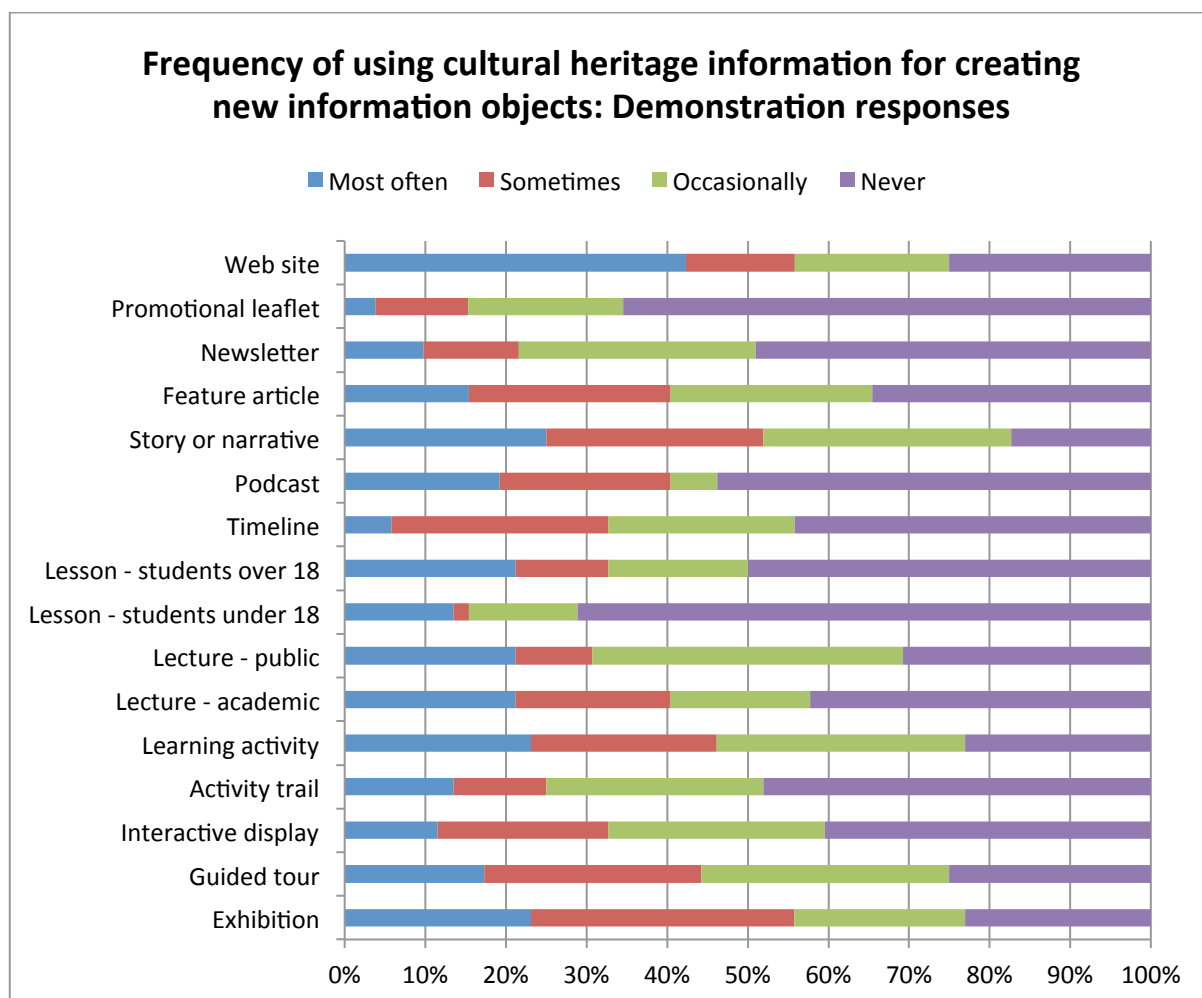


Figure 35 Use of cultural heritage information to create new objects: Demonstration responses

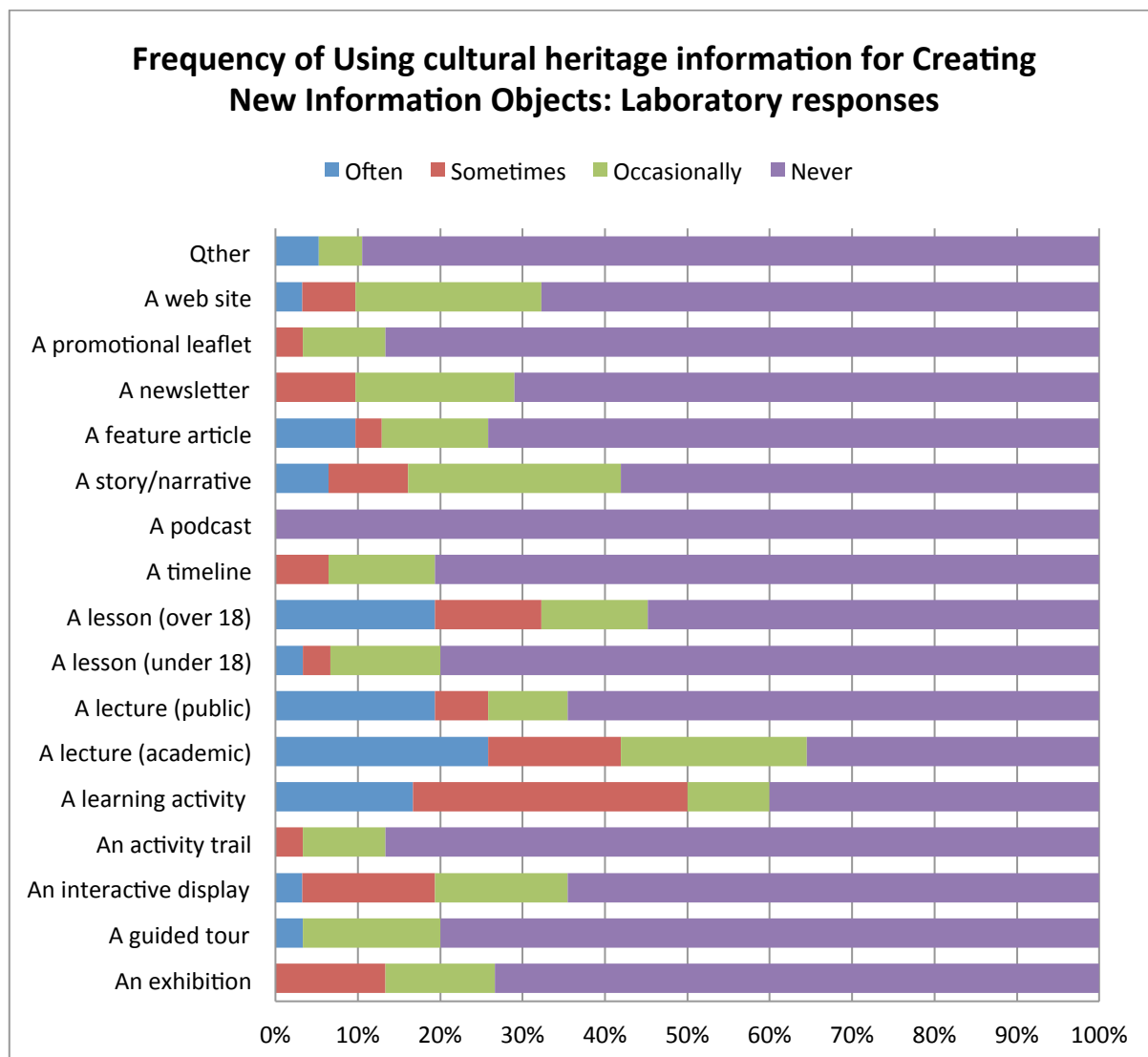


Figure 36 Use of cultural heritage information to create new objects: Laboratory responses

It is unsurprising that greater use of cultural heritage information for creation of new information objects occurs more frequently within the Demonstration sample of participants than the Laboratory participants, given that many of the latter were recruited via universities.

However, there was still a majority of Laboratory participants who have used cultural heritage information for academic lectures and learning activities, and sizeable minorities for use for other learning and teaching resources. It is also interesting to note that 42% have used cultural heritage information at some time to create stories and narratives, and there is also some evidence of users creating exhibitions (26%), guided tours (20%), timelines (19%) and activity trails (13%), which are all potentially viable using the PATHS functionality. Similarly, web sites (32%) and interactive displays (35%) show an inclination to create digital content.

Demonstration participants are creating new information objects more frequently, and across a wider variety of formats, the most often created resources being:

- Web site (42%)
- Story/narrative (25%)
- Learning activity (23%)
- Exhibition (23%)
- Equal – Academic lecture, Public lecture and Lesson for over 18s (21%)

Resources which are Often or Sometimes created (combined) include:

- Website (56%)
- Exhibition (56%)
- Story/narrative (52%)
- Learning activity (46%)
- Guided tour (44%)

And there are reasonably high levels of creation of Feature articles (40%), Academic lecture (40%), Podcast (40%).

And overall, there is some creation of new resources, be it Often, Sometimes or Occasionally:

- Story/narrative (83%)
- Learning activity (77%), Exhibition (77%)
- Web site (75%), Guided tour (75%)
- Public lecture (70%)
- Feature article (65%)

4.1.4 Initial impressions to the brief introduction to PATHS and usability semantic differentials: Demonstration responses

The first section of the questionnaire presented a series of semantic differential scales, rating polar opposite experiences on a 7-point scale of +3 to -3, with a neutral 0 (zero) position at the centre.

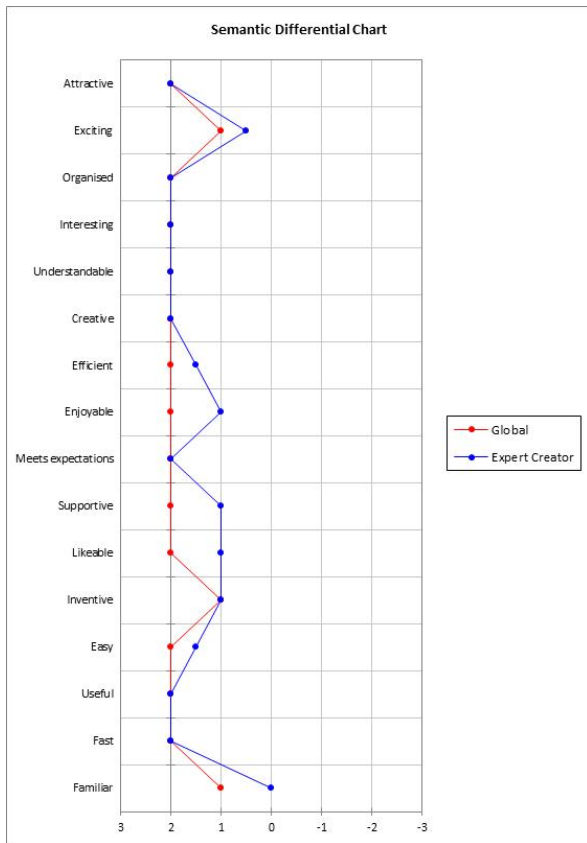


Figure 37 Expert Creator vs Global response

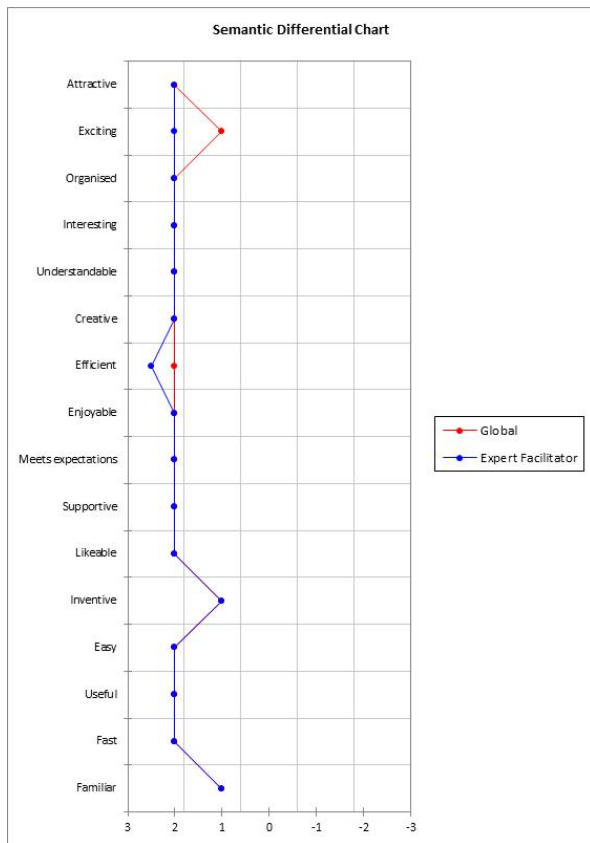


Figure 38 Expert Facilitator vs Global response

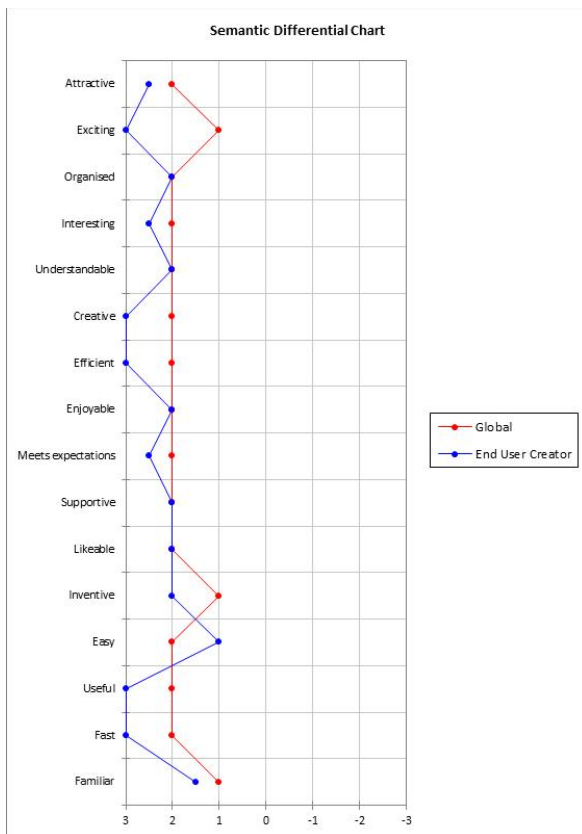


Figure 39 End User Creator vs Global response

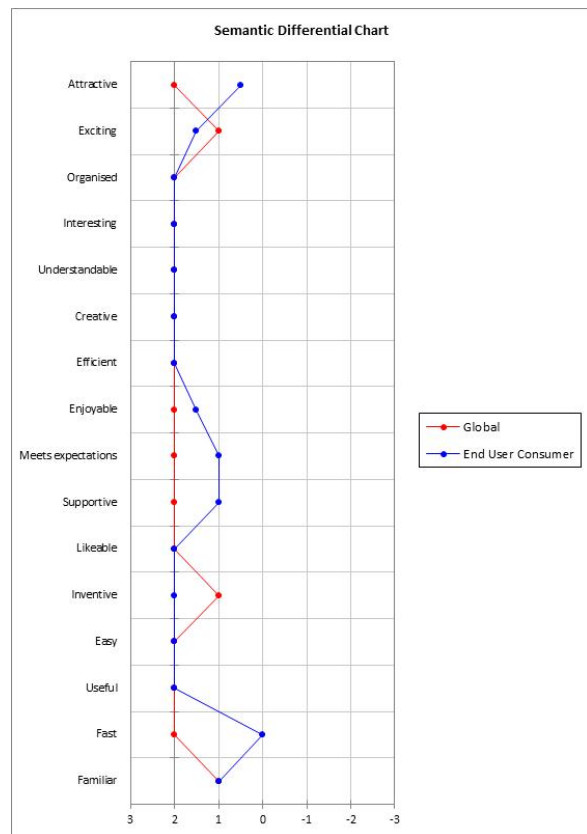


Figure 40 End User Consumer vs Global response

The median was used to calculate the point of central tendency for:

- all Demonstration participants (Global)
- Expert Creators
- Expert Facilitators
- End User Creators
- End User Consumers

This allows us to analyse and plot responses to a set of usability semantic differentials (Laugwitz et al, 2008) to elicit an overall perception of the usability of the PATHS system.

Results are very positive across all 16 scales. *Globally* the three scales with the lowest median, of 1, were:

- Exciting
- Inventive
- Familiar

This, coupled with discussions, indicates that PATHS could be made more exciting and inventive in its interface design and interaction. It is unsurprising that participants found PATHS to unfamiliar given the novelty of the system.

Expert Creators were slightly less positive in some areas, but still responded favourably across most scales. Areas of lowest rating still scored a median of +1:

- Familiarity
- Enjoyable
- Supportive
- Likeable
- Inventive

Expert Facilitators rated Inventiveness and familiarity lowest (medians of +1).

End User Creators were extremely positive in their responses across all one scale, how Easy PATHS is to use. Again, this still had a median of +1.

End User Consumers were a little less positive, with 5 scales having a median of 0 – 1:

- Attractive (0.5)
- Meets expectations (1)
- Supportive (1)
- Fast* (0)
- Familiar (1)

*It should be noted that difficulties with Internet connection affected the demonstration session with End User Consumers and this has undoubtedly impacted on scoring on the Fast scale.

When asked what, if anything, PATHS reminded them of participants responded:



Figure 41 Visual representation of other resources PATHS is similar to: Demonstration responses

4.1.5 Ease of use, Usefulness and Inventiveness of PATHS

Throughout the questionnaires, users were asked about the ease of use, usefulness and inventiveness of a range of functionality currently offered in PATHS, and also whether these could be improved, with an opportunity to comment of what could be done to improve them. These questions were presented in the questionnaires by functionality type, but for the purposes of efficiency and comparison of responses, the four questions have been grouped together, illustrating where there might be the greatest room for improvement across all functionality.

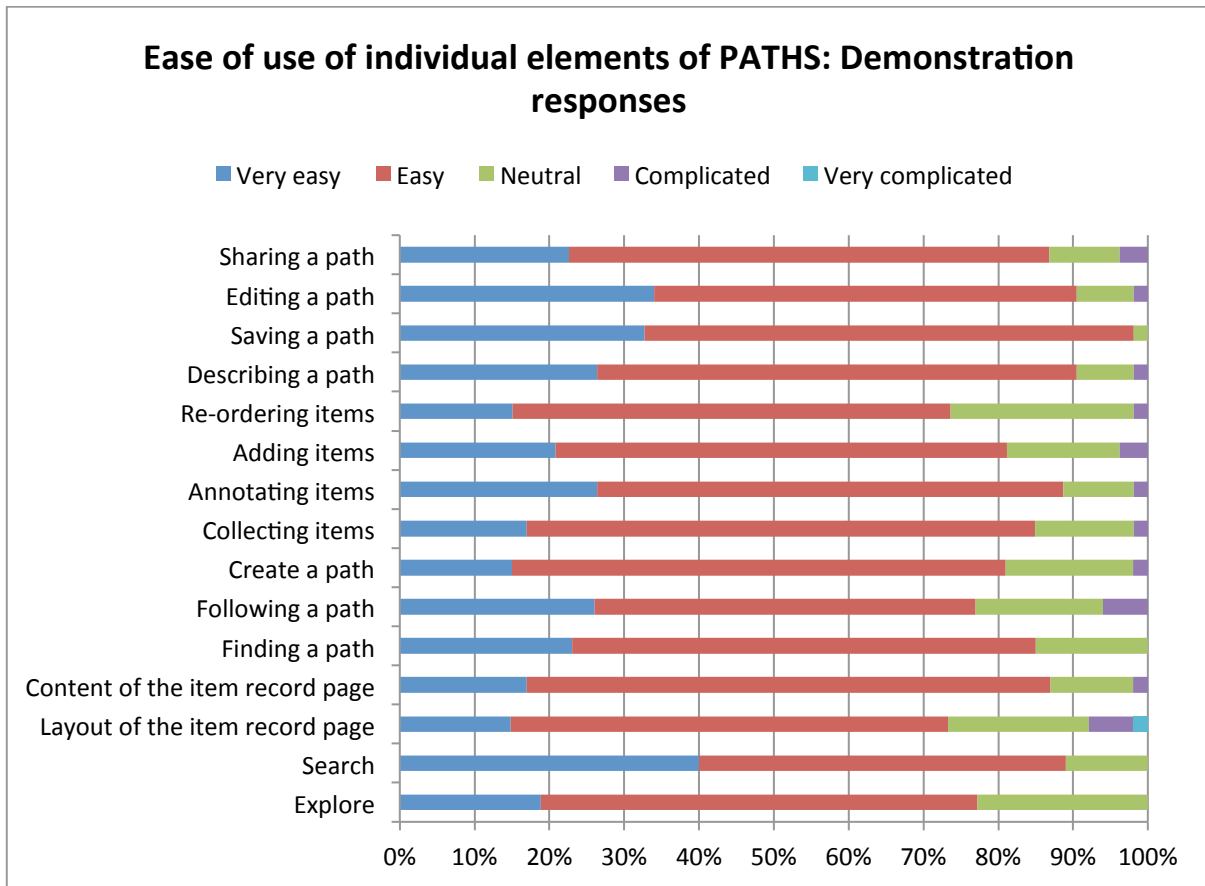


Figure 42 Ease of use of PATHS: Demonstration responses

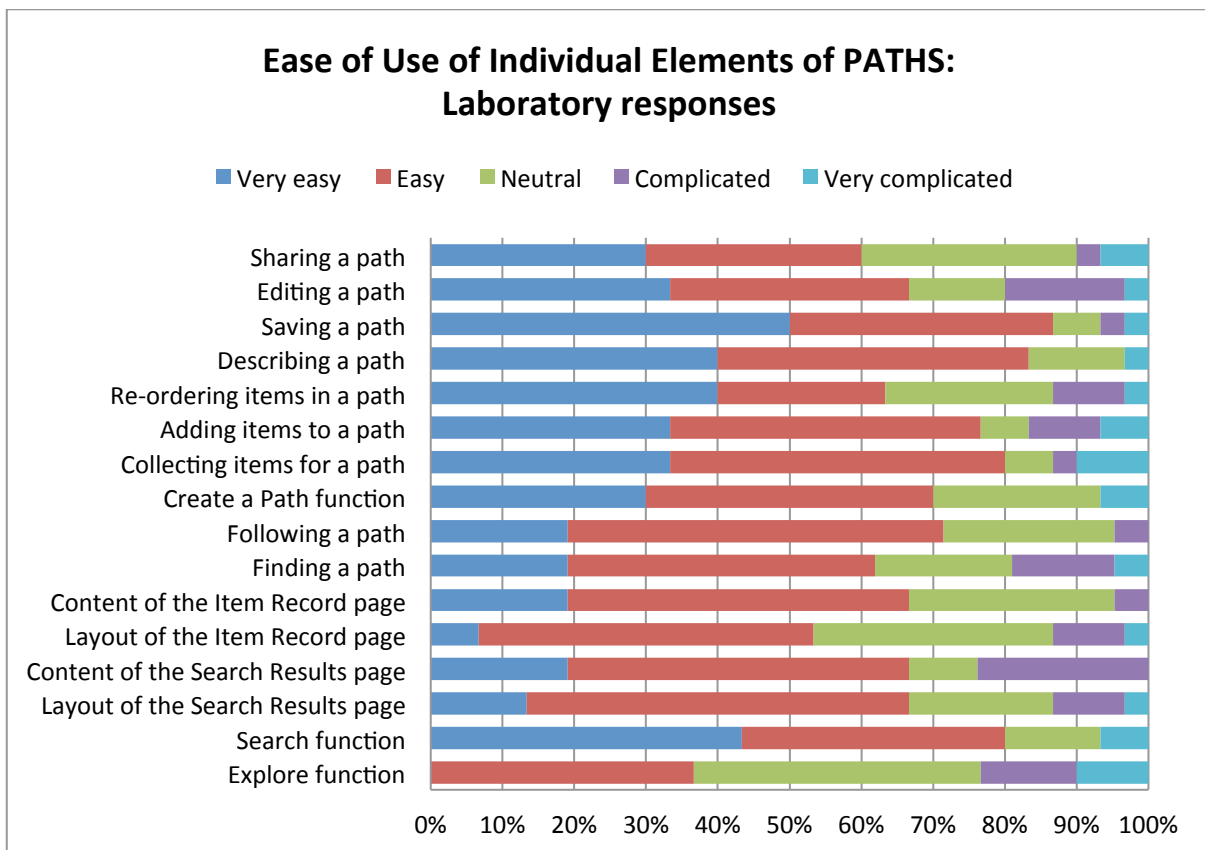


Figure 43 Ease of use of PATHS: Laboratory responses

In terms of ease of use, users rated PATHS functionality on a 5-point Likert scale from Very easy to Very complicated.

The majority of participants of the Demonstration evaluation sessions rated all elements of PATHS as Very easy or Easy, whilst the majority of Laboratory participants rated all except Explore as either Very easy or easy. Laboratory participants also gave Explore the highest proportion (although still relatively low at 23%) of complicated and very complicated ratings, as well as the highest proportion of neutral ratings (40%).

Demonstration participants found the following elements easiest to use (Very easy AND Easy):

- Saving a path (98%)
- Editing a path AND Describing a path (90%)
- Search AND Annotating items (89%)
- Content of the item record page AND Sharing a path (87%)
- Finding a path AND Collecting items (85%)
- Create a path AND Adding items (80%)
- Explore AND Following a path (78%)
- Layout of the item record page AND Re-ordering items (74%)

Laboratory participants found the following elements easiest to use (Very easy AND Easy):

- Saving a path (87%)
- Describing a path (83%)
- Search AND Collecting items (80%)
- Adding items (76%)
- Following a path (71%)
- Create a path (70%)
- Layout of the Search results page AND Content of the Search results page AND Content of the item record page AND Editing a path (66%)
- Re-ordering items (63%)
- Finding a path (62%)
- Sharing a path (60%)
- Layout of the item record page (54%)
- Explore (37%)

The search function is easy for most participants, which is to be expected given that this is one of the more conventional elements of the interface. However, the lowest proportion of 'very easy' ratings are given for the layout and content of the search results and item record pages, along with finding and following a path and the lowest proportion overall for very easy or easy is for the layout of the item record page, indicating that there is a need to assess the usability of these elements in more detail to see where improvements could be made.

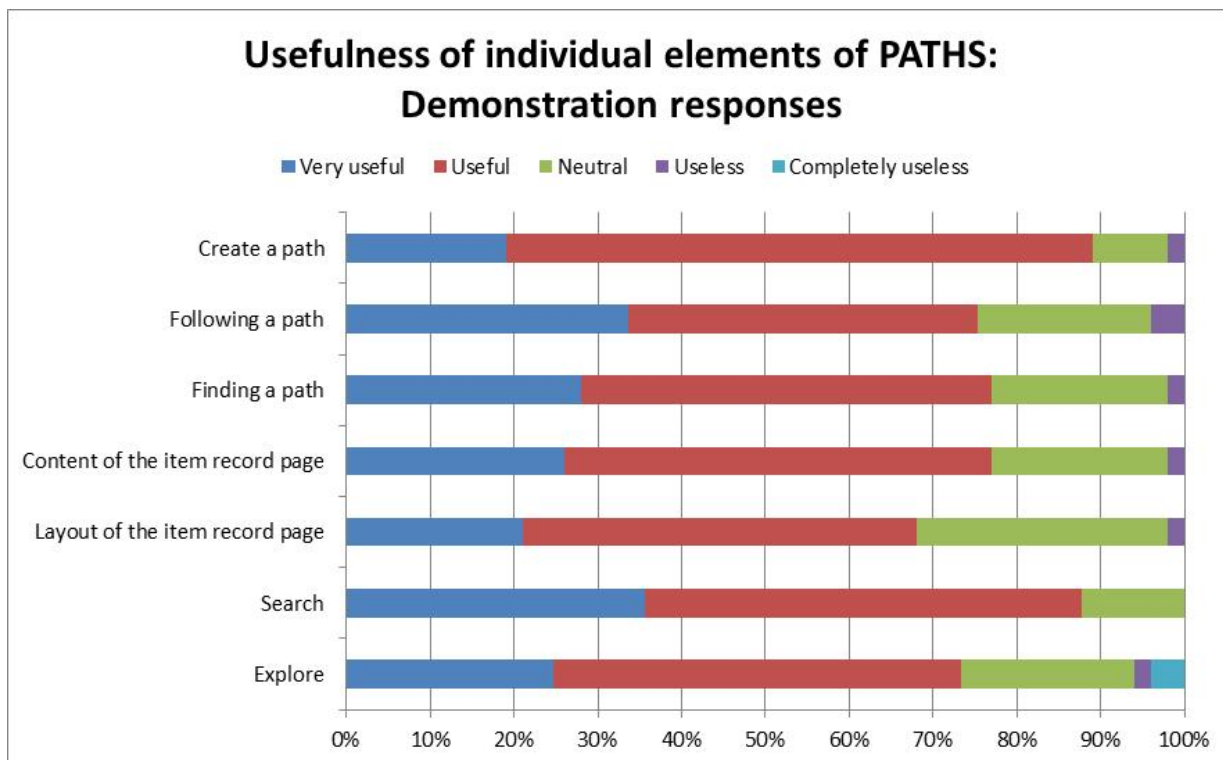


Figure 44 Usefulness of PATHS: Demonstration responses

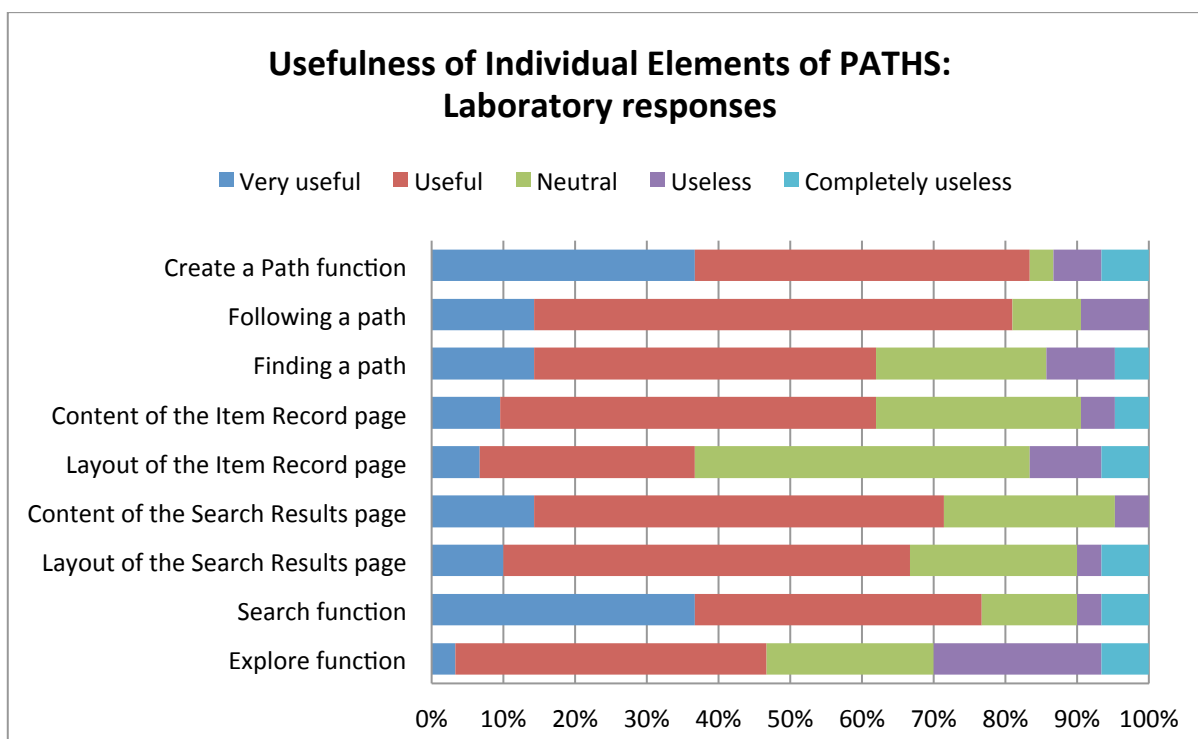


Figure 45 Usefulness of PATHS: Laboratory responses

In terms of usefulness both sets of participants agree that the *Create a path* function is the most useful element of PATHS, with a combined Very useful and Useful rating of 89% from the Demonstration participants and 84% from the Laboratory participants.

The majority of Demonstration participants rated the other elements of PATHS as either Very useful or Useful:

- Search (79%)
- Finding a path AND Content of the item record page (77%)
- Following a path (76%)
- Explore (74%)
- Layout of the item record page (68%)

The majority of Laboratory participants rated the other elements of PATHS as either Very useful or Useful:

- Following a path (81%)
- Search (77%)
- Content of the search results page (71%)
- Layout of the search results page (67%)
- Finding a path AND Content of the item record page (62%)
- Explore (46%)
- Layout of the item record page (37%)

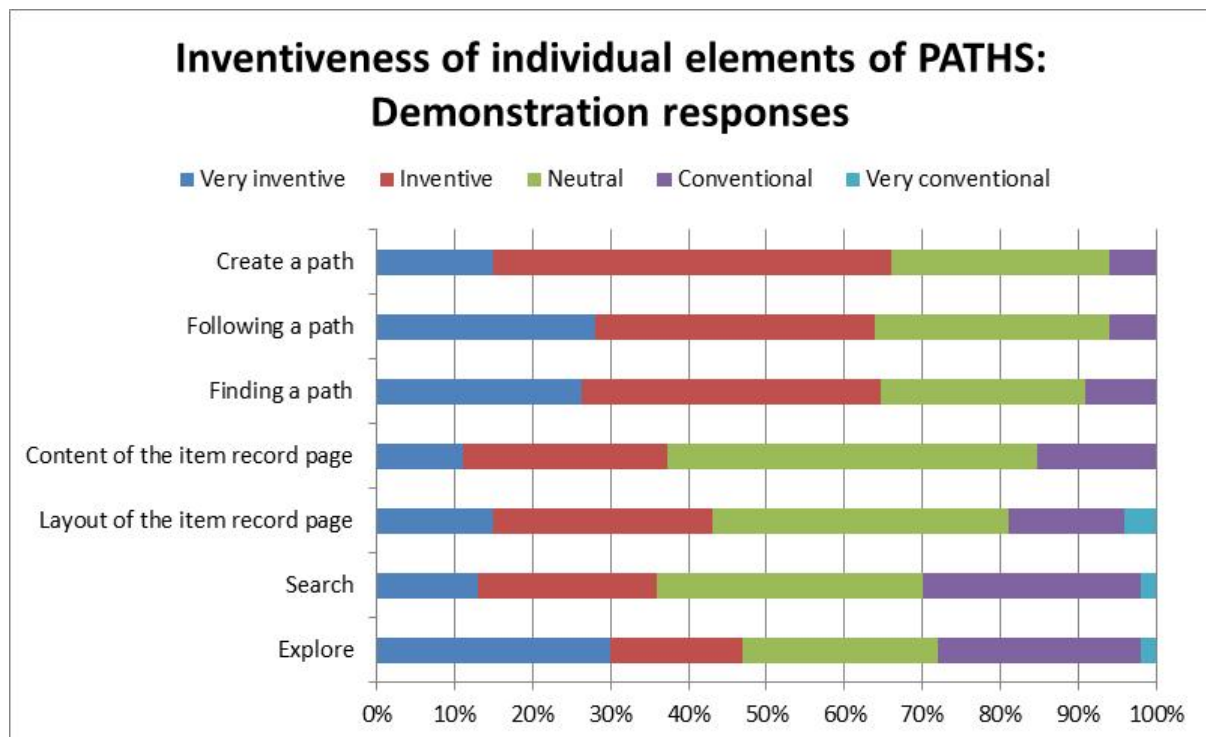


Figure 46 Inventiveness of PATHS: Demonstration responses

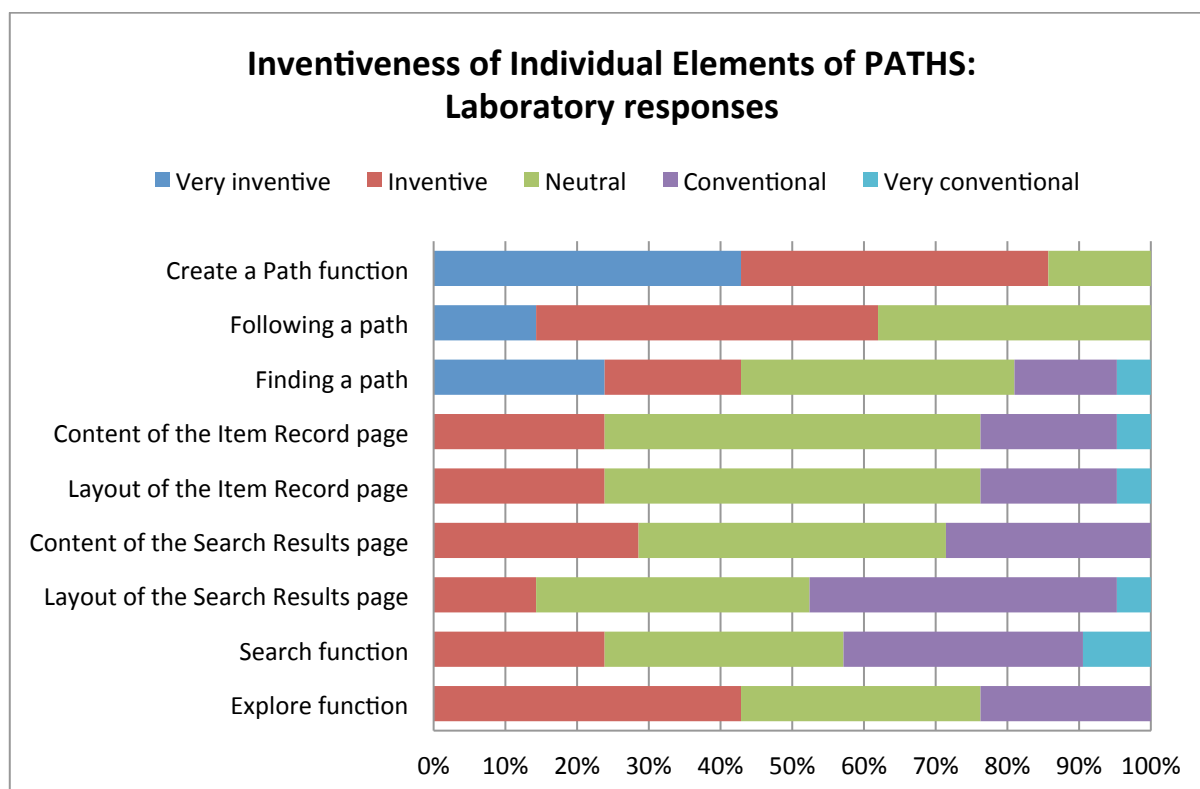


Figure 47 Inventiveness of PATHS: Laboratory responses

In terms of inventiveness both sets of participants agree that the *Create a path* function is the most inventive element of PATHS, with a combined Very inventive and Inventive rating of 66% from the Demonstration participants and 86% from the Laboratory participants.

The majority of Demonstration participants rated the other elements of PATHS as either Very inventive or Inventive:

- Search (79%)
- Finding a path AND Following a path (64%)
- Explore (47%)
- Layout of the item record page (43%)
- Content of the item record page (37%)

The majority of Laboratory participants rated the other elements of PATHS as either Very inventive or Inventive:

- Following a path (62%)
- Finding a path AND Explore (43%)
- Content of the search results page (29%)
- Layout of the item record page AND Content of the item record page AND Search (24%)
- Layout of the search results page (14%)

4.1.6 Suggestions for improvement of PATHS

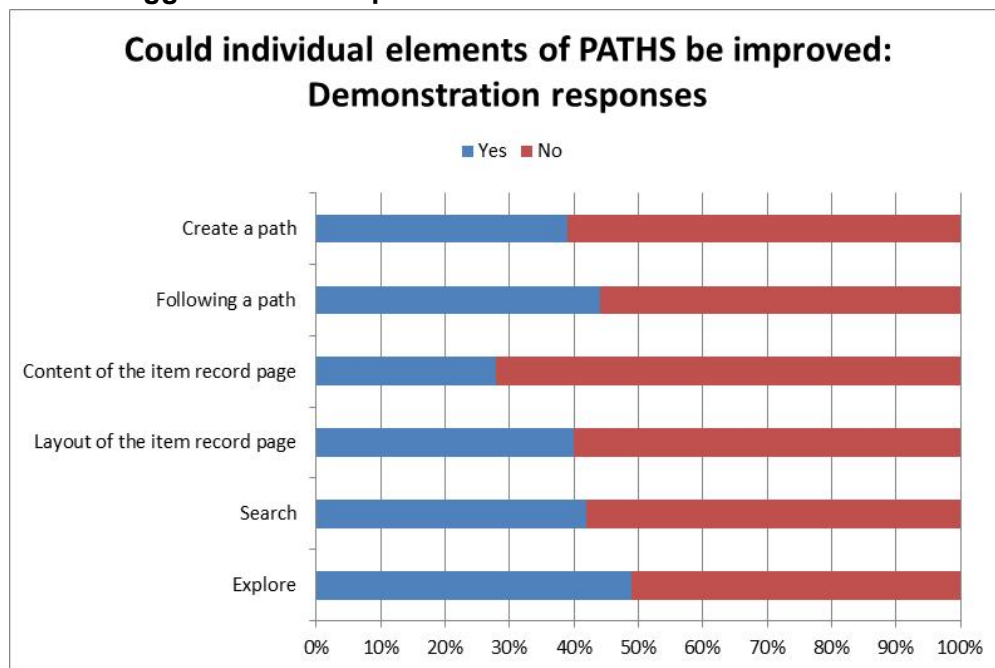


Figure 48 Improving PATHS: Demonstration responses

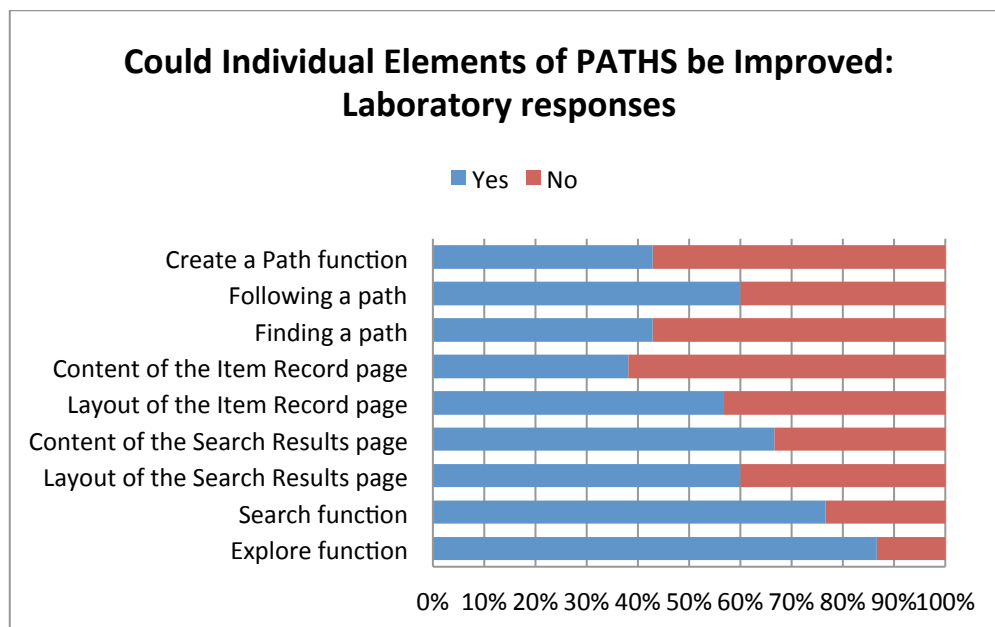


Figure 49 Improving PATHS: Laboratory responses

Despite the generally positive ratings for ease of use, usefulness and inventiveness, all elements of PATHS are seen to have room for improvement by a significant proportion of users.

Comments from the Demonstration and Laboratory participants as to how these elements could be improved are summarised in below:

PATHS Feature	Summary of Suggested Improvements / Other Comments
Explore	<ul style="list-style-type: none"> • 'People who searched/viewed this, also looked for ...' • Adding a search function to restrict the tags shown in the cloud • Advanced search • Restricting search by fields • Be explicit that Explore = browse • By giving more space to images, larger images, hover over small image function, titles with images, images more relevant to the tags selected • Combine Explore and Search functions • Distinguish Curated/ Crowd Sourced tags • Help user find non-standard terms • Make it easier to link between objects and ideas, e.g. Credo's 'concept map' function. • More interactive workflow • Order the results by popularity • Add information to page - more context • Suggestions on final page moved elsewhere on the page as it takes away from the search. • Include big image on left hand side of the screen with information [on screen shot of image cloud] • It would be preferable to be able to choose between an image cloud and a tag/word cloud if possible. • Explain that enlarged words in the tag cloud refer to the number of items with that tag, rather than 'popularity' meaning, and keep this variant! • Link with Search function, use YouTube, Amazon and other sites users are familiar with as models • Less inclusion of tags on subsequent screens - too cluttered at present • A search box to start from • An overview of what is available by topic (top-level categories) • Hierarchy, more sub-categories • More words per topic • Alphabetic organisation of tags
Search	<ul style="list-style-type: none"> • Advanced search functions available • Get rid of scrolling bar at the bottom of the Search screen • Restricting search by fields, eg Date, Media, On Show/Archived, Artist, Collection Date etc. • Combine with Paths and Browse • Why not make the Google site search accessible through the Paths site? • Remove scrolling suggestions. • Removing the suggestions as it is distracting

PATHS Feature	Summary of Suggested Improvements / Other Comments
	<ul style="list-style-type: none"> • Order in terms of most relevant/most viewed/most interesting • Lots of images - didn't see much data • If I am looking for a specific item wouldn't Google do it just as well? • Take away the clutter and the ticker tape. • Add 'Search tips' button/link • Sort the results by different criteria, eg media, location, age, availability. • Improved relevance of search results • Results sorted by relevance • Spelling correction • Suggested search terms • Re-sizing of images – see more smaller images per page, or larger images for detail • Different results are obtained from using single/plural words and variations of spelling– this should not happen • Did not realise the facets remained in place unless unchecked
Layout of search results	<ul style="list-style-type: none"> • Include a sort option • More results per page • More images, less text • Larger images • An option to remove items without images • Some way of jumping ahead further in the results pages than the next two • The 'Add to Workspace' button is useful
Content of search results	<ul style="list-style-type: none"> • Highlight the search words in the results text, like Google snippets • More results per page • More images, less text • Better quality images • Indicate the information source in the results text • Issues with multiple items with the same title, perhaps remove 'duplicates'
Layout of item record	<ul style="list-style-type: none"> • Better, more authoritative and informed data • Improve the 'Recommendations' options to make them clearer and more visible • Less space to text • Make 'Similar Items' less prominent, remove or relocate, too distracting • More visually stimulating • Combine Search/Explore functionality • Moving the Suggestions Section or locating it elsewhere on the page

PATHS Feature	Summary of Suggested Improvements / Other Comments
	<ul style="list-style-type: none"> • Normalize the tags that the user can introduce • Scrolling images a distraction • Further details would be useful • An online step-by-step learning tutorial • By using different colors from the other functions • Must have thumbnail image • Description needs to include institution owning item as well as Rights • I would like to see a little more room for writing and less white spaces • Possibility to upload large images as well • Too much information (layout is intrinsically related to choice of content) that an average user doesn't care about • Lack of contextualisation • Put 'Similar Items' below record • Seems cluttered - lots of bits of information packed together • Need an option to enlarge images • Highlight the search terms in the item record • The information is not well-organised, put important information at the top • The similar items area is confusing, not sure what these are • Formatting of the long links could be improved • Open external links in a new window
Content of item record	<ul style="list-style-type: none"> • Include fields like date, media, access to view etc. • Look to get some uniformity across all items if possible, ie. amount of information available • More stringent data quality control • There was very little content - no context to relevance of cultural heritage • Allowing to include external links in items contained in a path • Adding an option to add the items in a path without needing to follow that path • An alternative visualization way of to show search results, given that the "items" and "path" results are shown together • Show the total number of results from a query, currently only the number of pages is shown • Add cross-lingual synonyms for search (e.g., pyrenees, pirineos, pirineoak, etc.) • Not all data really necessary. Will most people want rights details? Most will want: 1) a few words about it. 2) Where it is. 3) If it is on display or not. 4) How to get a likeness, copy of it • Adding content can be interesting but it can also create a lot of noise. Some sort of moderation could be useful

PATHS Feature	Summary of Suggested Improvements / Other Comments
	<ul style="list-style-type: none"> • Allowing to add external links to items descriptions in paths • Further details provided - perhaps archive context (its place within the collection/relationship to other items) • Maybe more information on said item • More/better links to gain more information if needed • Always work best with image • More contextual information to catch all main user groups, not just specialist in certain areas eg add artist brief biography • Because the content is based on supplying organisation it can be hard to make sense of it and the information is not always relevant/useful. Might need a more standardised approach? • Remove too much large blank spaces in the web pages and making the visualization of the images bigger • Too much information (layout is intrinsically related to choice of content) that an average user doesn't care about • Lack of contextualisation • Put 'Similar Items' below record • The content will be of varying usefulness depending on the provider. This might make it difficult to be consistently useful • More information needed, text is often very sparse or non-existent • Titles could be improved for many items • Larger images needed • More consistency between records • Identify which collection the item is from • Links to other, more scholarly external content • Some items and titles are very repetitive, making it difficult to differentiate between them
Follow a path	<ul style="list-style-type: none"> • Able to return to original path easily • By showing images instead of captions on the past point of the path • Give an overview of the path at the bottom of the page AND 'Recently viewed items' AND 'Recently viewed' of your own trail • I didn't see a way to start again or skip to a particular place once I'd started. • Improving links • Interesting to restrict the search as you are browsing through the results • More information about 'Similar items' • Should have a 'Paths followed' section • More visual - rather than layout of a path as text links, see it as a visual trail • Need better overview and representation of the path • Need choice of starting points

PATHS Feature	Summary of Suggested Improvements / Other Comments
	<ul style="list-style-type: none"> • Not sure that the breadcrumb back to the original path is sufficient • Promote it as a standalone social media application • Overall 'moment of comprehension' is needed, or broken down into chunks, perhaps, if big • LOVE the path idea but still seems quite tricky when I'm in it - lots of text and millions of options which confused me?! Where am I in the path? • Limit amount of information to reasonable extent • Overview as thumbnails as well as titles • Creator status, Creator edit capacity • Have users accept museum's content restrictions/rights • I see this as more of a social media tool and as such adapting it to that approach and format could work well • Better overview • Better orientation • More links to other paths • More links to originating content • More indication of who the path creator is • More visual representation of the path on the first screen • More links to other paths - escape routes • Too textual at present, need photos and DIAGRAMS and overall 'map' of the path • Could be clearer as to where in the path you are and where you are going • Ability to view the item separately (as you would see it from the search page to provide authority information as well as what is written by users) • A better overview, including images and/or popups when you hover over an item • Easier, clearer way of getting back to a path after clicking through to the item record • More options to change direction • More explicit links between items (this may relate to explanations of the connections, or more visible links on the page)
Create a path	<ul style="list-style-type: none"> • Add personal objects/images • Adding the possibility to include external links in the created paths • Allow inclusion of additional content, e.g. image from Flickr • Easier to use tool • Make adding multiple items easier - either check box option or click and drag option • Make it more visual - improve way you see the whole path • Maybe want to suggest items for someone else's path • Means of adding content from user/creator

PATHS Feature	Summary of Suggested Improvements / Other Comments
	<ul style="list-style-type: none"> • More instructions and a bar showing your progress, e.g. Step 1 of 4 • More inventive visual interface/allow this to be edited • Perhaps more instructions for infrequent users • Show thumbnails on workspace area • Show whole path at once • Show related paths • The drag and drop system is not so direct • Make initial page and instructions less cluttered and have 'Help' menu available as drop down prompt • Have a group workspace • Would be useful to know who [role] is creating the path • Would want to pull in data from across the web • Need to be able to sort search results and pull in external sources and simplify annotation process • Multiple item selections • Drag and drop creation that feels like it does in re-ordering - which is nice • Geo-location - paths meets maps! • Blend with user images? e.g. photos of the same places today, interoperate with user generated images, e.g. Flickr • Facility to email Workspace to yourself or share your work/path to social media • Paths is the USP I think. Downplay 'Search' on the Home screen. Play up PATHS - that's what makes your site special • PATHS should entice the user in and be visually inspiring • Overall I think there are FAR TOO MANY ways in/widgets/approaches. I think it should strongly focus on paths with the other things available for more advanced users • Use existing item descriptions automatically • Move Up/Move Down buttons AS WELL as drag and drop to change order • Would like to associate one image as a 'cover image' for a path (like Facebook albums) • Include the text of the original item as the default • Make it easier to reference the original item text and larger images when writing captions • Make it easier to reorder items, e.g. using numbers, or a grid view • Make it clearer what can be edited • Add an edit button to the path overview page • The workspace pop-out obscures the search results text, making it difficult to annotate saved items • Allow user-created nodes for linking and descriptions between items

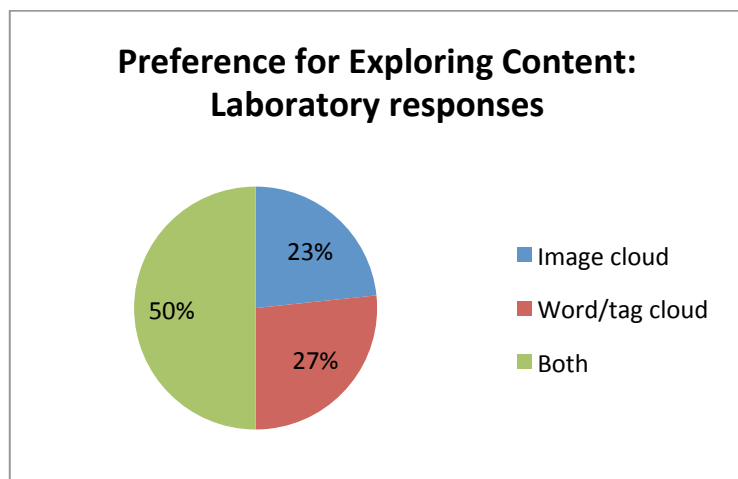


Figure 58 Preference for exploring content: Laboratory responses

Views on the best mode for exploring content is split with 36% of Demonstration participants preferring the image cloud, 22% preferring the tag cloud and 42% preferring the option to use either.

The Laboratory participants were also split, with a total of 50% preferring either an image cloud (23%) or a word cloud (27%), and the remaining 50% preferring to have both options available. When considered in the context of CSA types, it appears that on the WA scale, Wholists have a strong preference to see both word and image clouds, whilst Analytics have a strong preference for word clouds. Interestingly whilst it might be expected that on the VI scale that Verbaliser would express a preference for a word cloud and Imagers would prefer an image cloud, this is not the case. In fact, Verbalisers follow the pattern of the overall findings seen in Figure 58 above, and Imagers prefer either a word cloud or both, with very low support for image clouds.

4.1.8 Path flexibility, interaction and related content

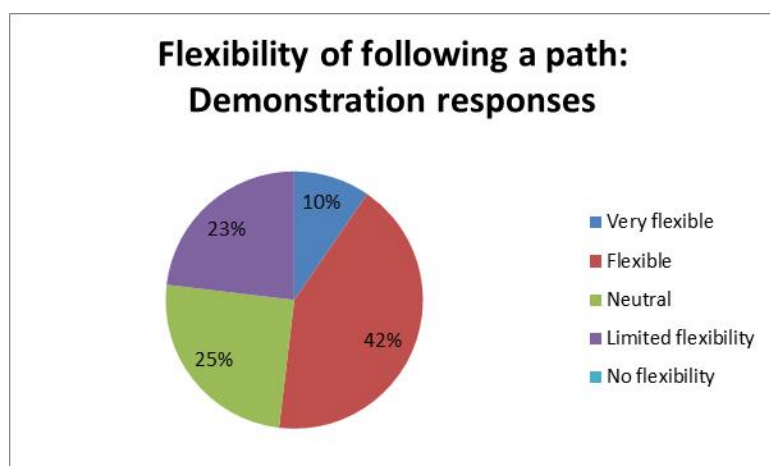


Figure 59 Flexibility of Following a path: Demonstration responses

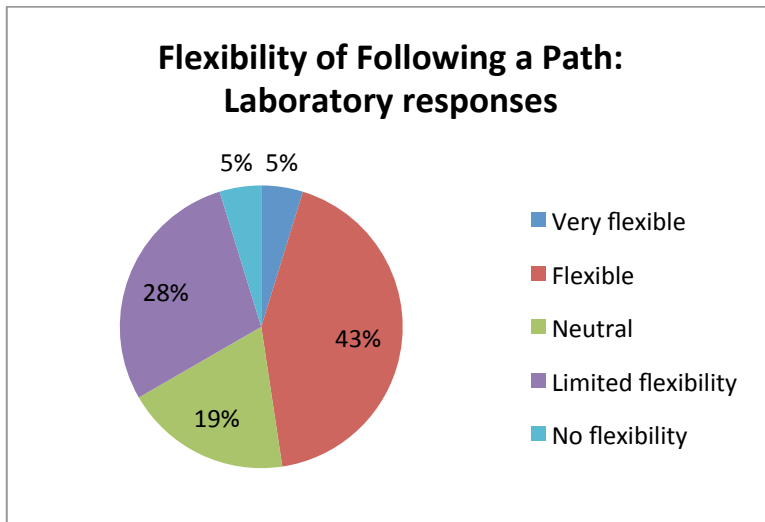


Figure 60 Flexibility of Following a path: Laboratory responses

As has already been seen in the results above, following a path is seen as easy to do, useful and relatively inventive, but with some opportunity for improvement. Since paths created in the current prototype are simple linear constructions, with a simple overview page and forward/back directional options, but no branching or other advanced features, we also wanted to know how flexible users found them. Results are encouraging, in that even with the current limitations, 52% of Demonstration participants and 48% of Laboratory participants found following a path to be flexible or very flexible.

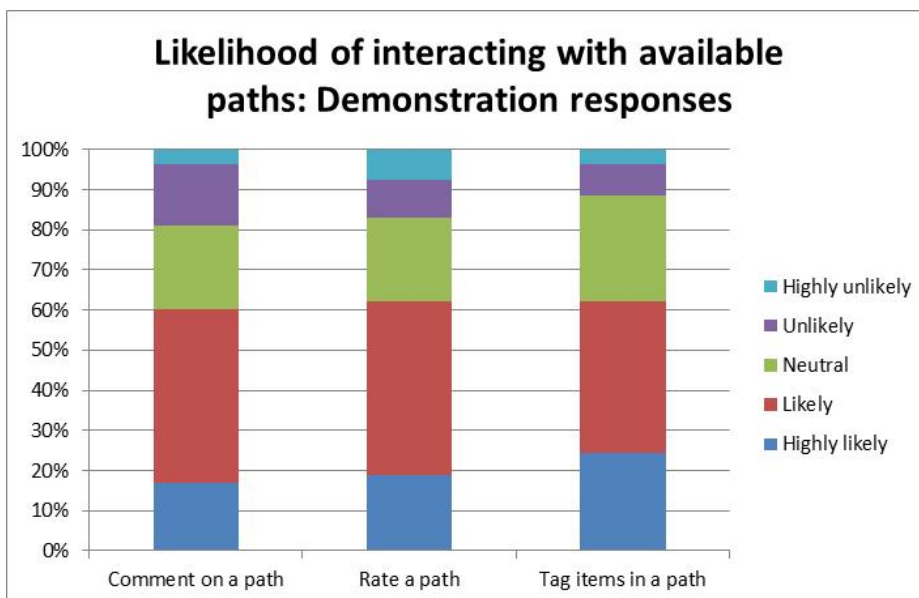


Figure 61 Likelihood of interacting with paths: Demonstration responses

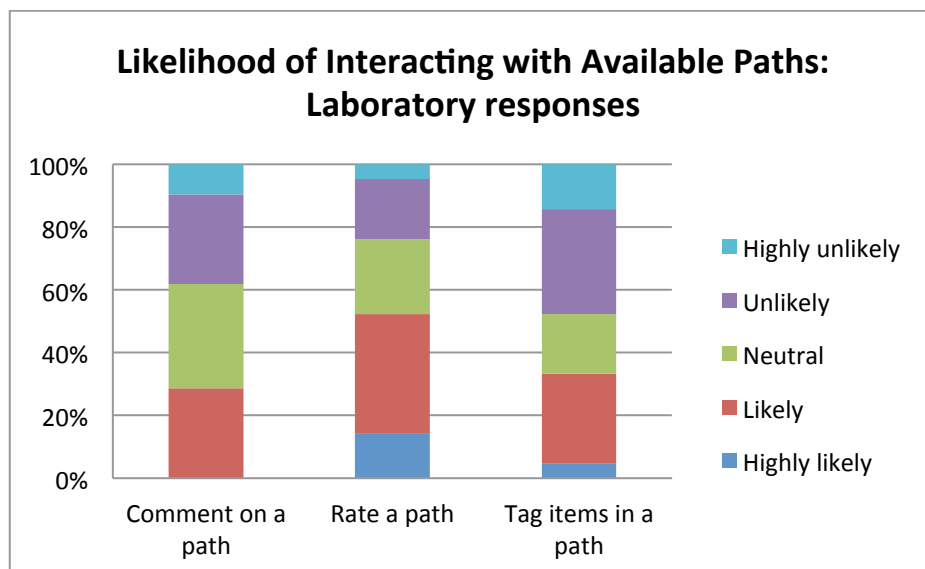


Figure 62 Likelihood of interacting with paths: Laboratory responses

Interactive features that allow users to leave their mark on the content in socially-oriented systems are popular and PATHS includes a few of these in the first prototype to judge their appeal to users and to help determine whether these features need to be developed further. Whilst these features were not actively demonstrated nor were users required to specifically engage with these features during the laboratory evaluations, they were clearly visible and some Laboratory participants investigated them during the introductory familiarisation period.

Demonstration participants expressed very similar views on interacting with paths, with 63% Highly likely or Likely to Tag items in a path, 62% Highly likely or Likely to Rate a path and 60% Highly likely or Likely to Comment on a path.

52% of Laboratory participants were 52% Highly likely or Likely to Rate a path, 33% Highly likely or Likely to Tag items in a path and 29% Highly likely or Likely to Comment on a path.

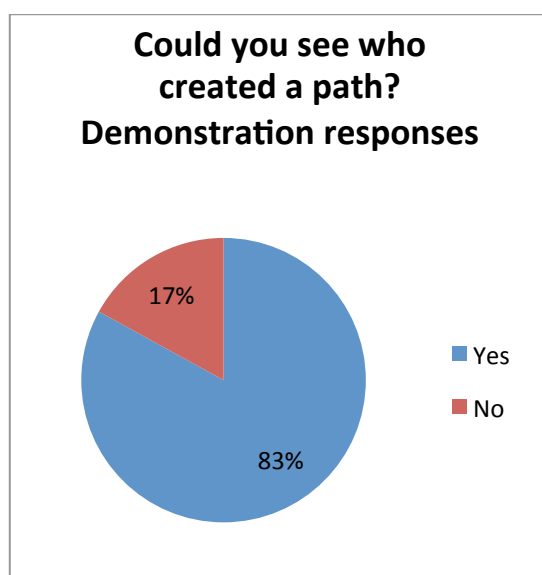


Figure 63 Path Creator: Demonstration responses

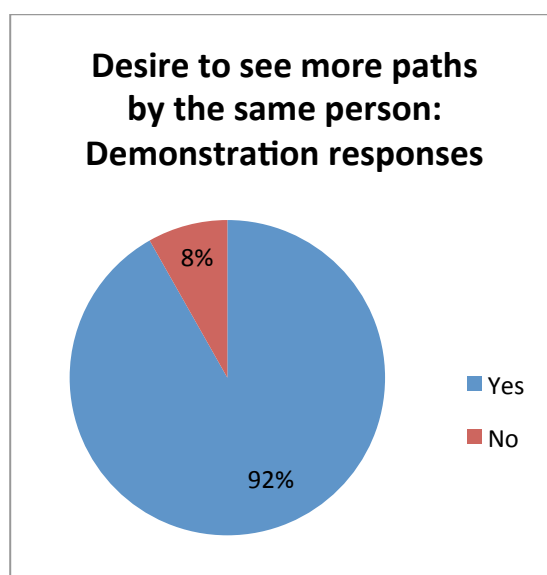


Figure 64 Other paths: Demonstration responses

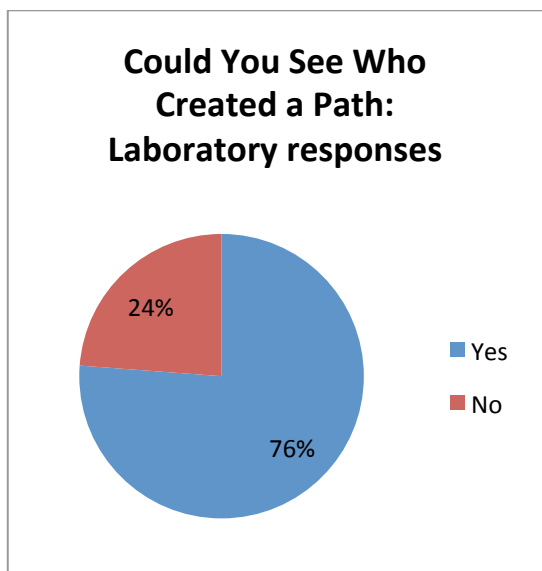


Figure 65 Path Creator: Laboratory responses

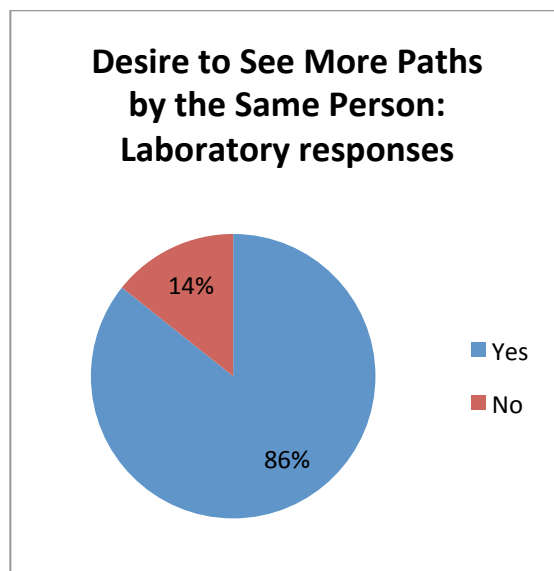


Figure 66 Other paths: Laboratory responses

Next we looked at issues relating to path ownership, and it is clear that a large majority of users can identify who created a path, and would also be keen to see more paths by the same person, if available. Comments made by Demonstration participants also indicated that it would be desirable to see the *role* of a path creator.

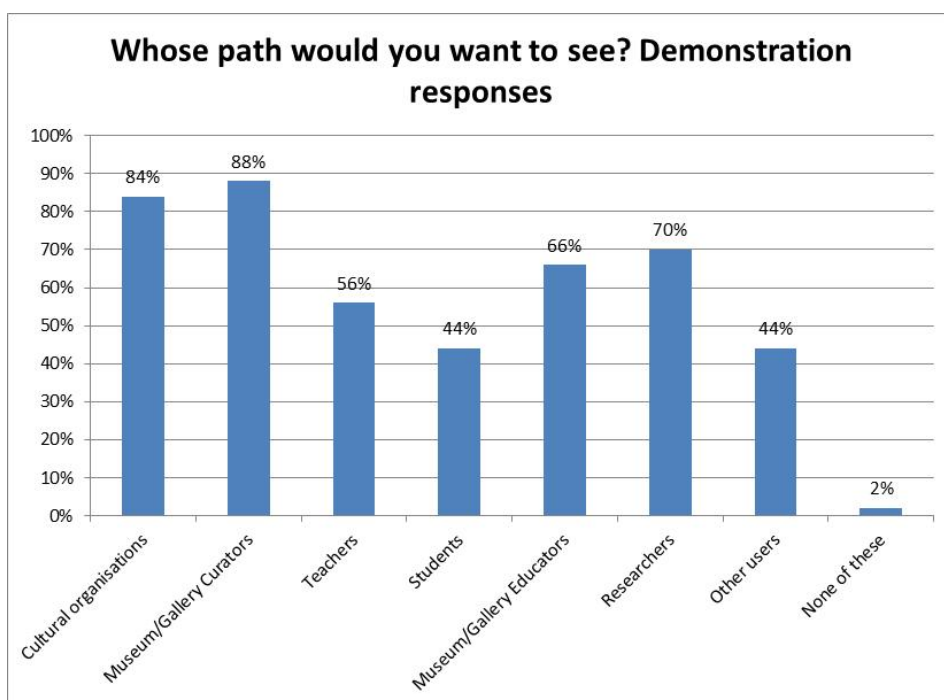


Figure 67 Most interesting paths to follow: Demonstration responses



Figure 68 Most interesting paths to follow: Demonstration responses

Looking further at whose paths users would be most interested in seeing, those from museum/gallery curators and cultural organisations and researchers were very popular, i.e. those from domain and subject experts. Within cultural organisations, those from curators are more highly sought than those from museum educators. Paths from teachers, students and other users were also of interest to a reasonable number of participants of both groups. Expert users of the Demonstration sessions expressed interest in seeing the paths of their users, as it would enable them to understand what was of interest to them.

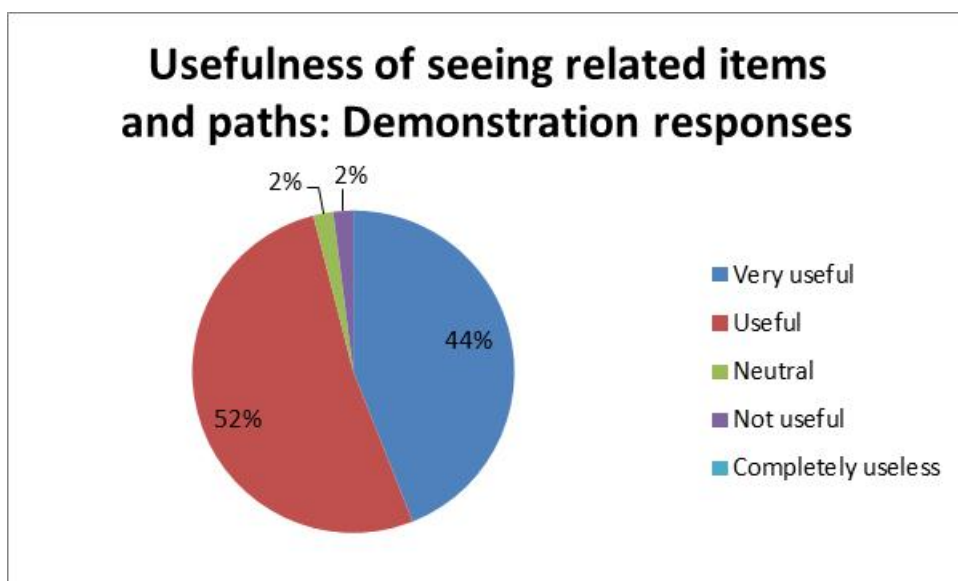


Figure 69 Related items and paths: Demonstration responses

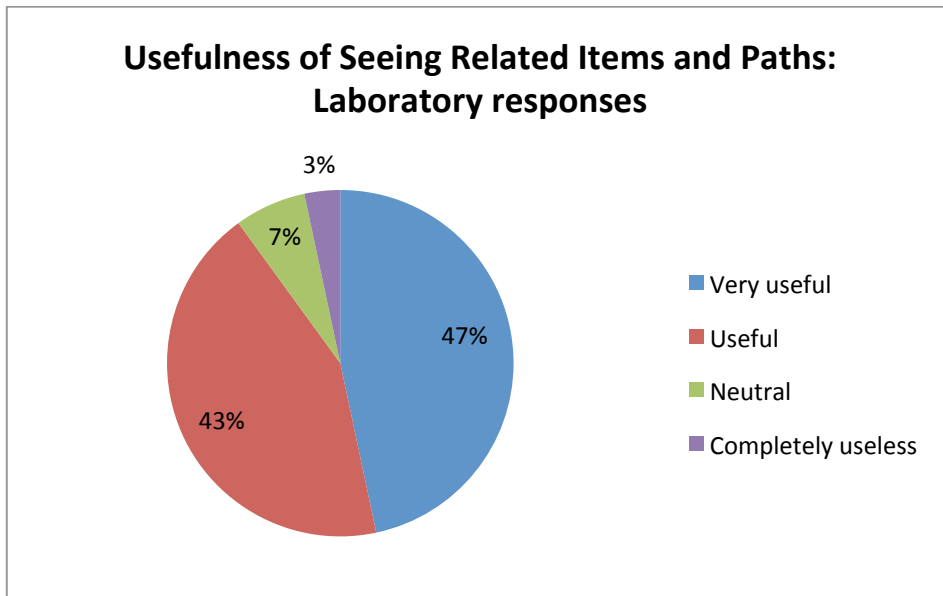


Figure 70 Related items and paths: Laboratory responses

Since we are interested in developing aspects of content recommendation for PATHS users, we asked about the usefulness of seeing different types of related content. Participants gave overwhelming support for the option to see related content items and paths, with 96% of Demonstration participants and 90% of Laboratory participants finding this Useful or Very useful.

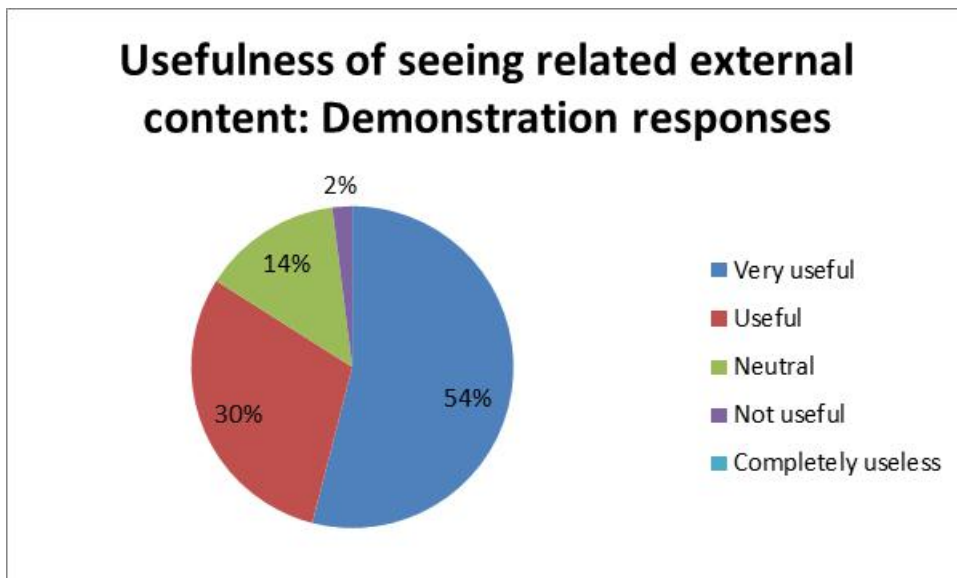


Figure 71 Related external content: Demonstration responses

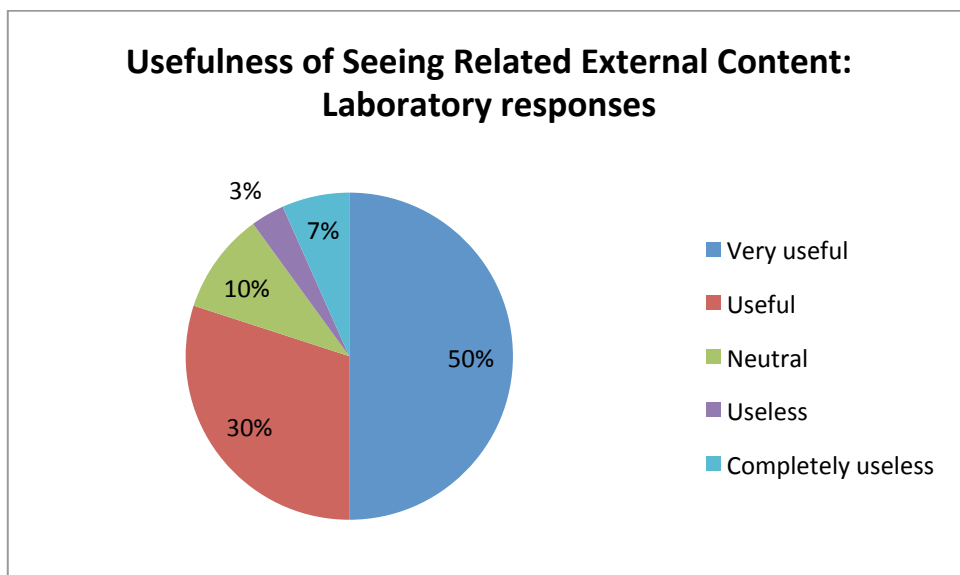


Figure 72 Related external content: Laboratory responses

There is also a high level of support for seeing related external content, with 84% of Demonstration participants and 80% of Laboratory participants finding this Useful or Very useful. At present PATHS offers links to Wikipedia articles on topics derived from the item record. In undertaking the evaluation tasks, a number of laboratory participants followed these links, especially when there was very limited descriptive information available within the item record itself.

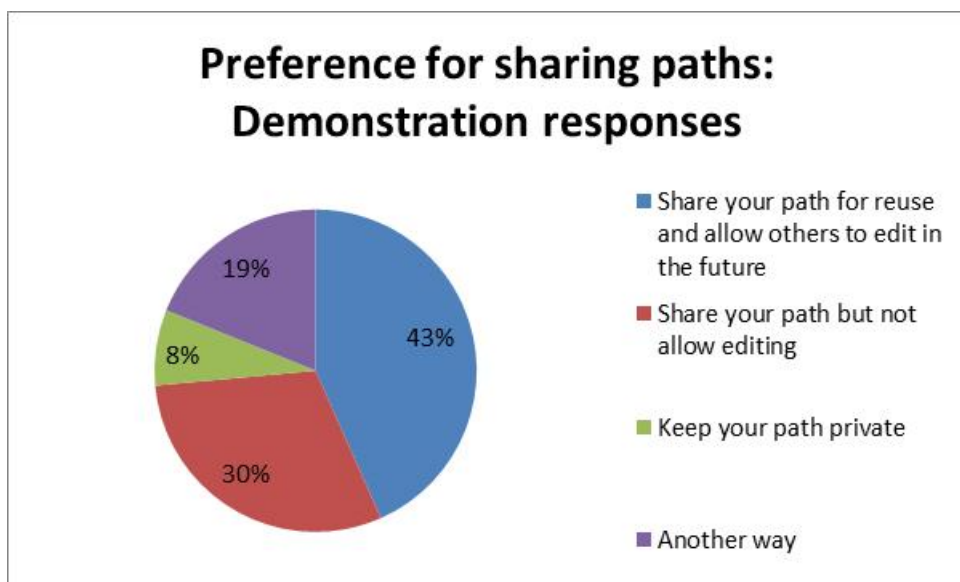


Figure 73 Preference for sharing paths: Demonstration responses

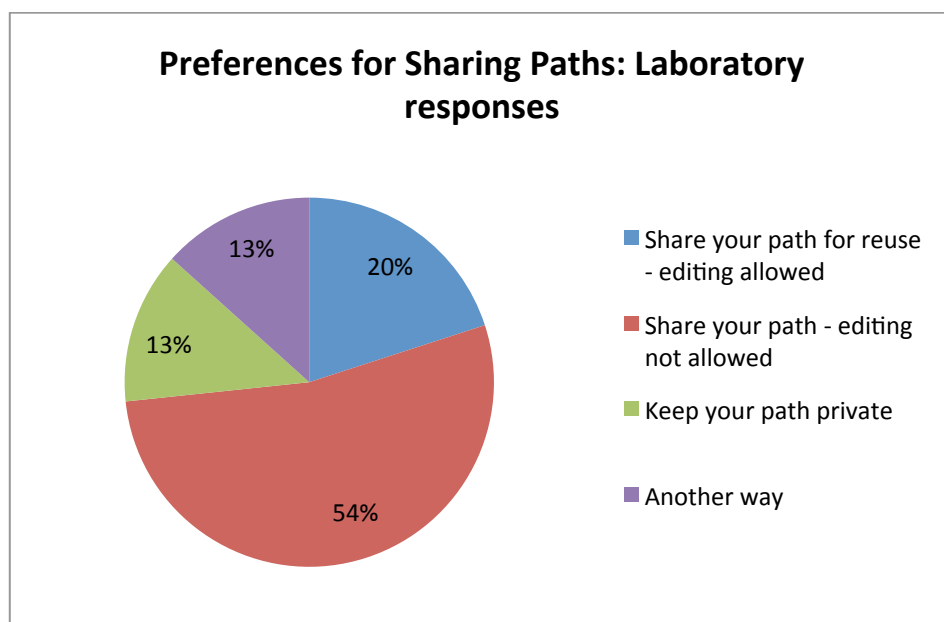


Figure 74 Preference for sharing paths: Laboratory responses

In the first prototype, users are able to create a path and then either keep it private for their own use only, or to share it publicly. Once shared the path is a fixed information object and cannot be cloned, edited or adapted by other users. When asked about possible options for sharing paths, a majority of Demonstration participants (43%) wanted to share a path and allow editing, whilst 30% wanted to share but not allow editing and 8% wanted to keep their path private.

The majority of Laboratory participants (54%) wanted to share their paths but not to allow editing, whilst only 20% were happy to allow reuse and editing of their path, and 13% wanted to keep their paths private for personal use only.

Suggestions for other ways in which a path could be shared focussed on allowing flexibility of choice, that is preference for sharing might vary according to what is in the path and why it was created, and that if editing is allowed, a copy should be made and the original should remain intact.

For example:

- Choose depending on the Path!
- Share your path for reuse and allow others to edit in the future AND Allow others to edit but keep a copy of the original somehow.

4.1.9 Preferred devices for PATHS activities

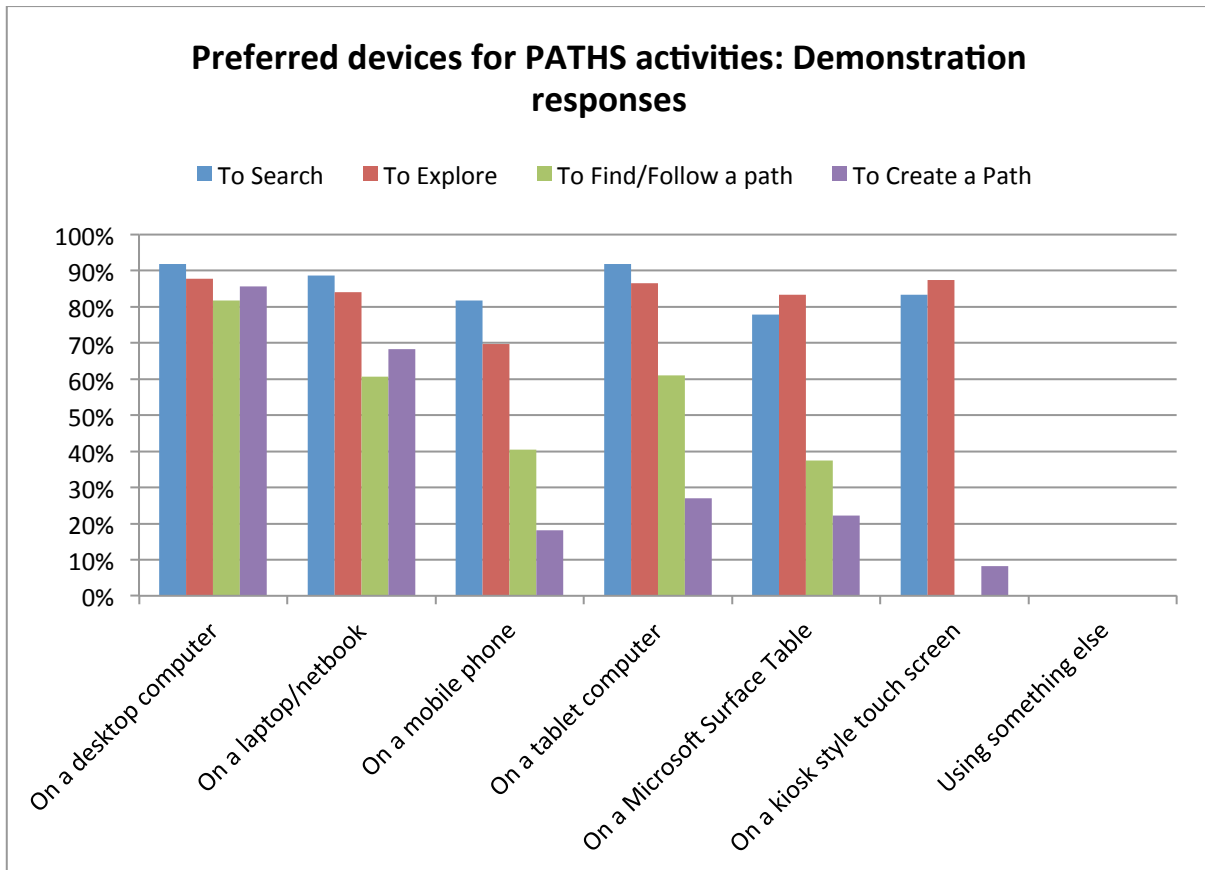


Figure 75 Preferred devices for PATHS activities: Demonstration responses

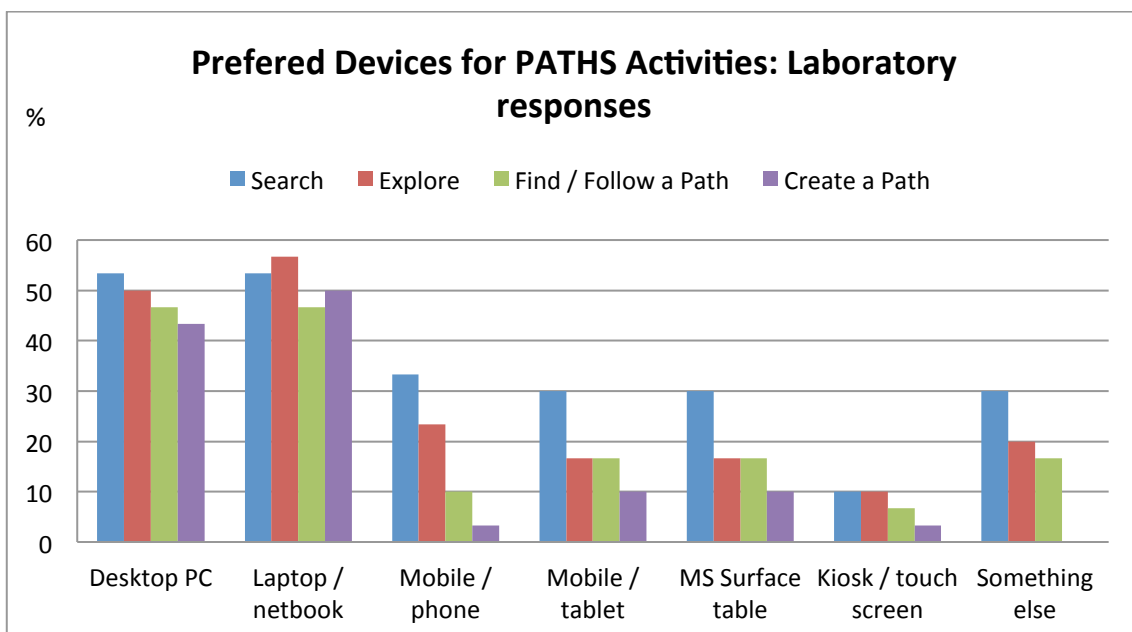


Figure 76 Preferred devices for PATHS activities: Laboratory responses

Looking ahead to the second prototype we also wanted to understand more about the types of devices on which people might want to use PATHS and the types of core activities they would want to carry out in each environment.

Demonstration participants exhibited a wider range of responses but the majority of participants would expect to use PATHS on a PC or laptop PC across all four activities of Search, Explore, Find and Follow a path and Create a path. Mobile phones were viewed as better for Search (82%) and Explore (70%) activities. Tablet computers were seen as best for Search (92%), Explore (87%) and Finding/Following a path (61%). Devices such as a Microsoft Surface Table were seen as better for Explore (83%), Search (78%) and kiosk style devices also for Explore (88%), Search (83%).

Laboratory participants also would expect to use PATHS on a desktop or laptop PC, with relatively even support for the four activities. For all other devices there is a much lower level of preference, and for all except touch-screen kiosks, it is much more likely that they would want to search than to engage in exploring, finding and following a path or creating a path. Whilst a few users indicated they would want to use 'something else', no additional suggestions were made for alternative devices to those already suggested.

4.1.10 PATHS and social media

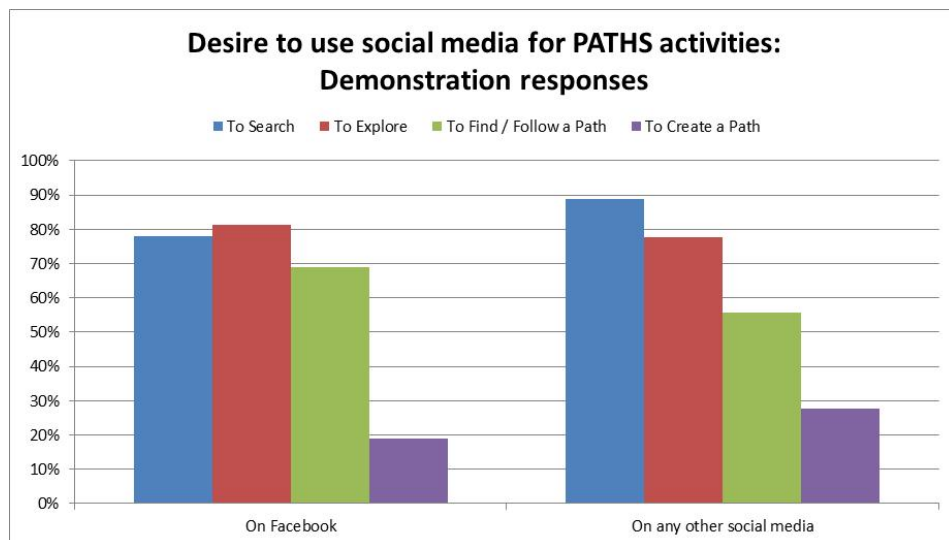


Figure 77 PATHS and social media: Demonstration responses

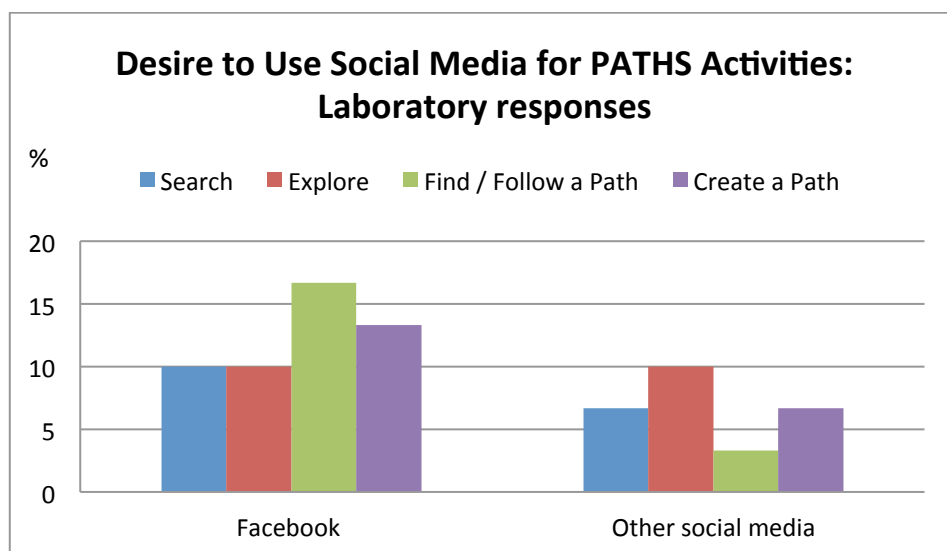


Figure 78 PATHS and social media: Demonstration responses

Finally, we asked whether participants would want to use PATHS in social media environments. Whilst there was comparatively little support from the Laboratory participants for this activity for Facebook, and even lower for other social media there was considerable interest from Demonstration participants where they would want to use PATHS on Facebook to Explore (81%), to Search (78%) and to Find/Follow a path (69%). Suggestions for other media included:

- academia.edu
- Twitter
- Tumblr
- Flickr
- Google maps/accounts
- Pinterest
- Reddit

In addition, there was one emphatic response that the user would never share educational content via social media due to privacy issues.

4.1.11 Final view of PATHS: responses to usability semantic differentials

The first section of the questionnaire presented a series of semantic differential scales, rating polar opposite experiences on a 7-point scale of +3 to -3, with a neutral 0 (zero) position at the centre.

Differentials from the Demonstrations

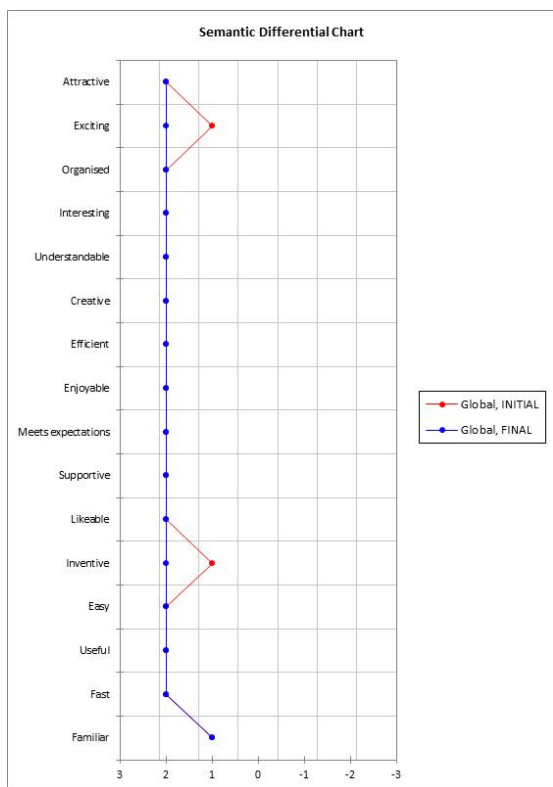


Figure 79 Global initial & final view

Globally perceptions across all scales were either maintained as Demonstration participants became more familiar with the system and, on two scales, Inventiveness and Exciting, improved (from medians of 1 to 2). Across all scales PATHS was viewed very positively.

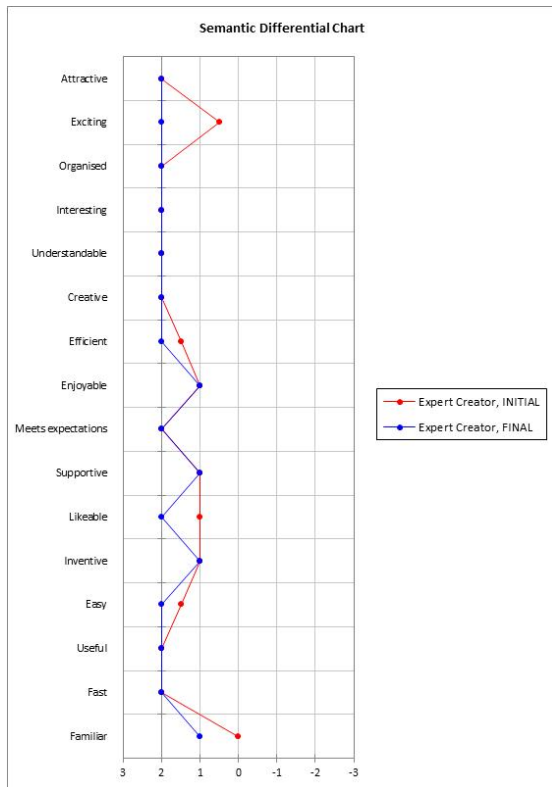


Figure 80 Expert Creator initial & final view

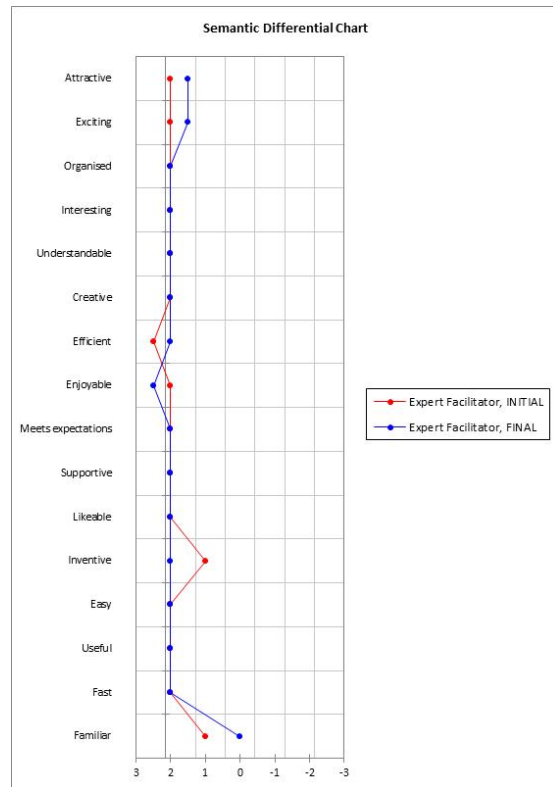


Figure 81 Expert Facilitator initial & final view

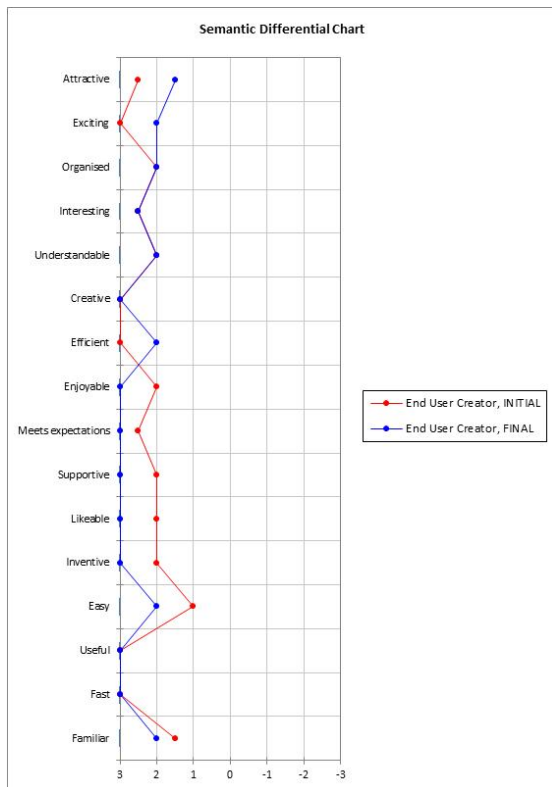


Figure 82 End User Creator initial & final view

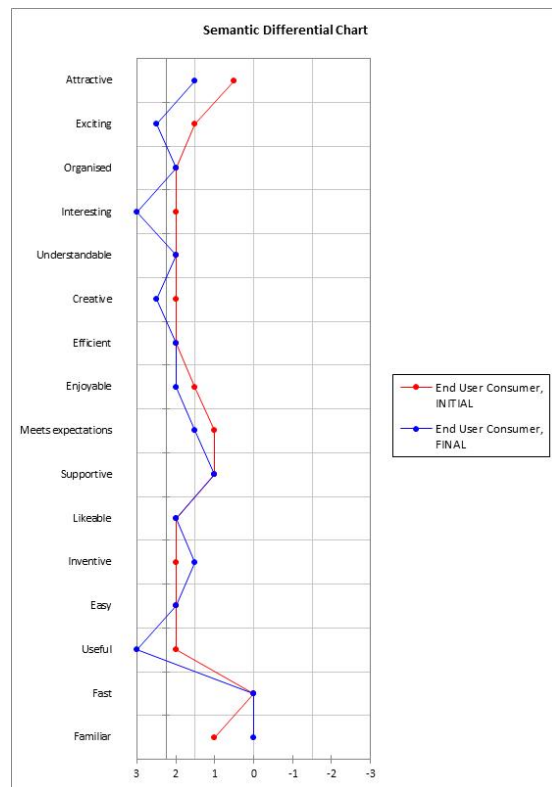


Figure 83 End User Consumer initial & final view

Of the *Expert Creators* ratings on all scales were either maintained as they became more familiar with the system or, on five scales, improved:

- Exciting
- Efficient
- Likeable
- Easy
- Familiar

Of the *Expert Facilitators* responses were a little more mixed as they became more familiar with the system. Ratings were lower after familiarisation on:

- Attractiveness
- Exciting
- Efficient
- Familiarity

But improved on:

- Enjoyable
- Inventive

Of the *End User Creators* responses were also mixed as they became more familiar with the system. Ratings were lower after familiarisation on:

- Attractiveness
- Exciting
- Efficient

But improved on:

- Enjoyable
- Meets expectations
- Supportive
- Likeable
- Inventive
- Easy
- Familiar

Of the *End User Consumers* responses were also mixed as they became more familiar with the system. Ratings were lower after familiarisation on:

- Inventive
- Familiar

But improved on:

- Attractive
- Exciting
- Interesting
- Creative
- Enjoyable
- Meets expectations
- Useful

Laboratory differential responses

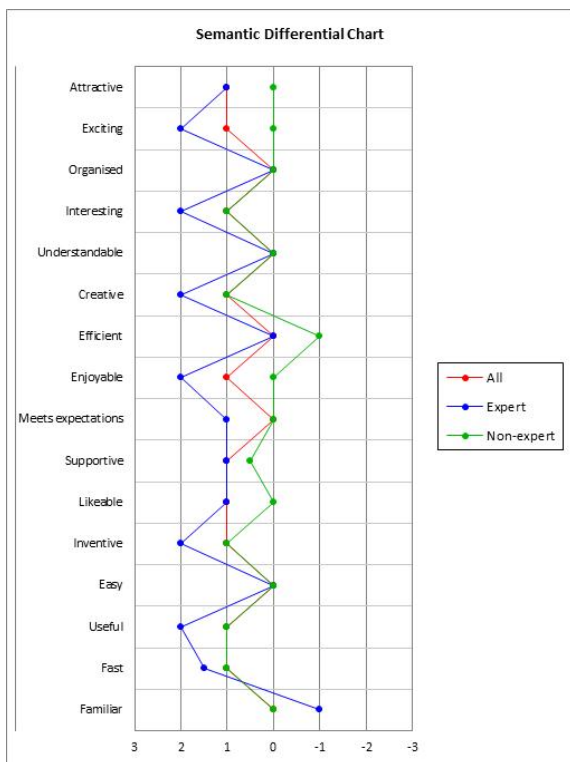


Figure 84 Final view of PATHS: Laboratory responses

Findings of the Laboratory participants show that of the complete sample of all participants, it can be seen that for 10 of the 16 scales there was a median positive response of +1 and in fact analysis of individual responses shows ratings across the range of +1 to +3. For the other six scales, the median is zero, indicating that for all scales, the majority response was at least neutral.

Comparing the responses from expert¹ and non-expert² participants it can be seen that for most scales, the expert participants are somewhat more positive than the non-experts, the exceptions being familiarity (experts are more negative), and the scales for organised and easy, where the median responses for experts and non-experts are identical. For the majority of scales where there is a difference between the two categories of participants the median varies by only 1 or 0.5, except for exciting and enjoyable, where the difference is +2 higher for expert participants over non-experts. There are only two scales where a negative median response of -1 is found from one of the categories of participants; organised for non-experts, and familiar for experts.

Looking at the responses in more detail, the PATHS prototype is judged to be fast (81% positive rating +1 to +3), and rather encouragingly is rated positive overall for being Inventive (80%), Creative (81%), Interesting (76%) and Useful (70%). The novelty of PATHS therefore appears to be high at the present time, suggesting that it may have potential to fill a gap in the provision of CH information. Given this degree of novelty, it is perhaps also to be expected that the rating for familiarity is much lower (30% positive), and that there is room for improvement (or possibly familiarisation) in terms of being understandable (40%) and easy (40%). Other areas requiring attention appear to be the presentation in terms of being organised (30%), and operation in terms of efficiency (43%). These last two areas need to be interpreted in the light of more detailed qualitative feedback from comments later in this questionnaire and the interviews.

4.2 Additional laboratory-based evaluation activities

4.2.1 Cognitive Style Analysis test

The Ridings Cognitive Style Analysis, CSA, test was undertaken as an addition the user profile questionnaire as a means of analysing potential cognitive behavioural and preferential differences between users in their interactions with the PATHS software. This test was only administered to the participants of the testing undertaken at the University of Sheffield. The findings are outlined below, with further discussion and cross-tabulation with key data from the task activities presented in Section 4.2.2.

¹ Expert participants are those with domain and/or subject knowledge, who use CH materials for work (including curatorial, teaching and research), and might use PATHS as expert path creators, and/or path facilitators.

² Non-expert participants are those without domain and/or subject knowledge, who use CH materials for leisure and study, and might use PATHS as non-expert path creators, and/or path consumers.

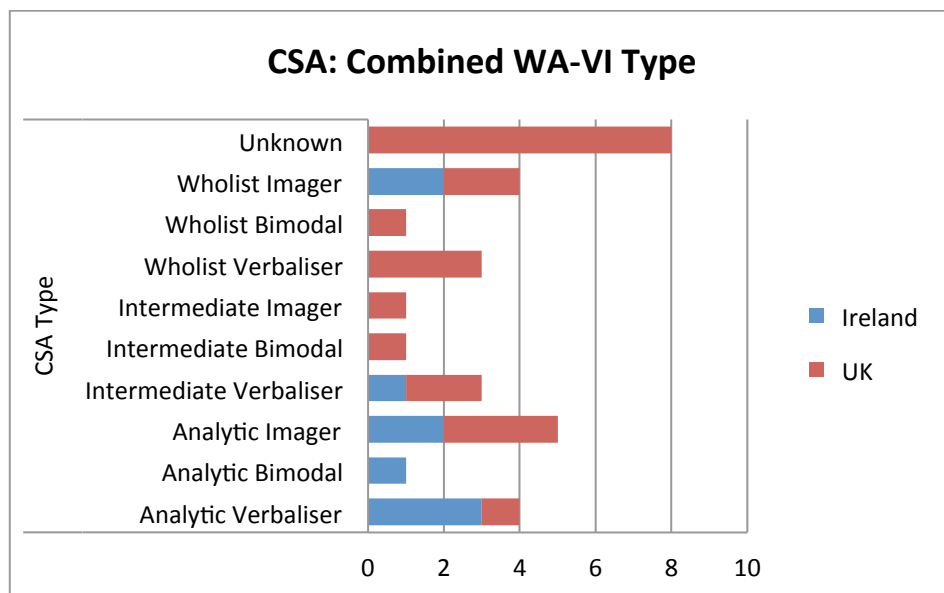


Figure 85 Cognitive Style Analysis scores

All nine of the Ridings CSA categories are represented across the two samples, with all but Analytic Bimodal represented within the UK sample. The largest category of participants is Analytic Imagers, followed closely by Wholist Imagers and Analytic Verbalisers. Overall, the categories incorporating Bimodal or Intermediate tendencies are less well-represented, with the exception of Intermediate Verbalisers. It is perhaps interesting to note that the Irish sample (academic faculty from the arts and humanities disciplines) comprises a high proportion of Analytic types, although Verbalisers and Imagers are evenly matched. In contrast the UK sample is evenly matched between Wholist and Analytic types, and also has a good proportion of Intermediate types. In addition, the UK is also evenly matched between Imager and Verbaliser types.

Note: There were 8 participants for whom the CSA test was not undertaken due to lack of availability of the software at the time of their user sessions.

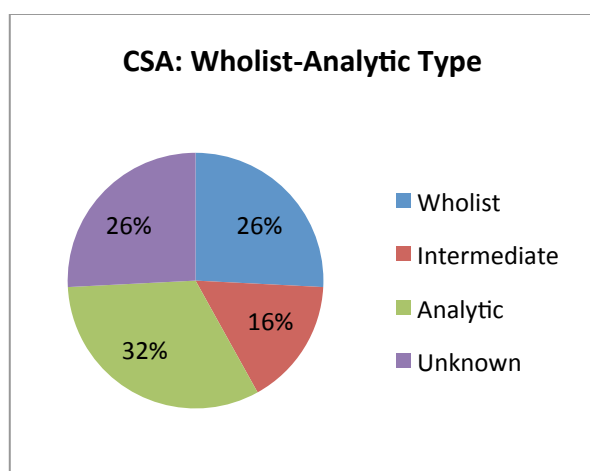


Figure 86 CSA scores: WA type

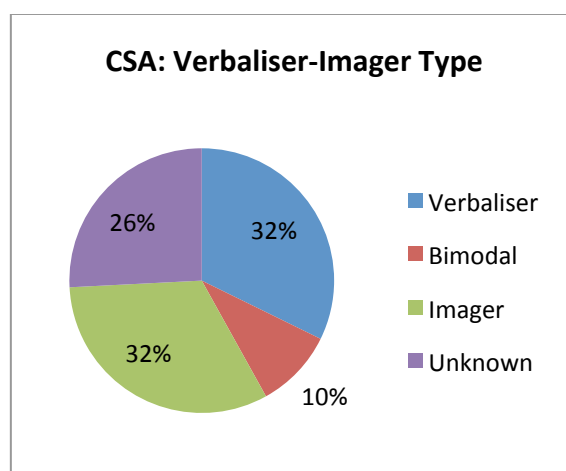


Figure 87 CSA scores: VI type

When splitting the two CSA scales into their constituent parts, it is clear that the polar opposites of Wholist-Analytic and Verbaliser-Imager categories are fairly evenly distributed,

and that the middle ground of Intermediates and Bimodals is less well-represented. As Ridings notes, however, the scales are not fixed, and it is therefore possible to re-distribute a sample evenly across the three categories in each scale, if desired for a specific study.

In addition to the categories shown here, the CSA test also provides numeric scores for each scale. From these, it is possible to calculate a mean average score, giving a mean of 1.27 for the Wholist-Analytic scale, and 1.03 for the Verbaliser-Imager scale. These sample means are both relatively close to Ridings' results (1.25 WA and 1.06 VI) for the standardisation sample.

4.2.2 Tasks

As described in the methodology section of this report, participants in the laboratory evaluations were required to undertake four short structured tasks and one longer more open-ended path creation task. In this section we first report on the findings of the task feedback questionnaire, and then look in more depth at the users' actual performance and information behaviour traits as evidenced from the observations data. It should be noted that this part of the analysis presents findings from the USFD sample only, comprising 22 participants.

4.2.2.1 Structured tasks

Four structured tasks were provided comprising a simple fact-find, extended fact-find, open-ended browsing and exploration. These were rotated between users using a Latin square design, and Figure 88 below indicates the number of users undertaking each of the task types in positions A-D in the task schedule. In order to compare the tasks by type, data collected as tasks A-D has been resolved to the task type.

		Sequence in which tasks completed: USFD				N
		A	B	C	D	
Task type	Simple fact-find	7	6	5	4	22
	Extended fact-find	5	4	7	6	22
	Open-ended browsing	4	7	6	5	22
	Exploration	6	5	4	7	22
Total		22	22	22	22	88

Figure 88 Structured task rotation

Following each task A-D, participants were required to complete a brief form comprising three 7-point semantic differential scales and an answer box. The three scales allow the user to rate the task according to their familiarity with the subject matter (Familiar---Unfamiliar), ease of completing the task (Easy---Complicated), and how enjoyable it was to engage with the task (Enjoyable---Annoying).

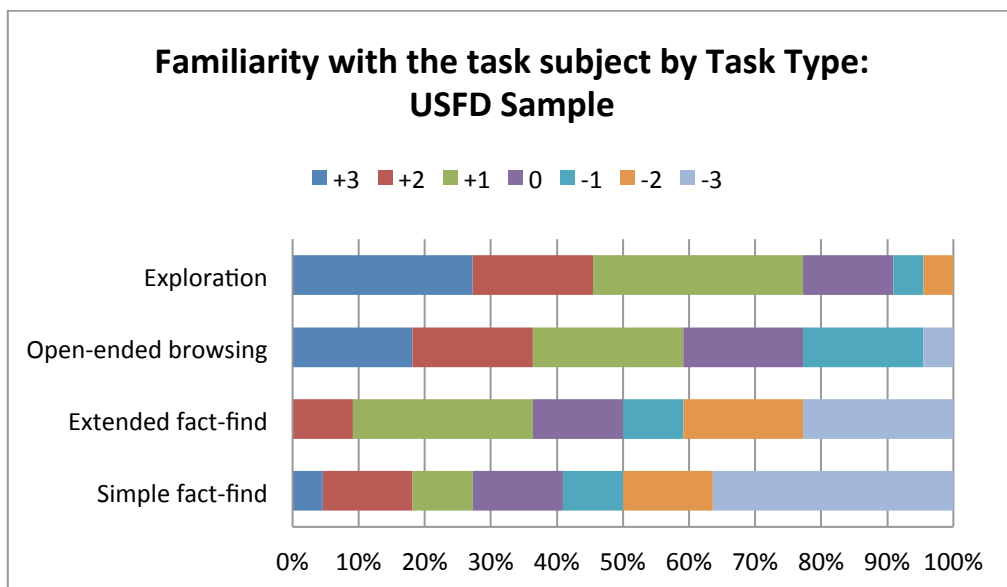


Figure 89 Familiarity with task subject

It is clear that users had the highest level of subject familiarity with the open-ended browsing task and the exploration task. These tasks allowed for some degree of user interpretation and flexibility on subject matter, whilst the two fact-finding tasks were much more prescriptive in their requirements. It is no surprise therefore, that the subject matter of the fact-finding tasks had a high degree of unfamiliarity amongst participants.

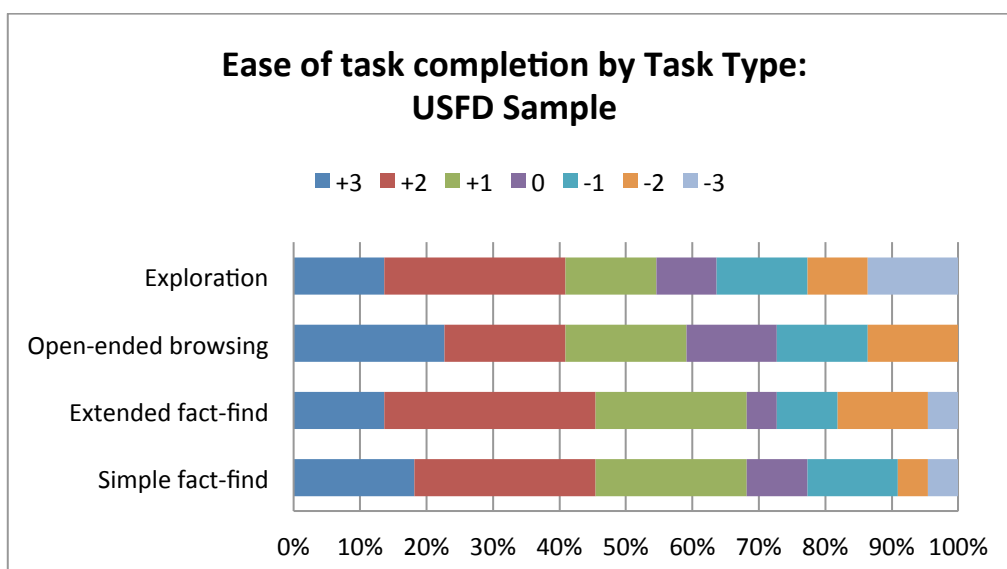


Figure 90 Ease of task completion by task type

The ratings for ease of completion are relatively similar across all four task types, with an overall positive response of (+1 to +3) from a majority of participants (ranging from 55% for exploration to 68% for simple fact-find). Looking at the positive responses in isolation, the fact-finding tasks are seen as easy to complete by slightly more participants than the browsing and exploration tasks, but only by a relatively small margin. In contrast, the tasks with the highest level of negative responses are exploration (36%) and browsing (browsing), with the fact-finding tasks again only marginally less negative. These ratings are somewhat

at odds with those given in the session feedback questionnaire for task support, which emphatically suggest that fact-finding is not well-supported in PATHS at the present time.

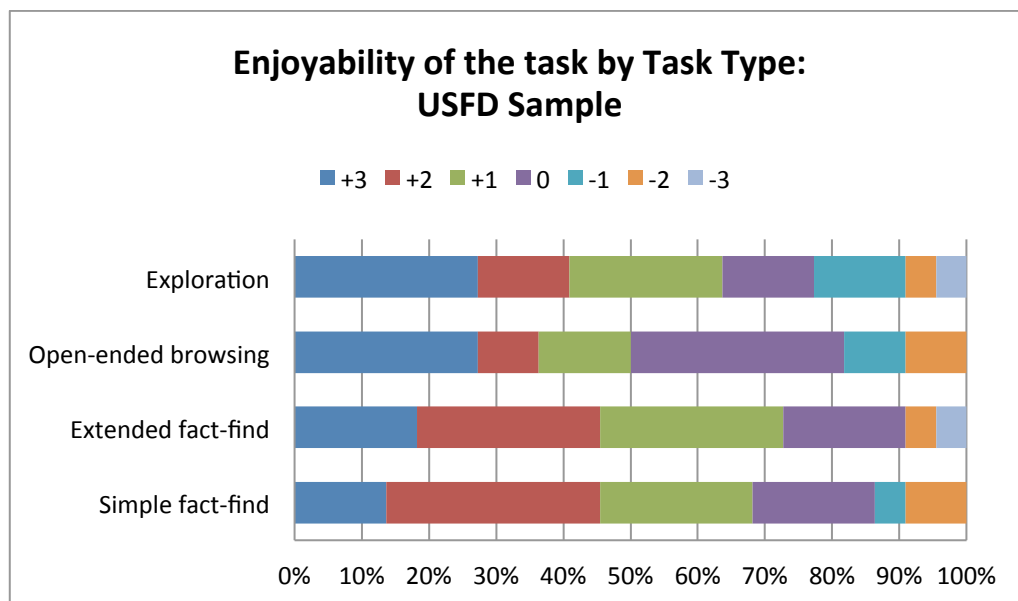


Figure 91 Enjoyability of the task by task type

There is greater variation in the ratings for enjoyability. The highest (+3) rating is awarded most often to the browsing and exploration tasks, although for overall positive responses (+1 to +3) the most popular task is the extended fact-find (73%), whilst the least popular is open-ended browsing (50%), with a much higher level of neutral responses for this task than any of the others. Negative responses are relatively low for the this scale, with the largest number being given for the exploration task (23%), and smallest being for the extended fact-finding task (9%).

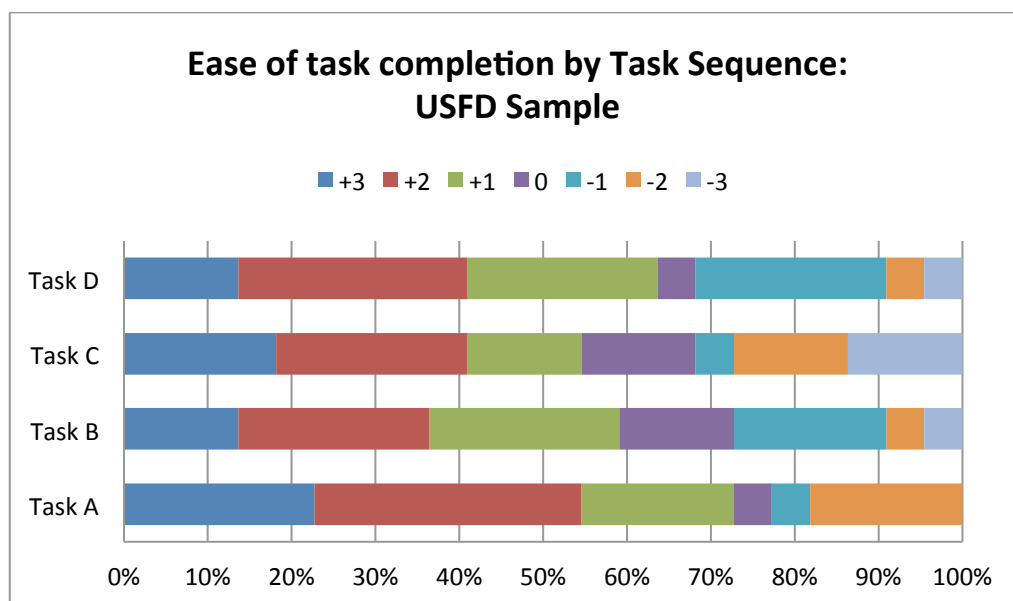


Figure 92 Ease of task completion by task sequence

If we consider tasks by sequence of completion rather than by type, it seems that the first and last tasks (A, D) have the highest positive ratings for ease of completion, and negative responses increase a little over the four tasks. This may indicate a greater level of awareness and frustration of regular issues arising in using the system, or perhaps a little task fatigue. Overall though, positive responses are shown for more than 50% of participants for all tasks.

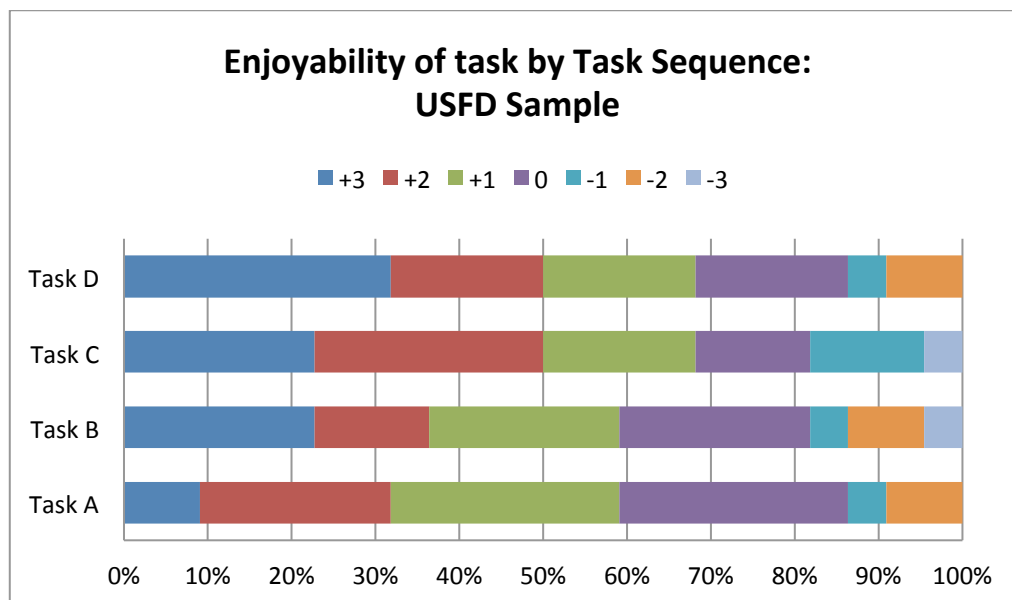


Figure 93 Enjoyability of the task by task sequence

Conversely, whilst positive ratings for ease of completion broadly decline over the course of the four tasks, positive ratings for enjoyability rise over the course of the four tasks and markedly so for the highest +3 rating. This trend may indicate that users need time to settle into using PATHS to grow in confidence and ability, but could be an indication that enjoyment rises as the end of the task session comes closer.

On analysing these data from the semantic differential scales in further detail, it is found that there is a statistically significant positive correlation (Spearman's Rank) of 0.417 at the 0.01 level between ease of task completion and enjoyability. This results seems relatively intuitive in that it would be reasonable to expect that easier tasks are more enjoyable, especially given that the opposite semantic for enjoyable was 'annoying'.

4.2.2.2 Path creation tasks

The longer more involved and interpretive path creation task was also followed by a brief feedback form, using the same three semantic differentials as for the earlier tasks, plus a rating of the user's own path and a comment box for feedback.

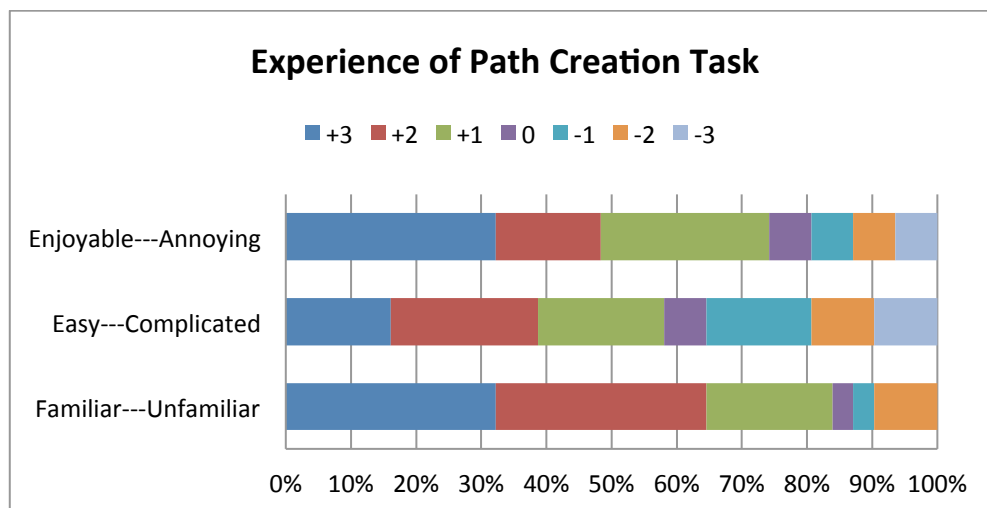


Figure 94 Experience of path creation task

A high proportion of users were able to create a path of a subject with which they some degree of familiarity, whilst the 13% giving a negative rating presumably had to select a topic based upon what they could find in the collection rather than what they knew most about. A large majority (74%) gave a positive rating for enjoyability of the path creation task, although somewhat fewer gave a positive rating for ease of completion (58%). It is also encouraging to see that there is little neutrality in the ratings for the path creation task, suggesting that participants have actively engaged with the system in this part of the evaluation, and formed an opinion one way or the other.

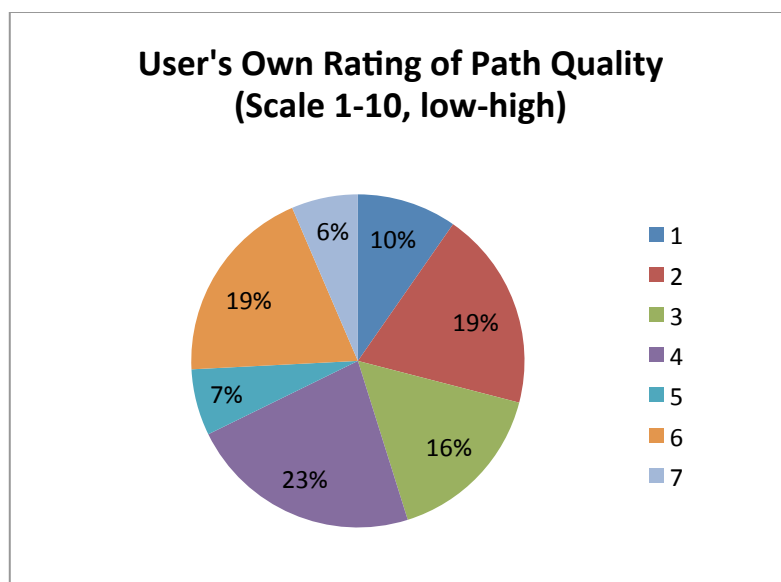


Figure 95 User's own rating of path quality

Participants were asked to rate the path that they had created on a scale of 1-10 (low-high). It is interesting to note that no-one gave a rating above 7/10, although this is perhaps to be expected given that this was the first time they had used the system and created a path, and that they were working within time constraints. A large minority (45%) gave a rating of 1-3 for their efforts, whilst 30% gave a rating of 4-5 and 25% gave a rating of 6-7 out of 10.

4.2.2.3 Task observation data

In this section we consider additional findings about the users' tasks, from actual observed data, including quantitative elements of time and activity levels, behavioural indicators and features of the paths created by users in the open-ended path creation task.

<i>Time taken</i>	Mean	Maximum	Minimum
Simple fact-find	4.53	5.00	2.83
Extended fact-find	4.07	5.00	1.83
Open-ended browsing	4.78	5.00	2.28
Exploration	4.36	5.00	2.34
Tasks A-D	4.44	5.00	1.83

Figure 97 Time taken for tasks

First we consider the amount of time taken to complete each task. For the short structured tasks, a time limit of 5 minutes was set, and from the data in Figure 97 above, it can be seen that the mean average for all task types was over 4 minutes. The maximum time taken for all four of these tasks, a maximum time of 5 minutes was recorded, and in fact, for 53 out of a total of 88 tasks undertaken (4 each by 22 users), a prompt was given to the user after 5 minutes had elapsed. For all tasks, however, there were a proportion of users who used much less than the 5 minutes allocated, with a minimum time of 1.83 minutes for the extended fact-find task, to 2.83 minutes for the simple fact-find task.

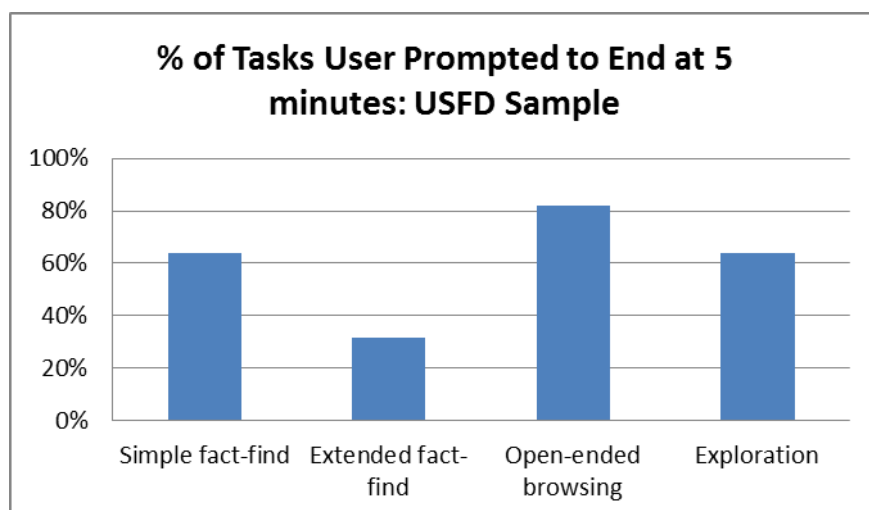


Figure 98 Percentage of participants prompted to end at 5 minutes

Participants were prompted least about ending the extended fact-find task, and most about the open-ended browsing task. Prompts for the simple fact-find and exploration tasks were even. A high proportion of participants needing prompting could mean one of two things, either they were finding the task difficult, or they were engrossed and engaged in it, and in both cases were possibly not sure when they had finished it satisfactorily. Spending longer time on a task can therefore be a positive or negative outcome.

<i>Mouse clicks</i>	Mean	Maximum	Minimum
---------------------	-------------	----------------	----------------

Simple fact-find	40.41	47	11
Extended fact-find	34.76	64	10
Open-ended browsing	55.32	95	26
Exploration	42.77	86	10
Tasks A-D	43.41	95	10

Figure 99 Number of mouse clicks per task

Observation data for the number of mouse clicks per task follows a similar pattern to time taken. What is interesting to note here are the differences in the minimum time taken in Table X above, and the minimum number of mouse clicks used shown in Figure 99. The lowest value for both measures is for the extended fact-find task, suggesting this is the task in which the users were most efficient, and was perhaps the easiest to complete. In contrast, the open-ended browsing task had the second lowest minimum time taken, but by far the highest for the minimum number of mouse clicks taken, suggesting a more active, faster paced style of information seeking behaviour. The highest maximum number of mouse clicks is also for open-ended browsing, and is lowest for the simple fact-find. In terms of mean average, the exploration task has an average number of mouse clicks similar to that for the average of all tasks, whilst extended fact-find is considerably lower and open-ended browsing is considerably higher.

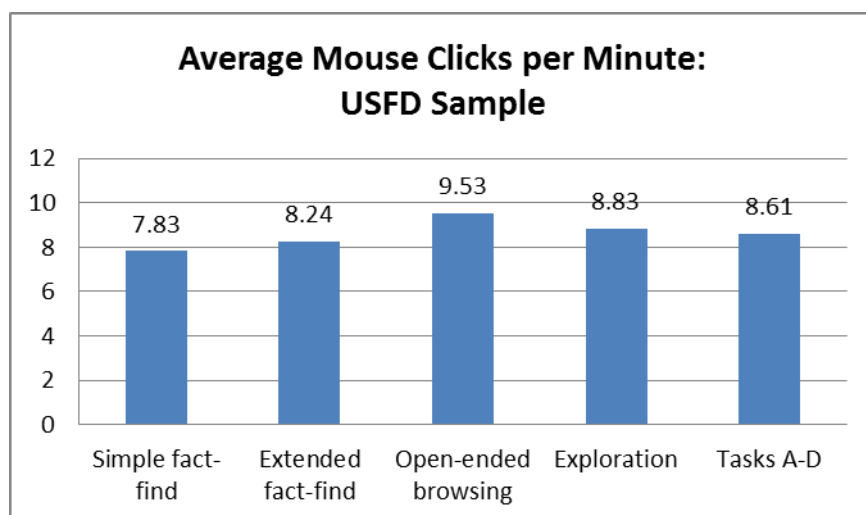


Figure 100 Average mouse clicks per minute

A comparison for the number of mouse clicks per minute on average for each task type, also follows the overall trends for mouse clicks and time taken, but actually reveals much closer results than for the individual measures, indicating that there are a few outliers at the extremes of activity levels.

<i>Path creation task</i>	Mean	Maximum	Minimum
Time taken	25.33	33.6	11.73
Mouse clicks	200.68	380	53
Mouse clicks per minute	7.91	14.94	4.52

Figure 101 Path creation task: time taken, mouse clicks, mouse clicks per minute

Similar data was also collected for the 30-minute path creation task. A minimum time taken of 11.73 minutes was recorded, compared to a maximum of 33.60 minutes, a difference of some 22 minutes. The mean average for time taken is however towards the higher end of the range at 25.33 minutes, and overall, very few participants required a prompt to finish the task in the time allocated. The range of activity for mouse clicks is even wider, with a minimum recorded of just 53 clicks, and a maximum of 380 clicks, with a mean average closer to the centre of the spread, indicating a wider range of activity levels for mouse clicks. From the physical observations, it was noted that some participants spent quite a lot of time thinking about the task and pondering their next move, whilst others engaged in more rapid fire activity in the face of uncertainty, seeming to use pro-active search and browsing behaviour as a means of sense-making and finding a resolution.

Compared with the shorter tasks, it is interesting to note that the average number of mouse clicks per minute for the path creation task is fairly low, and quite similar to that for the simple fact-find task, however the range is much wider than for all of the shorter tasks, with a minimum of only 4.52 (one every 12 seconds) clicks per minute and a maximum of 14.94 clicks per minute (one every 4 seconds).

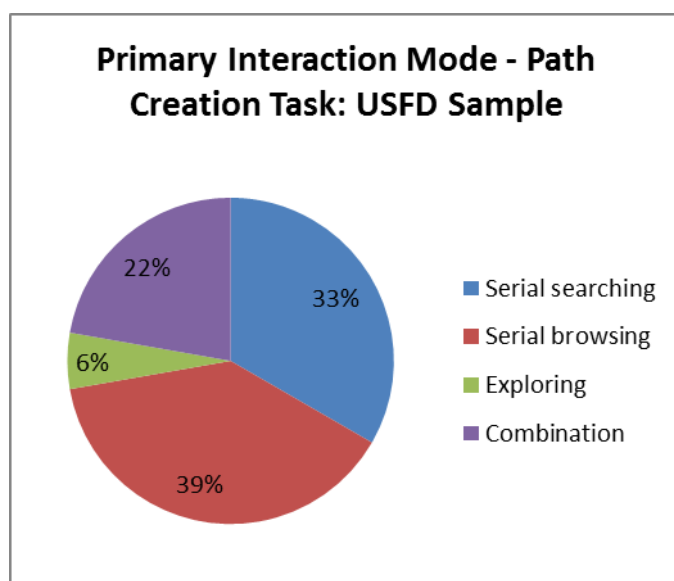


Figure 102 Primary interaction mode: path creation

The Morae software was used to view all of the tasks being undertaken on a remote computer in real-time, and the observation tools allowed for notes to be taken on the type of activity and interaction in fine detail. An analysis of this data for the path-creation task reveals a variety of primary interaction styles for this task, with a fairly even split between serial searching (33%) and serial browsing (39%), as the two most popular strategies. Serial searching involves repetitive search and reformulation, with only a page or two of search results viewed before searching again, and serial browsing involves very few searches, with large numbers of search results pages viewed (over 50 pages in some cases). These are then in effect, polar opposites of interaction. Only 6% engaged primarily in exploring behaviour (using the explore and similar items content), and 22% of participants occupied the middle ground, utilising a mix of search, browse and explore, with no strong preference for any one style. Further analysis of interaction mode by cognitive style reveals that none of the Wholist types engaged in serial searching, almost all preferring serial browsing, and one

preferring exploring. Analytic types were much more evenly spread in their interaction style between serial searching and browsing, and Intermediates were split between serial searching and combination strategies. On the Verbaliser-Imager scale, Imager types were split with between serial searching and serial browsing, whilst Verbalisers showed some preference for serial browsing.

4.2.2.4 Path data

Using a combination of the task observation data and the paths actually created by the participants in the evaluation study, we have also analysed the key properties of paths, and looked at the extent to which certain tools in the path creation workspace have been utilised in formatting and enhancing the path.

	# Items in Path	# Items with images
Mean	10.73	9.73
Median	9.00	8.50
Mode	5 ^a	6
Std. Deviation	6.692	6.741
Minimum	5	0
Maximum	29	29

Figure 103 Path data

First we considered the size of the path, looking at both the overall number of items included, and the number of items selected that had an image available. The number of items in a path ranged from a minimum of 5 to a maximum of 29, and for images the range is 0 (zero) images to 29 images.

However, looking at the mean averages and the medians we can see that the majority of users included a number of items towards the lower end of the range.

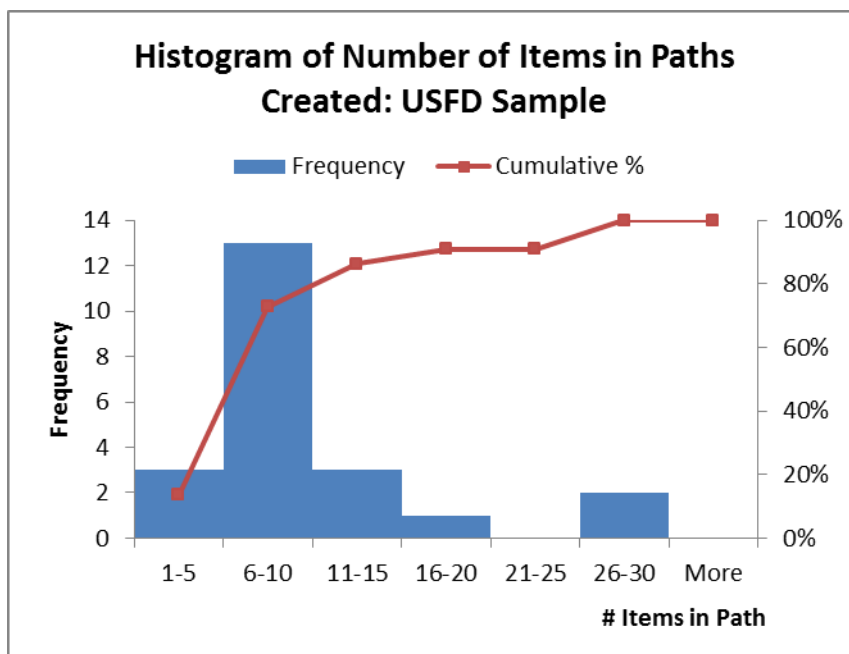


Figure 104 Number of items in paths created

The histogram in Figure 104 clearly illustrates this finding, showing that by far the most popular range is for 6-10 items in a path, with a low deviation around this core, and a few outliers at the higher end of the scale. This data should however be interpreted within the context of the time constraints and simulated nature of the path creation task at this stage, and it will be interesting to compare these results with those for field-based results, where users have unlimited time and are working on a real-life task that is more directly meaningful to them.

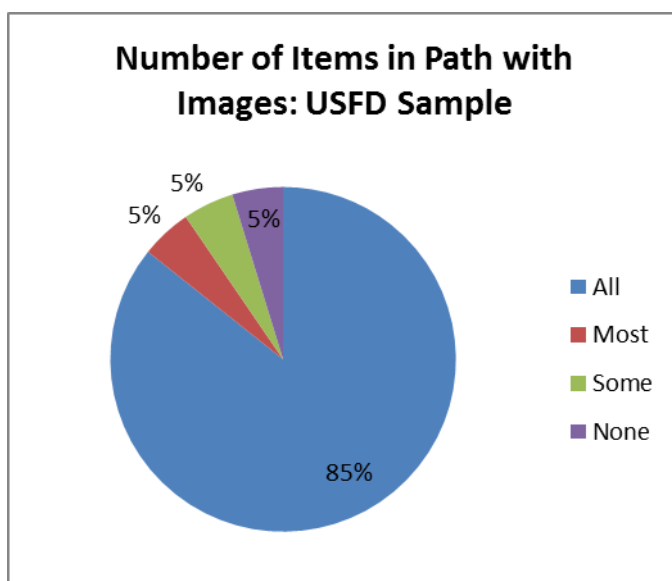


Figure 105 Number of items in paths with images

Looking in more detail at the data for the number of items included in paths that have an image available, it is clear that our sample supports the general understanding that cultural heritage collections have a strong image bias, as 85% of paths had an image available for all items selected. Only one participant selected solely items without images, and on further

discussion it was found that this was more from necessity than design, in that there simply were no items with images within the user's chosen subject area, and that images would have been included if they were available. Fortunately, due to an advanced level of subject knowledge, the user was able to select items with no images and relatively sparse data, and then add their own context to compensate for this. Referring to this user's experience and to the widespread comments revealed in other parts of the data it is clear that the overwhelming need is for collections to offer images where possible, and for these to be larger than thumbnail size to make them usable and interesting.

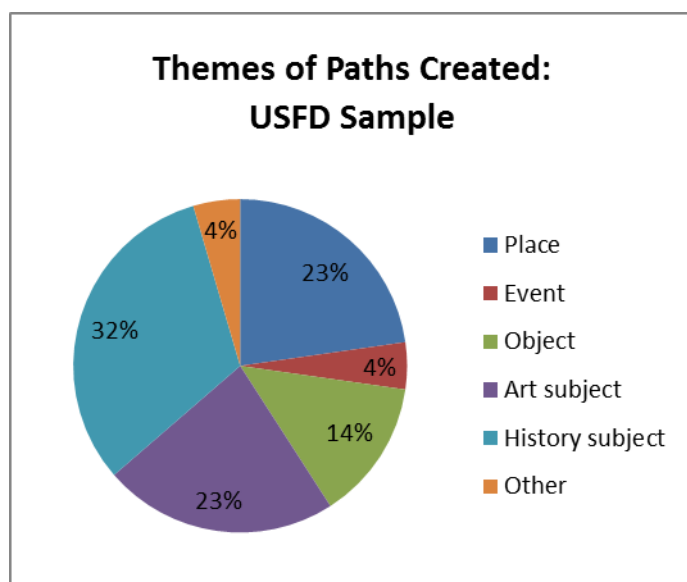


Figure 106 Themes of paths created

The paths created were manually categorised by theme to ascertain whether there are any distinct preferences for the subject matter of content included. The most popular categories were paths about places (23%), art subjects (23%) and history subjects (32%). These themes are likely to have been influenced at least partly by what content is currently available in PATHS, although the amount of art-related content is much less than for history, and also appear to have been influenced by the topics covered in existing paths in the system (e.g. places, topics related to the world wars). There were, however a significant number of expert users who attempted to build paths related to their own research interests, with varying degrees of success.

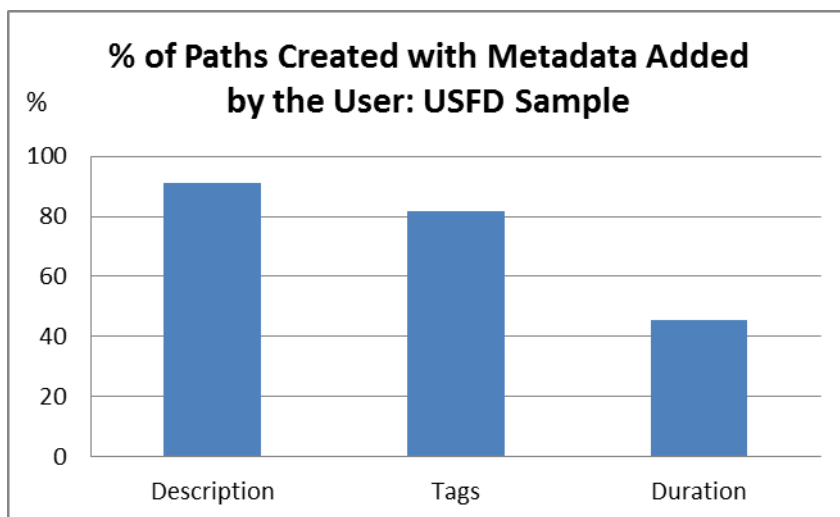


Figure 107 Percentage of paths created with metadata added by participants

Once items have been selected and they have been transferred in the path creation workspace, users have the opportunity to modify and enhance their path with a number of tools for adding content and metadata, and for re-ordering the content. On creating the path, most users immediately went to the metadata fields and added information for the path description and duration fields, as well as a number of tags (or keywords). A short 1-2 line description of the path appears to be the norm and was added in 91% of cases. Tags were added by 82% of users and a duration by only 46% of users. It is clear from further investigation that the tags were added incorrectly (without commas between them) by a significant number of users and a tip for successful use is required. Additionally, it appears that some users were not sure what to include in the duration field. General and student users were the most likely to add tags, with experts lagging some way behind, but general users were by far the least likely to add a duration for their path.

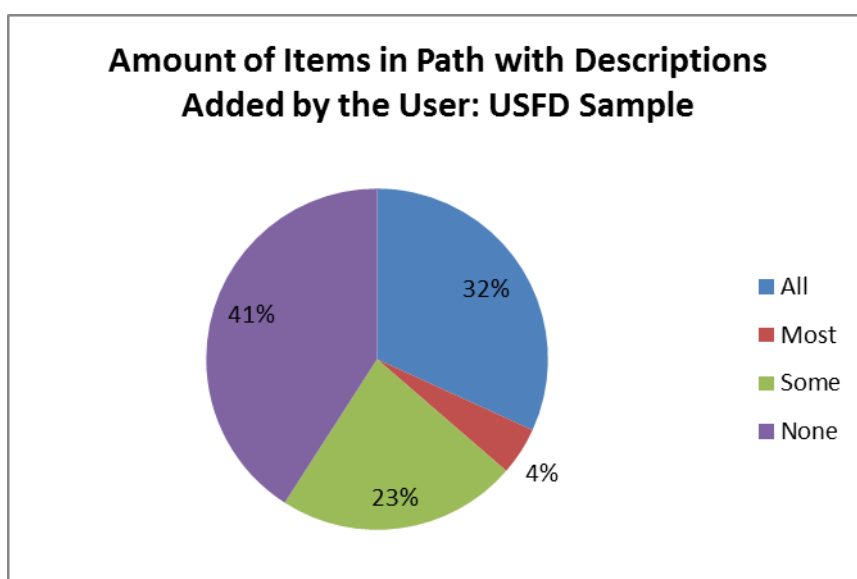


Figure 108 Amount of items with added descriptions

The items within a path can be annotated with the user’s own contextual information, and can be re-ordered into a more meaningful sequence, such as a chronological or narrative

sequence. These more advanced features were used by significantly fewer users, which could indicate a learning issue, a lack of need, or a time constraint. On reviewing the paths created by our evaluation participants it is found that in 41% of cases, contextual information was not added to any items in the path. There are however 32% in which annotations were added to all items (generally these were shorter paths with fewer items), and a further 27% where annotations were added to some or most of the items. Most of the annotations were very brief, and a review of the post-task comments reveal that this is one important area that participants would want to improve given more time and information available to them.

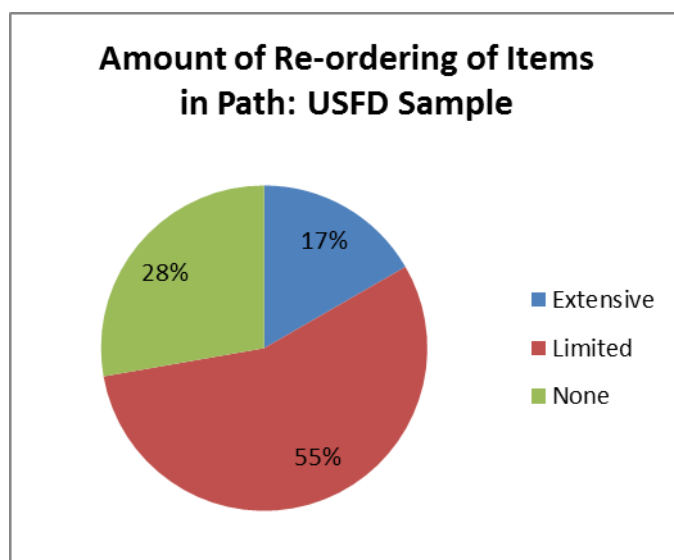


Figure 109 Re-ordering of items in path

In 72% of cases the items in the paths created were re-ordered to some degree, with 17% spending a considerable amount of time on this activity. This finding is encouraging, as the default is for items to be included in the path in the order they were saved to the workspace, and re-ordering indicates that users are thinking about their path as a whole and trying to make sense of the information it is intended to convey. Typical types of ordering included chronology, narrative, geography (for example, a walking tour), and interestingness.

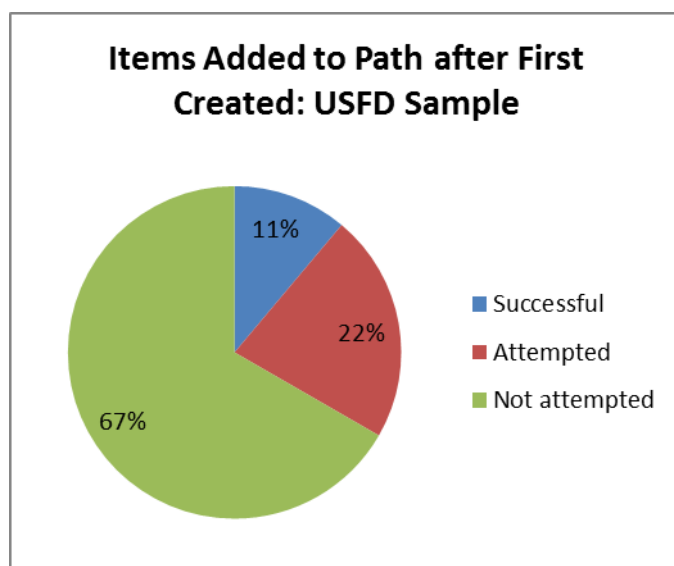


Figure 110 Items added to path after first created

Lastly, one of the most advanced activities related to path creation is to add additional items to the path after it has first been created. This was not attempted by the majority of users, whether because they did not want to, or because they either did not have the time or did not know how. Of those who did attempt to add more items to their path, only one third were successful, and in all cases there was evidence of considerable effort in trying to work out how to do this. This was in fact the main area for user error and for help required with regard to the paths creation task, and whilst it is clearly an important function, there needs to be consideration about how it can be made easier and/or clearer to achieve.

4.2.2.5 Interview data

After completing the tasks and the session feedback questionnaire, participants were played back the path creation task as captured in the Morae software and interviewed using a 'think-after' approach to gain further insight into this activity, along with more general feedback about the positive and negative aspects of using PATHS. Findings and recurring themes from these interviews are summarised in Figure 111:

Questions	Feedback
Deciding on a topic	<ul style="list-style-type: none"> Working within available content Research and personal interests, prior knowledge Topics explored earlier in the evaluation session
Information seeking strategies and tactics	<ul style="list-style-type: none"> Searching – exhausting the different variations of a term/phrase Searching – broad and then systematically working through related terms Searching – trying lots of varied terms to gauge what is in the collection, before narrowing down to something more specific Browsing search results – seeing what is

Questions	Feedback
	<p>available on a topic, especially when there is less content available</p> <ul style="list-style-type: none"> • Browsing similar items – for visually appealing items (serendipity), and to find items when there is little available from search results • Explore – less often, but useful when topics are well-covered to get an initial overview • Using the item record to pick up possible search terms • Using the tags and keywords for information when there is little textual content and/or lack of images • Using the facets – to filter e.g. for ‘images’ • Using the facets – to identify search terms
<p>Criteria for selecting items for the path</p>	<ul style="list-style-type: none"> • Images are available and interesting and/or attractive • Good level of descriptive content available • Content is interesting and/or relevant to the topic • Item is different to other items in the path • Anything available on the topic (when there is limited coverage) • Select everything (when there is greater coverage), then organise and decide what to keep later
<p>Criteria for ordering items in the path</p>	<ul style="list-style-type: none"> • Chronological, by date, era or time period • By object type and properties • By theme • By geography – following a tour • Developing a narrative • Most interesting items first
<p>How could the path have been improved?</p>	<ul style="list-style-type: none"> • Better quality, larger images • Images for all content • More detailed item descriptions • Better planning, thinking about what to include • More annotations to say why content is included and how it is connected • Inclusion of own user-generated and external web content
<p>What was the simplest aspect of the task?</p>	<ul style="list-style-type: none"> • Creating the path, using the path workspace • Search was familiar, but results could have been better on many occasions

Questions	Feedback
	<ul style="list-style-type: none"> • Adding to the workspace
What was the most difficult aspect of the task?	<ul style="list-style-type: none"> • Size of images made it difficult to know exactly what you were selecting • Lack of images and descriptions (in general) made it difficult to find and assess suitable content • Working with items that had similar titles (and often no images), and no supporting text made it difficult to add contextual information in the path workspace. Some users reported workarounds, opening the path items in tabs for reference purposes. • Adding additional items to the path at a later stage
What was most enjoyable about the task?	<ul style="list-style-type: none"> • Exploring content (but not using the Explore functionality) • Finding and choosing items to include in the path • Serendipity – finding unexpected content, new things • Creating the path
What was least enjoyable about the task?	<ul style="list-style-type: none"> • Frustrations arising from lack of content • Frustrations arising from size and lack of images • Nothing, it was all enjoyable
Overall impressions of PATHS	<ul style="list-style-type: none"> • Very good, generally easy to use • Could be really useful with the right collections • Great potential for sharing information and ideas with others • Easier to use than initially expected • A steep learning curve initially, could be aided with more help and tips available • Let down by the content and poor quality images • Restricted by content coverage in many subject areas • Too much text – needs to be much more visual
Who would use PATHS and for what purpose?	<ul style="list-style-type: none"> • Teachers/lecturers – for presentations and classroom activities (secondary and undergraduate) • Museum personnel - curating collections, giving

Questions	Feedback
	<p>an overview, or covering a topic in depth</p> <ul style="list-style-type: none"> • Leisure users – browsing, collecting interesting and/or visually appealing stuff • Researchers - to aid image-based research, to share and discuss content with fellow researchers and supervisors • Non-academic specialists (e.g. local historians) – collecting and sharing items of interest with other enthusiasts
Additional feedback	<ul style="list-style-type: none"> • Explore is not easy to use or understand • Layout o search results could be more flexible and easier to browse/scan and navigate • Similar items are useful, but the scrolling is annoying • Not enough coverage in many subject areas, not enough information in many records • There is a lot of repetition of content – very similar items, lacking enough supporting information and/or images to be able to differentiate them • Needs to link to the original collections and other relevant high quality content • Problems using the facets in the search results – they do not clear when starting a new search. Also some of the categories are unclear, and/or return unexpected content • Would like options to add private research notes • Would like options to share and discuss with specific individuals rather than publicly • Would like to use this for group work with students – i.e. collaborative path creation • Would like an introduction/tutorial, and help in context

Figure 111 Summary responses of Laboratory interview data

4.2.2.6 Observations – difficulties and errors

In addition to user-reported difficulties, it is perhaps useful to note those elements of the PATHS software that caused the greatest amount of difficulty, often requiring help to be requested, as well as observed user errors, including incorrect usage and misunderstanding of on-screen information.

One of the most frequent errors was incorrect use of the PATHS search box in an attempt to search the entire collection. The result of this action is that the user finds no or very few results, and it was seen that some users became stuck in a cycle of trying different search terms many times, and returning the same single result. It appears then that the two search boxes on the Paths home page are somewhat confusing, and that users are not readily identifying what error they have made, and in general, did not take corrective action, until they were offered help.

Another common error comes from users selecting facets in the search results page, but then neglecting to deselect them when reverting to a wider or new search. Again, the consequence of this error was a severely curtailed set of results, or no results at all, and it was evidenced with both of the search boxes. A few users worked out the solution for themselves after a number of iterations of the error, but several others required intervention. For this error, it seems that there is a need for greater visibility of the icon indicating that facets are selected, or possibly a manual or automatic reset of the search box when a new search is made. Related to this error, was an occasional misunderstanding of the facets, with some users evidently attempting to use them to broaden their search results, even when a count of a single item was listed against the facet. This activity resulted in further iterative behaviour, with apparently little comprehension of why no further results were delivered.

Finally, as noted in the path creation task observation data above, several users required assistance with some of the more advanced editing features, in particular with adding additional items to a path once it had initially been created, and less frequently, with reordering items. These elements of the task were not attempted by all users, perhaps further indicating that they were not immediately obvious, and required some degree of on-screen signposting at the very least. The issue of adding more items to a path is perhaps the area which needs the most attention, since the sequence of actions to achieve this are quite different to those when first creating a path from the items in the workspace, using a drag and drop method rather than using a button.

All of these issues observed in the laboratory evaluations are primarily related to usability of the interface, and should be considered as part of the redesign and development for Prototype 2.

4.2.3 PATHS support and use for tasks

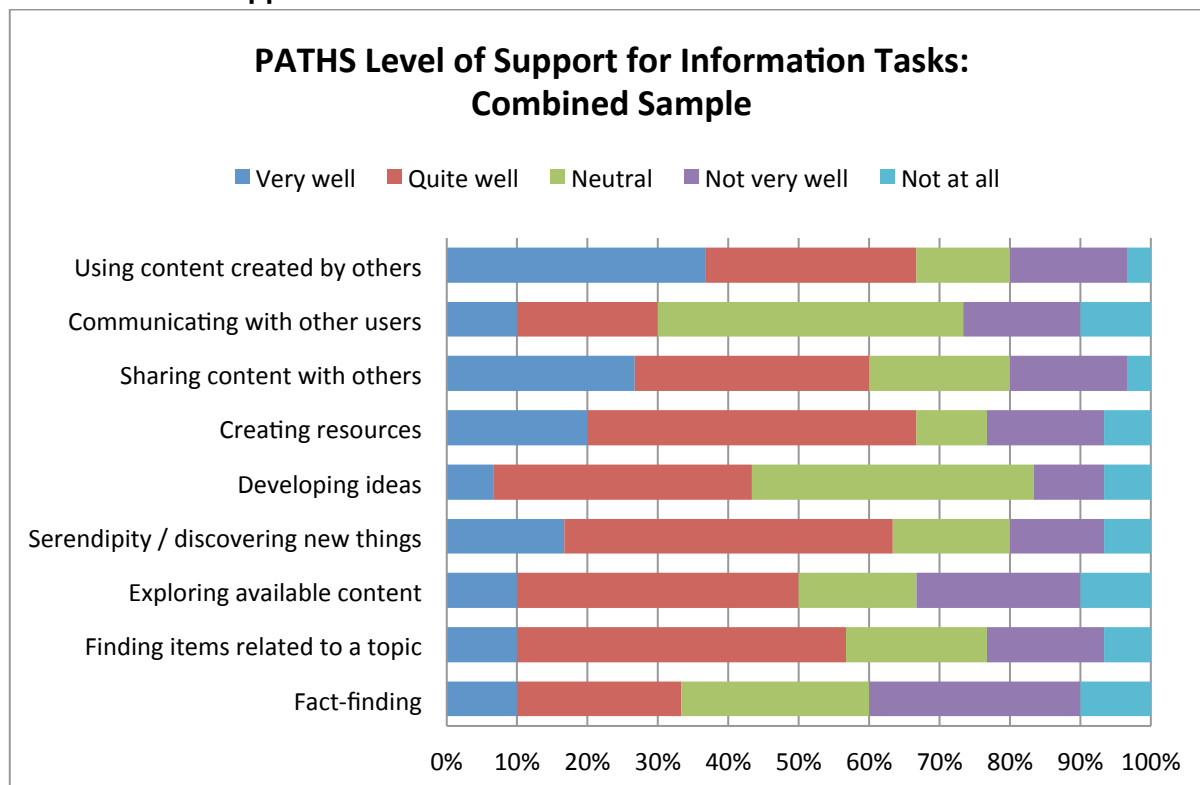


Figure 112 PATHS support and use for tasks

Asked to consider how well PATHS supports different types of information tasks, participants responded 'very well' or 'quite well' to most task types, the exceptions being communicating with others (30%), fact-finding (33%) and developing ideas (43%). The highest negative response was also for fact-finding (40%), with exploring available content also attracting a relatively high negative response from 33% of participants. Fact-finding is not a primary task associated with PATHS and there are inherent issues with the current content with regard to fact-finding. However, exploration is intended to be a core element of the system and it seems that further investigation of the issues in this area is needed. On a more positive note, there are high positive ratings for other key tasks that PATHS is designed to support, including; using content created by others (67% very well or quite well), creating resources (67%), serendipity and discovery (63%), finding items related to a topic (57%) and sharing content with others (60%).

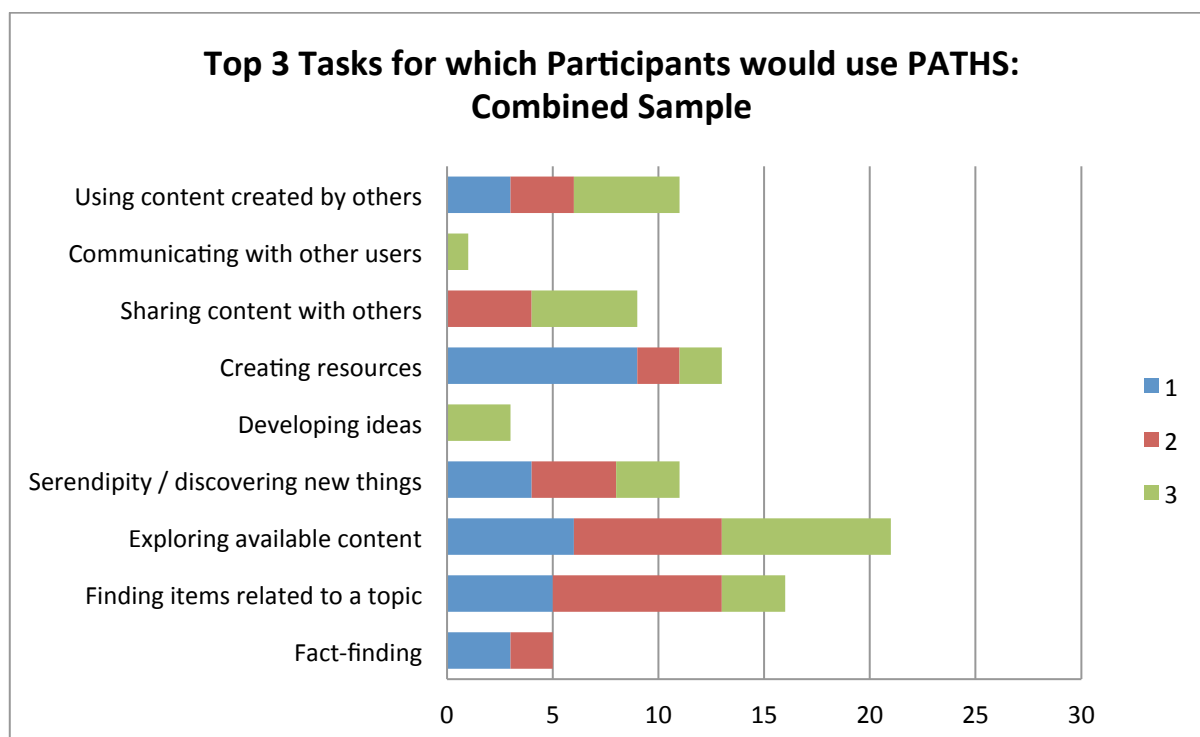


Figure 113 Top tasks for which participants would use PATHS

In accordance with the previous findings, participants were also asked to select the three tasks that they would be most likely to use PATHS for and surprisingly, given the somewhat negative reaction, the most frequently selected task is Exploring available content, placed 1st, 2nd or 3rd by 70% of participants. The highest 1st place selection is for creating resources, and if 1st and 2nd place are taken into account then finding items related to a topic is on equal footing with exploring available content. The least popular tasks for which PATHS might be used are developing ideas and communicating with others, each attracting only a handful or 3rd place responses. Fact-finding is also relatively unpopular although a small number of participants did place this task in 1st and second place. It is also somewhat surprising given the strong support for creating resources, that sharing content with others receives no 1st place selections and lags behind in 6th place in terms of popularity.

4.3 Results of the project-wide activities

Project wide activities have been undertaken by technical partners to evaluate accuracy, reliability and scalability using objective measures identified within the project evaluation methodology. These inform, complement and extend the overall user-centred evaluations carried out in the field-based demonstration and laboratory-based evaluations.

4.3.1 Content analysis and enrichment

This section presents a quantitative evaluation of the work undertaken in Work Package 2. The work package is responsible for NLP processing and metadata enrichment of a collection of Cultural Heritage (CH) items. All the details can be found in Deliverable D2.1. Specifically, the following tasks were measured:

- Content analysis (T2.2): NLP processing of the whole collection, including POS tagging, lemmatization and named entity recognition.
- Ontology extension (T2.3): in this task we address the problem of linking CH items to external vocabularies.
- Intra-collection links (T2.4): we create new relations between CH items, so that two CH items are linked if they are semantically similar.
-
- Background links (T2.5): we link CH items to external Knowledge Bases or sources such as Wikipedia.

Each subsection presents a quantitative evaluation of the specific task. Full details can be found in *D2.1 Processing and representation of Content for the first prototype* (2011).

The processing was performed on a subset of the Europeana collection. Specifically, PATHS project focuses on the next four collections in Europeana, the first two are in English, while the last two are in Spanish:

- SCRAN containing over 360,000 items.
- CULTURE GRID containing over one million items.
- CERVANTES containing about 75,000 items.
- HISPANA containing over one million items.

All processing was done on a computer with 16 GB of memory using a single 2.66 Ghz processor.

The ALINARI collection was not included in this analysis. Being a smaller collection the processing is much faster, and the same numbers apply. The quality of the NLP processes are also comparable.

4.3.1.1 Content analysis: evaluation of scalability

In this section the scalability of NLP processing is evaluated. The content of the target collection, both metadata and textual information, was analysed with Natural Language Processing tools to identify relevant pieces of information that can be used for generating links. The information identified includes specific attributes of the items as typically found in the metadata and also additional information that gives context to the item as found in the textual information that accompanies the items (people, organizations, dates and locations).

Scalability

- Items per minute: **7.4 item/min**
- KB of content per minute: **36.26 Kb/min**
- An estimate of the speed and sizes for collections 10 times larger than the one used in this study (approximately 25 million items) would be produced: **50 weeks using 7 CPUs**

4.3.1.2 Ontology extension

This task is a first attempt to extend the information in Europeana collection with ontology information. The analysis has focused in two collection for English and one for Spanish content:

- The Library of Congress Subject Headings (LCSH) and English Heritage-NMR for English
- The Spanish version of the LCSH vocabulary for Spanish

The process was applied to the Europeana subset, both for English and Spanish. The details of the method used for linking CH items to the vocabularies are described in deliverable D2.1.

Vocabulary	Num. of mapped items	Percentage
NMR	360,660	42%
LCSH	391,290	46%
Spanish LCSH	604,702	48%

Figure 114 Amount of matches found with some of the existing vocabularies

Scalability

- Items per minute: **3,500 item/min**
- KB of content per minute: **500 Kb/min**

4.3.1.3 Intracollection links

The aim of this task was to create links between items in the collection. Textual information associated to CH items is analysed and used to compute semantic similarity between them. Computing similarity can help as to relate items and create links between them. Also, these links can be used to create paths of similar items so that a user could easily access relevant items. This is important because improves navigation and leads to better user experience.

Scalability

- items per minute: **840 item/min**
- KB of content per minute: **2.84 Mb/min**

4.3.1.4 Quality, evaluation of how the automatic links compare to manual annotations

We used 5 similarity measures to compare the quality of the intracollection links. The evaluation is performed over a subset of 30 manually related items. We report the Pearson Product-Moment correlation coefficient³ as a measure of how well the automatic method correlates with the manual annotation (the higher the better). Please refer to *D2.1*

³ http://en.wikipedia.org/wiki/Pearson_product-moment_correlation_coefficient

Processing and representation of Content (2011) for the first prototype for the details of the automatic methods.

Method	Pearson Correlation
jc	0.72
tf.idf	0.71
ngram	0.67
lda-vector	0.81
WLVM	0.65

Figure 115 Similarity measures to compare the quality of the intracollection links

4.3.1.5 Background links

This task addresses the problem of automatically enrich CH items with background links into relevant Wikipedia articles, a process referred to here for brevity as 'wikification'. The process was applied to the English Europeana subset, comprising both SCRAN and Culture Grid collections. 98.3% of Europeana items are linked to wikipedia articles:

	wiki links	total	Percentage
Culture Grid	535002	547783	97.67
SCRAN	308883	310803	99.38
Total:	843885	858586	98.29

Figure 116 Amount of links to Wikipedia articles

More than 90% of the items have 3 or fewer links. Over a third have no links at all.

Scalability

- items per minute: **36,000 item / min**

4.3.1.6 Quality, evaluation of a sample of the links between equivalent items and Wikipedia articles

For evaluation purposes, a gold standard set of Europeana items was created. In total 100 items were randomly selected from Europeana. 25 of the items were filtered out since there was insufficient text to be processed, leaving 75 remaining. The text was then manually annotated with a set of links to relevant Wikipedia articles. It was found that 65 of these 75 had one or more relevant Wikipedia links (in the judgement of the annotator). The output of the Wikipedia Miner system was then judged against this gold standard. Using all links gives a high recall value of 87%. Eliminating low probability links results in a large drop in recall

performance, but precision is improved.

4.3.2 System architecture

A number of technical testing activities have been executed as part of the development process of the first prototype.

This testing involved two different levels of technical testing:

- As part of the methodology applied for the implementation of the prototype and infrastructure, module testing was conducted for each completed iteration of the development cycle. This testing involved establishing whether:
 - required functionality was present and working;
 - performance and scalability of the module was sufficient to handle envisaged data volumes and;
 - that the modules robustness permitted both well-known and malformed user input without breaking.
- Upon completion of the prototype and framework, an additional level of integration testing was executed in order to determine that not only the 'atomic' function of each module had been verified but that the platform and infrastructure as a whole performed as expected. This testing was done as a combination of:
 - technical verification of all envisaged functionality by technical developers and;
 - first-level functional testing conducted by a limited control group of individuals familiar with the software architecture and envisaged functionality.

At the completion of these two steps and subsequent adjustment and bug-fixes in the user interface and underlying prototype, the software was deployed to the validation stage involving external users. Additional detail on the testing process is given in *D3.1 System architecture specification* (2011).

i-Sieve identified some potential issues with the test harness, in particular, the fact that the automated test framework needs to be distributed so as to mimic in the best possible way the actual usage of the system but still maintain standard test harness characteristics. This means that although it will be physically away from the source tree, it needs to accommodate such features as the split between functional tests and unit tests, as well as regression testing.

i-Sieve therefore studied and analysed a number of execution engines that comprise the state-of-the-art in test harness platforms, namely Buildbot, Tinderbox, Hudson/Jenkins and the xUnit series of tests. From this it was established that a generic purpose test harness would not be suitable for PATHS therefore a process was initiated to extend the current open source systems, with new code for particular functionalities where need be. Working with Buildbot, which is written in Python, has allowed the extraction of many functionalities to create the basic harness structure. This is now to be extended with the particular methods for the functional tests and unit tests (in our case, "module tests") modelled after jUnit.

4.3.2.1 Test harness results

In order to test and analyse the performance of the servers that provide the backend services for the PATHS system various load conditions were simulated.

While seeking for a level of robustness that would provide users with an uninterrupted experience during the use of PATHS, two metrics were considered as important to document the expected quality of service (QoS): *Average Response Time* (Elapsed Time) for each service request and the server's *Error Rate* due to heavy load conditions.

By measuring every request and every server's response to those requests valuable information can be collected for the round trip of how long it takes the target web application to deliver the data. The resulting metric is a reflection of the speed of the web application being tested and indicates the server's performance from the users' perspective. The basic guidelines regarding response times have been about the same for thirty years (Miller 1968; Card et al. 1991):

0.1 second (one tenth of a second): Ideal response time. The user does not sense any interruption.

1 second: Highest acceptable response time. Download times above 1 second interrupt the user experience.

10 seconds: Unacceptable response time. The user experience is interrupted and the user is likely to leave the site or system.

Concerning the server's Error Rate, it is to be expected that some errors may occur when processing requests, especially under heavy load conditions. Usually errors begin to appear when the load has reached a point that exceeds the web application's ability to deliver what is necessary. The Error Rate is the mathematical calculation that produces a percentage of problematic requests to all requests. The percentage reflects how many responses have HTTP status codes indicating an error on the server, as well as any request that never gets a response. The web server will return an HTTP Status Code in the response header. The Error Rate is a significant metric because it measures the "performance failure" in the application. It tells you how many failed requests are occurring at a particular point in time of your load test. We can categorize performance into four categories according to their reliability (error rate) below:

Good reliability category, with error rate $r < 0.01$.

Above-average reliability category, with error rate r between 0.01 and 0.0375 (average).

Below-average reliability category, with error rate r between 0.0375 (average) and 0.1.

Poor reliability category, with error rate $r > 0.1$.

At this early stage, the simulation tests were conducted using a test harness framework developed with open source tools. Average Response Time and Error Rate was measured for each one of the following services:

1. Authenticate
2. GetUserByUri
3. Search
4. GetItemByUri

5. GetItemByID
6. AddWorkspaceItem
7. CreatePath
8. AddTag
9. GetTagsForUri
10. AddComment

A “test cycle” for each of the following four different load situations were conducted by gathering 1500 samples (loops) for each load:

- 1 user
- 10 concurrent users
- 50 concurrent users
- 100 concurrent users

Evaluation of the test results reveals that although the Average Response Time is in most cases lower or close to the barrier of 1 sec, which gives a good user experience, the Error Rate in many cases exceeds the limit of 3.75% of an above-average performance system. Further optimization and testing are to be conducted in the following months in order to decrease the Error Rate. More sophisticated tests could include identifying click-patterns for typical user operations and tracing how many requests are sent from the Client to the back-end API for each.

The results data are presented in three groups of services: 1) General services, 2) Get-type services and 3) Add-type services. For each group we present the tables containing the actual data for each group’s service followed by two charts that graphically represent the data, one for the Average Response (Elapsed) Time and one for the Error Rate (%). The Average Response Time charts’ y-axis corresponds to the total time in milliseconds that has elapsed from the moment of the request to the moment of receiving the server’s reply. Accordingly, for the Error Rate chart the y-axis corresponds to the percentage of the total number of requests, for which we received an error from the server. Both charts’ x-axis corresponds to the number of concurrent requests. Each group’s service is presented with a different colour.

General services

- Authenticate
- Search
- Create Path

Authenticate		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	146
10	1.33	148
50	3.73	332
100	4.7	734

Search		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0.17	164
10	1.8	168
50	3.36	396
100	3.59	776

CreatePath		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	167
10	2.53	173
50	3.13	402
100	3.28	806

Figure 117 General services: Authenticate, Search, Create Path

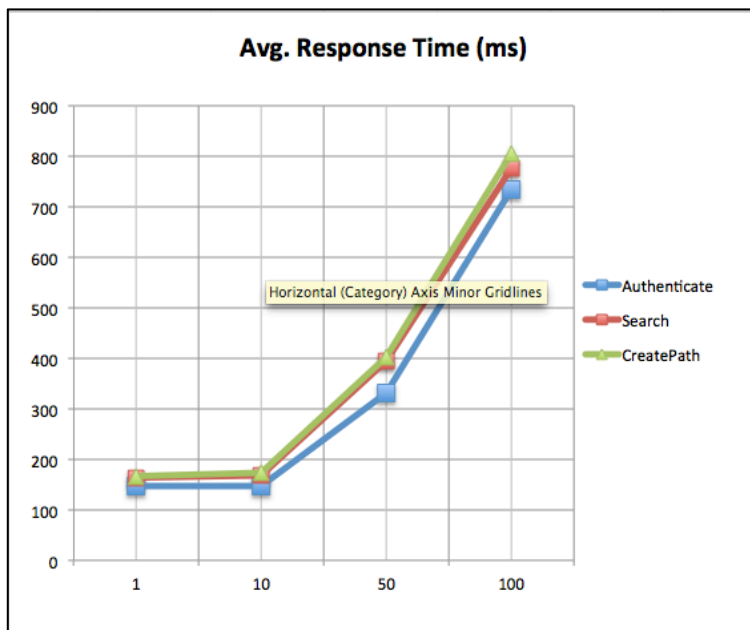


Figure 118 Average response time: General services

Figure 118 illustrates the average response time in milliseconds for each of the general type services. Measurements taken for 1, 10, 50 and 100 concurrent requests respectively.

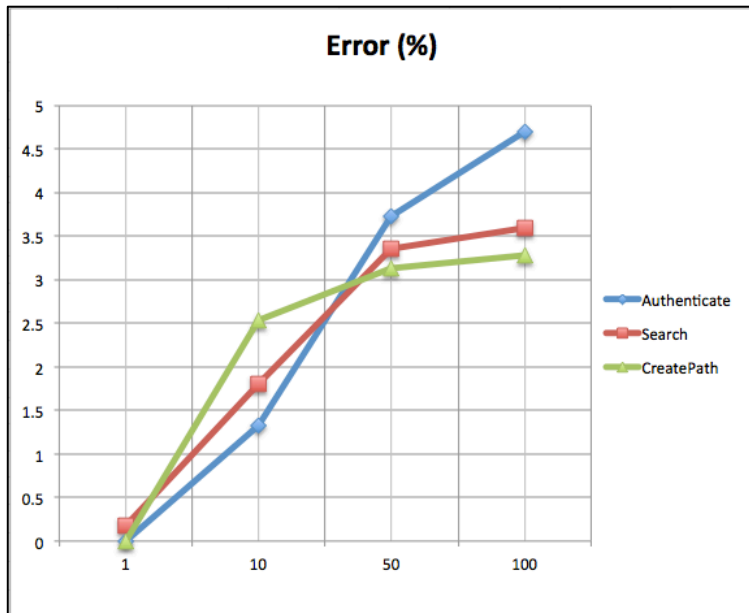


Figure 119 Error rate: General services

Figure 119 represents the percentage of the requests that returned an error for each of the general type services. Measurements taken for 1, 10, 50 and 100 concurrent requests respectively.

Get-type services

- GetUserByUri
- GetItemByUri
- GetItemByID
- GetTagsForUri

GetUserByUri		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	145
10	1.34	152
50	3.53	382
100	3.8	729

GetItemByUri		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	346
10	2.33	457
50	2.47	1294
100	2.9	2514

GetItemByID		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	140
10	1.4	149
50	1.83	342
100	2.48	690

GetTagsForUri		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	464
10	0	468
50	0	1847
100	0.03	3522

Figure 120 Get-type services: GetUserByUri, GetItemByUri, GetItemByID, GetTagsForUri

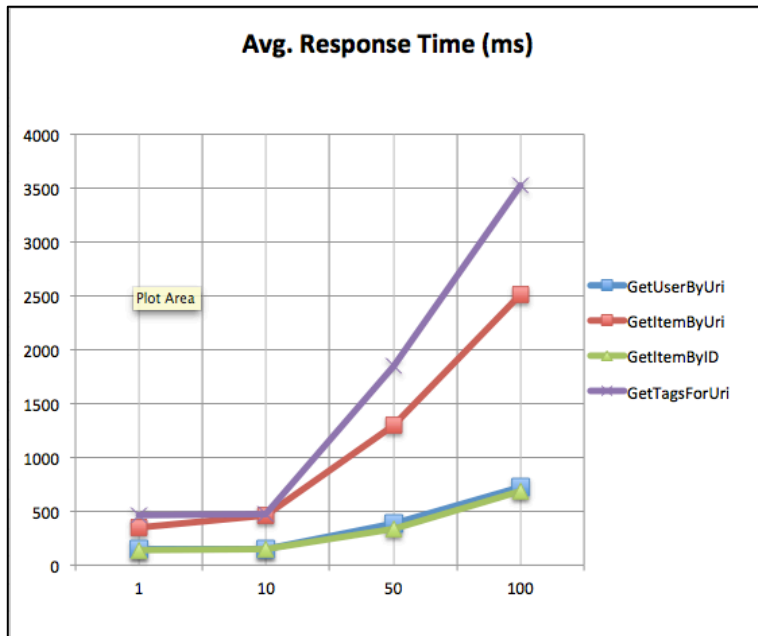


Figure 121 Average response time: Get-type services

Figure 121 illustrates the average response time in milliseconds for each of the get-type services. Measurements taken for 1, 10, 50 and 100 concurrent requests respectively.

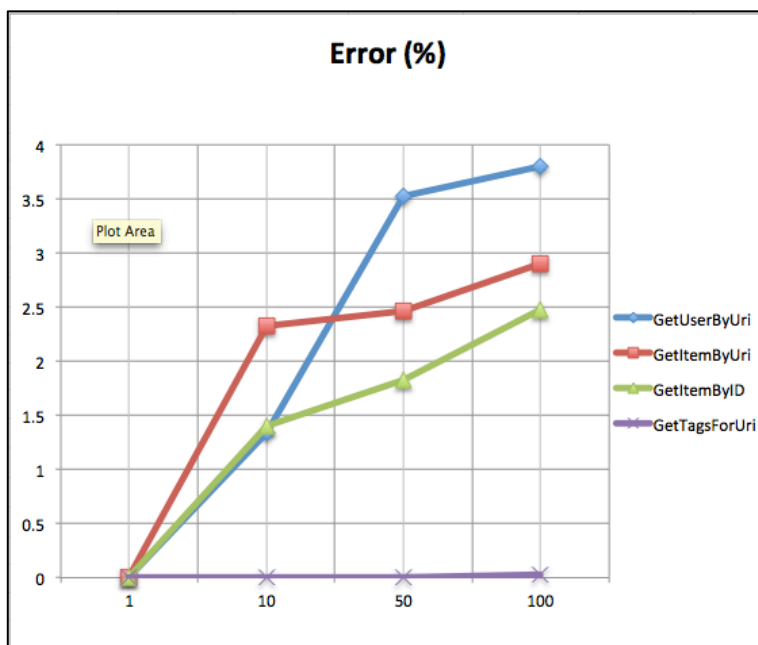


Figure 122 Error rate: Get-type services

Figure 122 shows the percentage of the requests that returned an error for each of the get-type services. Measurements taken for 1, 10, 50 and 100 concurrent requests respectively.

Add-type services

- AddWorkspaceltem
- AddTag
- AddComment

AddWorkspaceltem		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	156
10	1.8	159
50	2.32	382
100	2.97	742

AddTag		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	170
10	1.67	175
50	2.33	455
100	2.92	969

AddComment		
# Users (concurrent)	Error (%)	Average Elapsed Time (ms)
1	0	164
10	1.27	170
50	2.23	402
100	2.92	801

Figure 123 Add-type services: AddWorkspaceltem, AddTag, AddComment

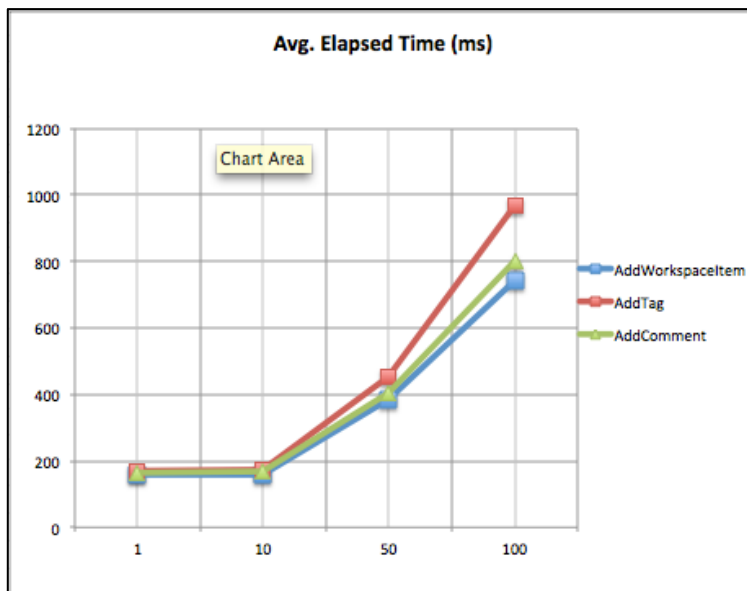


Figure 124 Average elapsed time: Add-type services

Figure 124 presents the average response time in milliseconds for each of the add-type services. Measurements taken for 1, 10, 50 and 100 concurrent requests respectively.

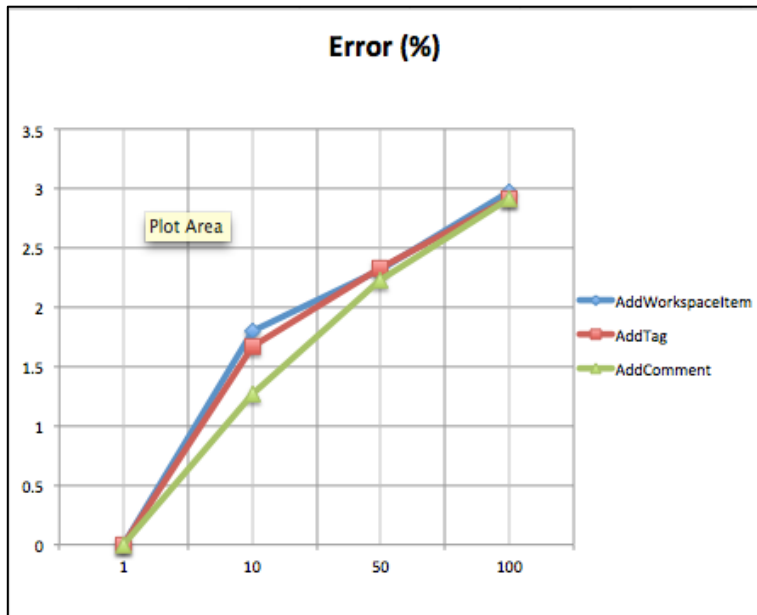


Figure 125 Error rate: Add-type services

Figure 125 illustrates the percentage of the requests that returned an error for each of the add-type services. Measurements taken for 1, 10, 50 and 100 concurrent requests respectively.

4.3.3 User Interaction and Interface Design – Cognitive Walkthrough

As a follow-up to the interface design and as a precursor to the laboratory evaluations an expert evaluation was carried out using the Cognitive Walkthrough technique (Sharp et al, 2007). This process aims to uncover any likely usability issues that will arise for users carrying out key tasks, and to indicate areas that may need attention in further developing the system and user interface.

This evaluation was carried by USFD, and analyses tasks relating to the primary elements of the PATHS User Interaction model, as follows:

- Task 1 – Finding and following a path (Consume)
- Task 2 – Collecting items for a path (Collect)
- Task 3 – Creating a path from collected items (Create / Communicate)

In the Communicate element we have covered the aspects of annotating and editing path content, but have not included aspects of sharing via email and social media, or commenting and rating content. The latter are somewhat more secondary activities, and are relatively common to web social web environments. Rather, our goal is to evaluate in detail the core and more novel aspects of PATHS.

Results for the three tasks are shown in Figures 126, 127 and 128, below.

Task 1 – Find/follow a path

Actions	Evaluation criteria – will users...	Evaluation
1) In the Paths section, search by keyword or select from tags	know what to do?	Yes – searching by keyword and tags are common tools for locating content in web-based systems.
	see how to do it?	Yes – the Paths section and the functionality are clearly visible on the home page and users are familiar with search boxes and tag clouds. No – if they are on any other page, than the main home page, or the paths home page, there are no indicators of how to find paths. If they try to find a path using Explore or Search, the results, if any, are mixed in with other results.
	understand whether their action was correct or not?	Yes – a set of search results appears. If no results are returned, a message to that effect is provided, although this could be made more prominent.
2) Select path from search results	know what to do?	Yes – it is common to select an item of interest from a set of search results.
	see how to do it?	Yes - each path in the search results offers a 'Follow this path' button.
	understand whether their action was correct or not?	Yes – an overview page is reached with the same title shown in the search results and a summary of the path content. No – they may be confused if the full overview cannot be seen (e.g. on a laptop screen), and may not understand why the 'Follow this path' button appears again.
3) Follow the path using navigational tools – view the first item	know what to do?	No – it is not clear that they can start from any node in the path.
	see how to do it?	Yes – there is a prominent 'Follow this path'
	understand whether their action was correct or not?	Yes – the first page of the path is presented
4) Follow the path using navigational tools – view	know what to do?	Maybe – if they have experience of multi-page content, then they should know how to use navigational forward and back buttons.

Actions	Evaluation criteria – will users...	Evaluation
additional items	see how to do it?	Yes – there are prominent forward and back buttons. No – it is not clear that you can jump ahead to later items, and it is necessary to go back to the path overview to jump more than 2 pages forward or back
	understand whether their action was correct or not?	Yes – the next selected path page is presented.

Figure 126 Cognitive Walkthrough Task 1: Find/follow a path

Task 2 – Collect items for a path

Actions	Evaluation criteria – will users...	Evaluation
1) Use the Search and/or Explore functions to locate relevant items	know what to do?	Yes – search is a familiar functionality Yes – tag clouds are familiar functionality No – it is not clear what the Explore function does that is different to Search, and Explore is a relatively uncommon functionality.
	see how to do it?	Yes – the search box is prominently featured on the home page and Search page No – there are two search boxes, which may be confusing for some users No – the tag cloud shown on the home page is mainly in Spanish, which will be off-putting for English speakers, and it is not clear that other versions are available by selecting the Explore tab
	understand whether their action was correct or not?	Yes – Search - a list of search results is delivered, or an indication that no results were found Yes – Explore – a more specific tag cloud is delivered, along with sample images No – Explore – there are no traditional search results, as is common in other web sites
2) Review the relevance of items of interest	know what to do?	Yes – Search – users are familiar with search results lists and with checking the main item records for additional information Maybe – Explore – if they are used to using image collections such as Flickr

Actions	Evaluation criteria – will users...	Evaluation
	see how to do it?	<p>Yes/Maybe – Search – should be OK when there is an image, title and description available, but may not be clear when content is missing. It is clear that you can click hyperlinks to see the full record.</p> <p>No – Search – users might expect that clicking an image will present a larger version.</p> <p>Maybe – Explore – if selecting on image content, but they may not realise that additional information is available from which to judge relevance.</p>
	understand whether their action was correct or not?	Yes/Maybe – this is a subjective judgment by the user. However, there may not be enough content available for many items to accurately judge relevance.
3) Add items to the workspace	know what to do?	Yes – saving items for later use is a common function, especially in library-type environments, although the exact terminology may be new.
	see how to do it?	<p>Yes – there is a prominent ‘Add to Workspace’ button on every item in the search results and on the item record page.</p> <p>No – it is not clear how to add individual images from the Explore pages (and in fact is not possible at present)</p>
	understand whether their action was correct or not?	<p>Yes – the workspace pops out from the left-hand side and the item is listed there.</p> <p>No – when the first few items have been added to the workspace, additional items are not seen at first glance as they are added to the bottom of the list and the user must scroll to see them. There is no indication of the number of items in the workspace or that this has increased.</p>

Figure 127 Cognitive Walkthrough Task 2 – Collect items for a path

Task 3 – Create a path from collected items

Actions	Evaluation criteria – will users...	Evaluation
1) Use 'Create Path' button in the workspace to transfer items to the Path workspace	know what to do?	Maybe – this is a new functionality for most initial users and they may not realise they need to take specific action.
	see how to do it?	Yes – if they are logged in and have added items to their workspace, the 'Create Path' button is clearly visible. No – if they are not logged in, there is no indication of how to create a path from items in the workspace.
	understand whether their action was correct or not?	Yes – the Path workspace appears, with their content and options for editing.
2) Add a title and metadata	know what to do?	Yes – if they have created web content (e.g. blogs, Flickr, YouTube) previously they will be familiar with these actions.
	see how to do it?	Yes – the title and metadata boxes are blank, inviting content to be added. No – it is not clear in what format the tags should be added. No – they may not be sure what to include in the duration field.
	understand whether their action was correct or not?	Yes – content appears in the metadata field as typed No – it is not possible to see the final result (or preview it) until the path has been published.
3) Add/edit item titles and contextual information	know what to do?	Maybe – editing content is implicit in creating web content, but creating a path is a new activity. No – users might expect the original item descriptions to be included in their path.
	see how to do it?	Maybe – the title fields are shown as text boxes, but an editor must be opened to add descriptions. The double click approach is relatively unresponsive, and the edit icon is somewhat unclear.
	understand whether their action was correct or not?	Yes – if they manage to edit the fields, the new text is shown.

Actions	Evaluation criteria – will users...	Evaluation
4) Move the items into the preferred order	know what to do?	Maybe – drag and drop is a fairly common feature of editing content, but many users may not have done this before. Some users may be used to alternative functionality, such as up and down arrows.
	see how to do it?	No – it is not made clear that items can be moved and/or how to do it.
	understand whether their action was correct or not?	Yes – the item moves to a new position.
5) Delete irrelevant items	know what to do?	Yes – this is a common function in web editing environments.
	see how to do it?	Yes – icon is prominent and clear in its use.
	understand whether their action was correct or not?	Yes – the item disappears from the workspace.
6) Add any additional items required	know what to do?	Maybe – they will know they need to get items from the search results to the path, but there are several steps to this action, some of which are different to creating the path in the first instance.
	see how to do it?	No – there are no instructions, and it is a multi-step process. The drag and drop element from the Search workspace to the Path workspace is not clear. An ‘add to path’ button in the Search workspace may help.
	understand whether their action was correct or not?	Yes – if they are successful, the item will appear in the workspace. No – if they are unsuccessful they are not prompted with any information to this effect, and have to review the whole path to try to work this out.
7) Publish the path	know what to do?	Yes – if they have worked with web content in the past. No – they may think that having created the path, it is automatically available to other users.
	see how to do it?	Yes – the ‘publish’ button is prominently displayed.
	understand whether their action was correct or not?	Yes – the path overview page is displayed.

Figure 128 Cognitive Walkthrough Task 3 – Create a path from collected items

4.4 Review against the User Requirements and Functional Specification

The functionality provided by the first prototype has been evaluated against the functionality specified in *D1.3 Functional Specification of the first PATHS prototype (2011)*. The table below shows all user requirements as listed in D1.3 - Appendix: User Requirements by Priority together with the functional specification they relate to, their implementation status and, where applicable, explanatory notes. Four implementation statuses are used:

- **Complete:** The requirement is fully implemented in the first prototype.
- **Partial:** Parts of the requirement have not been implemented or work differently than specified in D1.3, see the Notes for an explanation.
- **Limited:** The prototype implements a limited part of the requirement; see the Notes for an explanation.
- **Not implemented:** The requirement has not been implemented at all, see the Notes for an explanation.

Overall the majority of the top-priority user requirements and functionality has been implemented in the first prototype. The exceptions to this are the ability to search within the user's workspace and all functionalities related to user rights and permissions. The "Search workspace" functionality was not implemented in the first prototype due to time pressures, while the rights and permissions related functionality was not implemented when it became clear that it was not required for evaluation at this stage. These will be re-considered when the functional specification for the second prototype is drawn up.

Of the lower priority functionalities only those that were either directly required for the various evaluation exercises or were closely linked to top-priority functionality were implemented in the first prototype.

Spec #	Req. #	Title	Priority	Status	Notes
5.1	10.1.1	Registration	MUST	Complete	
5.1	10.1.2	Profile	MUST	Partial	1) 2) 3)
5.1	10.1.3	Edit Profile	MUST	Complete	
5.1	10.1.4	Visibility of profile	MUST	Limited	4)
5.3	10.1.5	Search the collection	MUST	Complete	
5.4	10.1.6	Primary object	MUST	Partial	5)
5.2, 5.7	10.1.7	Collect Objects	MUST	Complete	
5.3	10.1.8	Search workspace	MUST	Not implemented	6)

Spec #	Req. #	Title	Priority	Status	Notes
5.3	10.1.9	Search Paths by topic	MUST	Complete	
5.3	10.1.10	Save searches	MUST	Partial	7)
5.11	10.1.11	Find existing paths	MUST	Complete	
5.4	10.1.12	Links to related content	MUST	Complete	
5.5, 5.7	10.1.13	Create Paths	MUST	Complete	8)
5.5	10.1.14	Edit Paths	MUST	Complete	
5.10	10.1.15	Identity	MUST	Complete	
5.5, 5.10	10.1.16	Search engine friendly	MUST	Complete	
5.7	10.1.17	Add content	MUST	Complete	9)
5.5	10.1.18	Describe themes and sub-themes	MUST	Complete	
5.7	10.1.19	Add content tied to objects	MUST	Complete	
5.7	10.1.20	User comments on Paths	MUST	Complete	
5.7	10.1.21	Attribution	MUST	Complete	10)
5.5	10.1.22	Grant access to specific users & user groups	MUST	Not implemented	1)
5.6	10.1.23	Permission to clone	MUST	Not implemented	11)
5.1	10.1.24	User identity	MUST	Complete	
5.10	10.1.25	Multiple platforms	MUST	Complete	
5.11	10.1.26	Zoom	MUST	Partial	12)
5.11	10.1.27	Sense of discovery	MUST	Complete	
5.12	10.1.28	Delete user profiles and user-generated content	MUST	Complete	13)
5.8, 5.11	10.2.1	Familiarity	SHOULD	Complete	

Spec #	Req. #	Title	Priority	Status	Notes
5.2	10.2.2	Organise Personal Collection	SHOULD	Limited	14)
5.3, 5.10	10.2.3	Flexible design	SHOULD	Complete	
5.4	10.2.4	No restrictions on object type	SHOULD	Complete	15)
5.5	10.2.5	Create Paths across multiple sessions	SHOULD	Complete	
5.12	10.2.6	Grant access to specific groups	SHOULD	Not implemented	1)
5.12	10.2.7	Communication with Path creator	SHOULD	Not implemented	16)
5.5	10.2.8	Activity description	SHOULD	Complete	
5.8	10.2.9	Tagging objects	SHOULD	Complete	
	10.2.10	Aggregate tags	SHOULD	Complete	
5.3, 5.8	10.2.11	Search via tags	SHOULD	Not implemented	17)
5.5	10.2.12	Show/hide annotations	SHOULD	Not implemented	18)
5.6	10.2.13	Clone paths	SHOULD	Not implemented	11)
5.3	10.2.14	Time factor	SHOULD	Not implemented	19)
5.2	10.3.1	Add any resource to holding space	COULD	Not implemented	20)
5.3, 5.9	10.3.2	Rate Paths	COULD	Complete	
5.12	10.3.3	Receive private comments	COULD	Not implemented	16)
5.12	10.3.4	Tag rewards	COULD	Not implemented	11)
5.12	10.3.5	Geolocation data	COULD	Not implemented	21)

Spec #	Req. #	Title	Priority	Status	Notes
5.12	10.3.6	Matching Paths and objects to locations	COULD	Not implemented	21)
5.3	10.3.7	User content	COULD	Not implemented	9)
5.5	10.3.8	Web content as object	COULD	Not implemented	20)

Figure 129 Review against the Functional Specification

1. The user-group functionality was not implemented due to time constraints.
2. The user-role functionality (user/facilitator/...) was not implemented as the prototype allows for fluent and transparent switching between these roles at any time.
3. The cognitive style information is stored in the backend, but not surfaced in the user interface.
4. Only the user's nickname and their paths are displayed, all other profile information is private and this cannot be changed by the user.
5. Where the information is available the user can navigate to the original digital artefact.
6. This feature was not completed in time for the user tests.
7. Searches cannot be explicitly saved / loaded. However they can be bookmarked and also added to the user's workspace enabling the user to return to them later.
8. During preliminary partner-internal testing some features were removed as these impacted the usability of the prototype (annotate connections between nodes, you-might-also-be-interested-in links).
9. Due to questions about how to police license issues on user generated images / audio / video, the prototype supports only text.
10. To ensure a clean user-interface not all attribution information is highlighted in the user-interface, even though it is stored in the back-end.
11. This feature was not implemented due to time constraints.
12. Limited overview functionality is available, enabling the user to see either the titles of all nodes in the path or an individual node.
13. This is only possible directly on the back-end and not through the prototype user-interface.
14. The user can re-order the items in their workspace, but no further organisation is possible.
15. For all object types the prototype displays a thumbnail and where available a link to the original digital object.
16. Due to 4) it is not possible to share e-mail addresses even if the user were prepared to allow that. The complexity of implementing a full communication platform is outside of the Paths project's scope.
17. The user-generated content is currently not indexed by the search sub-system.

18. If the path creator wishes to have a path node without a description, then they can leave the description empty.
19. The path-length specified by the path creator is shown in the search results, but cannot be used in the search itself.
20. Due to the complexity of dealing with potentially transient objects on the web, this feature was not implemented.
21. The amount of geo-location data available in the collection meta-data is very limited, making this impossible to deploy at the full scale of the data.

In addition to the prioritised functionalities a number of non-prioritised functional specifications were also listed in D1.3. These have also been reviewed and are listed in the table below using the same annotations as above. During development these were essentially treated as SHOULD priority functions.

Spec #	Title	Status	Notes
6.1	Visualise/Browse the System	Complete	
6.2	Access Object Similarity Data	Complete	
6.3	Calculate Path Relatedness	Not implemented	i)
6.4	Behavioural Logging & Classification	Partial	ii)
7.1	General Users	Complete	
7.2	Registered Users	Partial	iii)
7.3	Access Control	Partial	iv)
7.4	Groups	Not implemented	v)
7.5	Visibility and Privacy	Limited	vi)

- i. Due to the slow growth of paths in the system during the evaluation trials, an insufficient number was collected to enable the development of a path-relatedness metric.
- ii. All interactions with the system are logged, but the information is currently not used to adapt the system.
- iii. As stated above the clone-path and group functionality was not implemented due to time constraints. All other functionality was implemented
- iv. The “Administrator” user was not implemented on the front-end due to time constraints, but all their tasks can be performed directly on the back-end.
- v. As stated above this functionality was not implemented due to time constraints.
- vi. The user has to publish the path to make it visible to other users. The remaining functionalities were not implemented due to time constraints.

5. Conclusions

This evaluation of the first PATHS prototype has been completed by involving groups of participants representative of the target end-user communities in a series of demonstrations and laboratory trials. This has enabled the collection of extensive data relating to the different user interaction profiles for both expert and non-expert path creators, path facilitators, and path consumers that were identified in earlier project work and reported in *D1.1 User Requirements Analysis*. In addition to the user evaluation a series of tests of the system architecture and the underlying content have been carried out by project partners.

Together these results have enabled us to extrapolate a detailed set of recommendations for development of the PATHS system based upon clear empirical evidence. In the first instance, our results form a sound basis for developing the functional specification for the second PATHS prototype. They will also help to realise the PATHS vision of a system that enables enhanced information access to cultural heritage collections, through novel forms of user interaction, supported by appropriate and personalised adaptability.

Evaluation carried out in the field via demonstration sessions to groups of users provided detailed results of their preferences and use of cultural heritage information, and their responses to both the concept and implementation of the PATHS system. Close collaboration between the partners running the Demonstration and Laboratory evaluation strands has ensured that data has been collected in a way that provides an integrated, cohesive and rich picture of both users' perception and actual use of the PATHS prototype.

The evaluations carried out in the laboratory provided comprehensive and in-depth feedback from users about their experience of actually using PATHS. By incorporating simulated and open work tasks, it has been possible to gain real insights into the positive and negative aspects of usability of the prototype. It helped us to understand more about users' likely information behaviour and their potential uses of PATHS. For example revealing the types of paths that might be created, uncovering typical errors in using the system and areas where help may be required.

It was evident that all participants had an overall positive response to PATHS, finding it mostly easy to use, interesting and useful. The system is also seen as offering novel functionality that could be useful in a number of different user scenarios.

Negative responses are largely derived from two areas; usability issues that can be easily rectified, and content issues which are outside the scope of the current project. The usability issues provide us with very useful pointers for improving the PATHS user interface in the second prototype, while the content issues provide us with scope for recommendations that can be fed back to supplier organisations and the wider cultural heritage community. In addition, there were a small number of suggestions for additional functionality that will also be critical in informing the second prototype.

Lessons learned from carrying out the evaluations primarily relate to time and resources. The evaluation of the second prototype is planned to take place during 2013. In this second

phase activities will be extended to include field trials in different scenarios, evaluation of the mobile application and the Laboratory sessions will be extended to allow longer for each individual evaluation. The timing of the sessions needs to be planned around the summer holiday period to enable both local host institutions and participants to be recruited to take part. In practice this means that July and August are difficult months in which to conduct user evaluations and next years' work needs to be scheduled with this in mind. There may be an opportunity to include remote online user testing next year, as USFD is currently investigating a system and protocol, which could help include additional participants in the testing although remote working would not allow post-task interviews and the rich data that can be captured by this means.

Finally, it is recommended that a limited group of users are encouraged to use PATHS in a naturalistic setting, undertaking their own work tasks, over a period of time. This would not only overcome the restrictions from the time limit for path creation tasks with the laboratory, but would also provide invaluable insight into how PATHS might actually be used in the real world. To this end, we are identifying a small number of volunteers from the first prototype evaluations who would be interested in using it again for their own purpose, and also within teaching and learning settings.

This work will continue in the next cycle of development and evaluation where we will continue to work with expert and non-expert users, and will further identify recommendations for development of the prototype system.

6. Recommendations for development of PATHS

The following sections detail specific recommendations for development.

6.1 Registration/User Accounts

Evidence	Recommendation	Priority High, Medium, Low
4.1.6	A requirement that users accept the terms and conditions as set out by content providers	High
4.1.6	At point of Registration allow for role to be selected. Roles of path creators be displayed rather than names, e.g. Museum Curator, Lecturer, Visitor, Student	Medium
4.1.6	At point of Registration give guidance on name to be displayed	Medium
4.1.6	Allow image, photo, icon to be used to represent the Path Creator	Low

Figure 130 Recommendation: Registration/User Accounts

6.2 Explore

Evidence	Recommendation	Priority
4.1.6	Allow restriction by fields	High
4.1.6	Enable larger images to be viewed	High
4.1.6	Enable image rollover to display larger image	Medium
4.1.6	Allow concept map view of tags	Medium
4.1.6	Distinguish between curated and crowd-sourced tags	Medium
4.1.6	Allow sorting of tag/image cloud by popularity or frequency or holding institution	Medium
4.1.6	Option be begin with a search	Medium
4.1.6	Improved collection overview – full range of top-level topics	High
4.1.6	Use of hierarchy to facilitate browsing	High
4.1.6	More contextual information with images	Medium
4.1.6	Alphabetical sorting of tag cloud	Low
4.3.3	Provide traditional 'search results' for Explore pages to aid comprehension and selection of items	Medium

Figure 131 Recommendation: Explore

6.3 Search

Evidence	Recommendation	Priority
4.1.6	Enable Advanced Search option	High
4.1.6	Allow restriction by fields, such as Date, Media, On Show/Archived, Collection Date	High
4.1.6	Allow ordering of items, such as by title, year, location, most relevant, most viewed	High
4.1.6	Add Search tips/help link	High
4.1.6	Improve search functionality, e.g. query suggestions, stemming, relevance, spell check	High
4.1.6	Relocate scrolling bar at bottom of search screen	Low

Figure 132 Recommendation: Search

6.4 Search results

Evidence	Recommendation	Priority
4.1.6, 4.2.2.5	Make the layout more flexible – number of results / grid or list view	Medium
4.1.6, 4.2.2.5	More options for jumping to later results	Medium
4.1.6	Sort facility	Medium
4.2.2.5, 4.2.2.6	Improve facets – more categories, easier to select/deselect	High
4.1.6, 4.2.2.5	Option to filter out records without images/descriptions	High

Figure 133 Recommendation: Search results

6.5 Item Record Content and Layout

Evidence	Recommendation	Priority
4.1.6	Highlight search terms within record	Low
	Description to include institution owning the item as well as Rights	Low
4.1.6, 4.2.2.5	Improve the layout for usability and aesthetics	Medium
4.1.6	Ensure the layout is consistent, even when content is missing	Medium
4.1.6	Make the Wikipedia links shorter to improve the layout of the page and make them easier to read	Medium
4.2.2.5	Consider switching off the scrolling of similar items or make less prominent	Low

Figure 134 Recommendation: Item record content and layout

6.6 Finding a path

Evidence	Recommendation	Priority
4.1.6	Allow sorting of path results by field	High

Figure 135 Recommendation: Finding a path

6.7 Following a path

Evidence	Recommendation	Priority
4.1.6	Enable easier return to original path if navigated away from it	Medium
4.1.6	Allow choice of path starting point	Low
4.1.6	Display Creator role	High
4.1.6, 4.2.2	Include thumbnail images on the path overview page	Medium
4.1.6, 4.3.3	Make it easier to navigate across the full range of pages	High
4.2.2.5	Better visualisation of the paths	High
4.1.6, 4.2.2.5, 4.3.3	See original item descriptions, as well as annotations	High

Figure 136 Recommendation: Following a path

6.8 Workspace (search)

Evidence	Recommendation	Priority
4.1.6, 4.2.2.5	Ensure that the workspace does not obscure search results, e.g. format as a split-screen view	High

Figure 137 Recommendation: Workspace (search)

6.9 Workspace (path)

Evidence	Recommendation	Priority
4.2.2.5	View original item description to aid annotation	High
4.2.2.6, 4.2.2.6, 4.3.3	Make it easier/more explicit how to add further items to the path	High
4.2.2.6, 4.3.3	Make it easier/ more explicit how to reorder items in the path	Medium
4.1.6, 4.2.2.5	Offer flexible workspace layout options – e.g.	Medium

	condensed view, list, grid	
4.2.2.5	Enable collaborative working on paths	Medium

Figure 138 Recommendation: Workspace (path)

6.10 Creating a path

Evidence	Recommendation	Priority
4.1.6	Allow adding of personal objects/images	Low
4.1.6	Improve adding of multiple items	Low
4.1.6	Instructions/help available at point of need, bar showing progress through creation process	Medium
4.1.6	Improve visualisation of path creation process	Medium
4.1.6	Display thumbnails in Workspace	Low
4.1.6	Enable Geo-location data to be used	Low
4.1.6	Enable Workspace to be shared	Low
4.1.6	Allow one image to be the path 'cover image'	Low
4.1.6, 4.2.2.5	Enable branching within paths	High
4.1.6, 4.2.2.5	Enable the addition of user-generated text-only nodes	High
4.1.6, 4.2.2.5	Consider the option to include web content and/or the user's own content	Low

Figure 139 Recommendation: Creating a path

6.11 Publish/share path

Evidence	Recommendation	Priority
4.2.2.5	Offer more options for publishing the path, including sharing with selected people	Medium
4.2.2.5	Consider offering private / collaborative discussion of items in the path	Low
4.1.6	Include an option to download the path	Medium

Figure 140 Recommendation: Publish/share a path

6.12 Overall

Evidence	Recommendation	Priority
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4.2.2.6	Integrate search, explore and path sections	High
4.1.6, 4.2.2.5	Provide an introduction and/or tutorial	High
4.1.6, 4.2.2.5	Provide context-sensitive help and/or tips	High

Figure 141 Recommendation: Overall

6.13 Content

NB: these are major issues for users but some things may not be possible to address immediately in PATHS due to restrictions with the Europeana data. We note them here as these issues will continue to cause difficulties for users and should be addressed by content providers if PATHS is to be used with other collections in the future.

Evidence	Recommendation	Priority
4.1.6, 4.2.2.5, 4.3.3	Larger images	High
4.1.6, 4.2.2.5, 4.3.3	More detailed / better quality item descriptions, available for all items	Medium
4.1.6, 4.2.2.5	Improved titles – less repetition for some content, some way of differentiating between very similar items	Low
4.1.6	Additional metadata, e.g. date/time period	Medium
4.1.6, 4.2.2.5	Links to original collection	High

Figure 142 Recommendation: Content

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Appendix 1 Demonstration evaluation: Participant Pack including Information Sheet, Consent Form and Questionnaire

PATHS Project User Evaluation Participant Pack

[NB p1-4 to be retained by the participant, p5-15 to be collected by the Moderator]

*You have been invited to take part in user evaluation for **PATHS**, an EU-funded collaborative research project which aims to build a system that enables enhanced, personalised exploration of digital cultural heritage collections.*

You don't have to take part, but your participation and feedback will be important to help us build a system that works best for you as a user, and that will hopefully be of use to you in the future.

Taking part:

At the session you will be asked to:

- Fill in a short questionnaire about you and your experience in the cultural heritage area.
- Watch two short demonstrations of the PATHS system.
- Discuss your opinions and thoughts on the system with a small group of other participants.
- Complete a survey with your feedback on the system.

We will be recording the session – these recordings will only be used by project staff to assist in noting the discussion.

A few things you should know:

- You're free to withdraw from the research at any point.
- All the information we collect as part of your participation will be kept strictly confidential and anonymised before it is used for reporting.

Thank you for taking part in PATHS!

There's a Q&A on the next few pages if you want a few more details.

PATHS Project User Evaluation Research Information Sheet

1. Research Project Title: PATHS – Personalised Access to Cultural Heritage Spaces: User Evaluation

2. Invitation paragraph

You are being invited to take part in PATHS, an EU-funded collaborative research project between Alinari 24 Ore Spa, the University of the Basque Country, MDR (Consultants) Ltd., the University of Sheffield, Asplan Viak Internet Ltd and, i-Sieve Technologies Ltd. Before you decide to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, which explains what will be involved and how the information you provide might be used in support of the research goals. Thank you for reading this.

3. What is the project's purpose?

Nowadays, significant amounts of cultural heritage materials exist online (e.g. collections from museums, art galleries, archives, libraries and historic sites), offering a wealth of rich data to a wide variety of potential users. Information is available through web sites, digital libraries, encyclopaedic resources such as Wikipedia, as well as portals such as Europeana, and is offered in many different formats, with varying amounts of supporting descriptions. However, given the sheer volume and diversity of information, users may find it difficult to navigate the collections to locate exact items of interest and to interpret their meaning. For example, keyword-based searches provide limited forms of access; many users may be unfamiliar with cultural heritage terms and concepts, and often there is limited support for users as they gather information to extend their knowledge and learn new things. At the same time, cultural heritage institutions are looking at new ways for users to experience their collections and are using technologies such as social networks, user participation and personalisation to enrich the online experience and to encourage deeper engagement.

We aim to build a system that will address these issues by enabling exploration of digital cultural heritage collections, enhanced by personalisation and recommendations, along with tools for information organisation and sharing, and supporting the processes of knowledge discovery and learning. More information about PATHS can be found at the project website <http://www.paths-project.eu/>. This project will end in 2013.

4. Why have I been chosen?

We aim to build a system that fully supports users' information needs and preferences and for this to be achieved, we need to get input from a wide variety of users, both expert and non-expert, in areas such as cultural heritage, education, media and tourism professions, as well as a wide variety of general users with an enthusiasm for or interest in using cultural heritage collections for leisure, entertainment, study or personal research. You have been identified as potentially belonging to one of these expert or non-expert user categories through your affiliation with a relevant organisation.

5. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be required to sign a consent form in advance, or in the case of online research to tick a box to the same effect. You are free to withdraw from the research at any time. You do not have to give a reason.

6. What will happen to me if I take part?

If you agree to take part in the study you will be asked to undertake a 'user evaluation' of the PATHS system, which will include the following activities:

- A short preliminary questionnaire to profile your prior experience online and in cultural heritage activities
- Watching a demonstration of the PATHS prototype system
- Discussing your opinions of the system within a small group of other participants and completing a post-demo questionnaire to provide us with feedback on our prototype system.

Whilst you are watching the demonstration and participating in the discussions we will use an audio recorder (and possibly a camcorder) to record the discussions, we may also take some photographs of the group as a whole (but not of individuals). Audio recordings will only be used by project staff only to assist in noting the discussion. Photos will only be used within reports and dissemination materials to illustrate the types of demonstrations we have undertaken – individuals will not be identifiable. Recordings will not be shared and data from the recordings will be anonymised before any reporting is done.

7. What do I have to do?

Before you agree to take part you will be provided with full details of the format of the PATHS user evaluation activities, with an opportunity to ask questions and clarify anything about which you are unsure. During the evaluation we ask that any information you provide is accurate to the best of your knowledge, and where your opinion is sought that you provide honest and frank responses. The PATHS prototype will be demonstrated to you and we ask that you give us feedback to the best of your ability and in any way you feel is appropriate. There are no right or wrong responses to any of the research exercises and you will not be judged on anything you do or say in this context.

8. What are the possible disadvantages and risks of taking part?

There are no foreseen risks involved in taking part in this study. If there is any information you do not wish to provide, you are free to decline.

9. What are the possible benefits of taking part?

By contributing to this research project it is hoped that we can use your input to refine the new PATHS system. In turn, PATHS aims to improve access to cultural heritage resources, supporting exploration of collections and creative use of materials in new ways that may be of use to yourself and others in the context of work, education and/or leisure interests.

10. What happens if the research study stops earlier than expected?

If for any reason the study has to stop, we will announce this on the project website and make sure that all data supplied up to that point is managed in accordance the project's research ethics procedures.

11. What if something goes wrong?

If you have any questions about the study or wish to make any complaint, please contact either the Local Investigator, xxxxxxxxxxxxxxxx at xxxxxxxxxxxxxxxx, by email xxxxxxxxxxxxxxxx OR Ms Jillian Griffiths, Evaluation and Field Trials Leader, MDR (Consultants) Ltd., by email jillian.griffiths@mdrpartners.com. Your question/complaint will then be handled accordingly.

12. Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential and will be managed in accordance with the project's research ethics procedures. All information you provide will be anonymised before analysis takes place, and you will not be able to be identified in any reports or publications resulting from the research.

13. What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

The information sought from you is about your needs, preferences and experiences in using cultural heritage collections online, and in particular via the new PATHS system. Input from representative end users is vital in building and refining a system that is easy to use and that provides information and tools to support the various types of activities that its users may wish to complete, in the way that feels most comfortable and useful to them.

14. What will happen to the results of the research project?

The information you provide will be combined with that from other participants and once analysed will be used to make recommendations for the refinement and ongoing development of the PATHS system.

15. Who is organising and funding the research?

This work is supported by funding from the European Union under the Seventh Framework Programme (FP7). Information on this programme is available at http://cordis.europa.eu/fp7/home_en.html.

16. Contact for further information

PLEASE INSERT LOCAL INVESTIGATOR DETAILS HERE

Thank you for taking part in this project

QUESTIONNAIRE SECTION 1

Please write a nickname (this will only be used if you wish to withdraw at a later date)

GenderFemale Male Prefer not to say **Age group**

Under 18 years <input type="checkbox"/>	18-25 years <input type="checkbox"/>
26-35 years <input type="checkbox"/>	36-50 years <input type="checkbox"/>
51-65 years <input type="checkbox"/>	Over 65 years <input type="checkbox"/>
Prefer not to say <input type="checkbox"/>	

Which do you currently live in?Italy Spain UK **What is your current *main* occupation (please *only select one*)**

Student at school <input type="checkbox"/>	Student at College /university <input type="checkbox"/>
Researcher <input type="checkbox"/>	Lecturer/Professor <input type="checkbox"/>
Teacher <input type="checkbox"/>	Librarian/Information specialist <input type="checkbox"/>
Curator/Archivist <input type="checkbox"/>	Writer <input type="checkbox"/>
Manager/Administrator <input type="checkbox"/>	Retired <input type="checkbox"/>
Carer/Parent <input type="checkbox"/>	Not employed/not in education <input type="checkbox"/>
Other, please specify <input type="checkbox"/>	

How experienced are you in using the Internet?Advanced user Intermediate user Basic User No experience **How often do you search for information online?**Never Rarely (perhaps once a month) Often (once a week) Very often (almost every day)

Do you look for any of the following types of cultural heritage information? (Tick *all* that apply)

	For work	For study	For leisure	N/A
News	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reports and data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Magazine style features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio / podcasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catalogue of items in a collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detailed description of items in a collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Images of items in a collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Academic literature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expert comments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General user comments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify				

Have you used any of the following websites for information about cultural heritage? (Tick *all* that apply)

	For work	For study	For leisure	Never used
Wikipedia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Europeana	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Twitter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YouTube	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flickr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LinkedIn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blogs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local authority sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tourism and travel sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What's On guides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Online news and magazines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify				

When looking for cultural heritage information online (Tick which applies)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I want to see everything that is available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I only want to see the highlights of the collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I only want to see items with images	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I want to get to the relevant facts as quickly as possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often browse around a topic to build up a more detailed picture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am confident in finding what I am looking for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is too much information and I don't know what to select	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to follow a guided tour or trail on a specific theme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to save or bookmark items to view again later	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to share interesting things I find with other people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Why do you look for cultural heritage information? (Tick which applies)

	Most often	Sometimes	Occasionally	Never
General interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entertainment / enjoyment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparing for a visit in person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Following up from a visit in person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchasing tickets, gifts or publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research for work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research for study	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research for leisure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with enthusiasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with experts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify				

Have you used items from cultural heritage collections to create any of the following? (Tick which applies)

	Most often	Sometimes	Occasionally	Never
Exhibition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guided tour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interactive display	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Activity trail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Learning activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lecture - academic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lecture - public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lesson - students under 18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lesson - students over 18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Podcast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Story or narrative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feature article	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newsletter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promotional leaflet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify				

That's the first form filling done, now we'll demonstrate PATHS to you!

QUESTIONNAIRE SECTION 2

Having had a brief demonstration of PATHS what are your first impressions? Do you think it is (please circle a number):

Attractive						Unattractive
3	2	1	0	1	2	3
Exciting						Boring
3	2	1	0	1	2	3
Organised						Cluttered
3	2	1	0	1	2	3
Interesting						Not interesting
3	2	1	0	1	2	3
Understandable						Not understandable
3	2	1	0	1	2	3
Creative						Dull
3	2	1	0	1	2	3
Efficient						Inefficient
3	2	1	0	1	2	3
Enjoyable						Annoying
3	2	1	0	1	2	3
Meets expectations						Does not meet expectations
3	2	1	0	1	2	3
Supportive						Obstructive
3	2	1	0	1	2	3
Likeable						Unlikeable
3	2	1	0	1	2	3
Inventive						Conventional
3	2	1	0	1	2	3
Easy						Complicated
3	2	1	0	1	2	3
Useful						Useless
3	2	1	0	1	2	3
Fast						Slow
3	2	1	0	1	2	3
Familiar						Unfamiliar
3	2	1	0	1	2	3

If familiar, what did it remind you of?

Now we'll have a more detailed look at PATHS!

QUESTIONNAIRE SECTION 3

Thinking of the tag/word cloud - did the *Explore* function seem (please circle your choice):

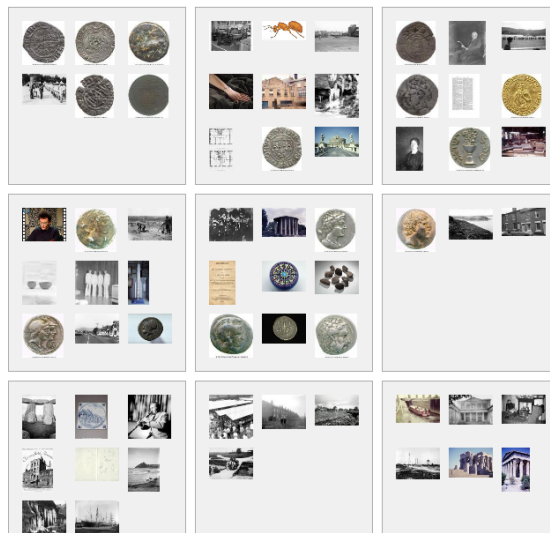
Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

How would you prefer to explore items, using an image cloud or using a tag cloud?

Image cloud Tag/word cloud Both

[Coin_print_kirklees_denarius_silver](#)
[Coin_denarius_roman_republic](#)
[medieval_greek](#)

Coin, denarius, roman_republic, medieval, greek



Could we improve the *Explore* function?

Yes

No

If Yes, please tell us how _____

Did the *Search* function seem (please circle your choice):

Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

Could we improve the *Search* function?

Yes

No

If Yes, please tell us how _____

Did the *layout* of the *Item Record* page seem (please circle your choice):

Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

Could we improve the *layout* of the *Item Record* page?

Yes

No

If Yes, please tell us how _____

Did the *content* of the *Item Record* page seem (please circle your choice):

Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

Could we improve the *content* of the *Item Record* page?

Yes

No

If Yes, please tell us how _____

Did *finding* a path seem:

Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

Did *following* a path seem:

Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

Do you feel that there is flexibility in how you can follow a Path? For example, moving between items on the Path, changing direction or be able to stop, start and go backwards?

Very flexible	Flexible	Neutral	Limited flexibility	No flexibility
---------------	----------	---------	---------------------	----------------

Could we improve *following* a path?

Yes No

If Yes, please tell us how _____

How likely are you to *comment* on a Path?

Highly likely	Likely	Neutral	Unlikely	Highly unlikely
---------------	--------	---------	----------	-----------------

How likely are you to *rate* a Path?

Highly likely	Likely	Neutral	Unlikely	Highly unlikely
---------------	--------	---------	----------	-----------------

How likely are you to *tag items* on a Path?

Highly likely	Likely	Neutral	Unlikely	Highly unlikely
---------------	--------	---------	----------	-----------------

Could you see who *created* a path?

Yes No

Would you want to see *other* paths from the *same person*?

Yes No

Would you want to see paths by?

Cultural organisations Museum/Gallery Curators Teachers Students
Museum/Gallery Educators Researchers Other users None of these

Would it be useful to see related items or related Paths?

Very useful	Useful	Neutral	Not useful	Completely useless
-------------	--------	---------	------------	--------------------

Would it be useful to see related external content (e.g. from Wikipedia)?

Very useful	Useful	Neutral	Not useful	Completely useless
-------------	--------	---------	------------	--------------------

Did the *Path Creation* function seem:

Very easy	Easy	Neutral	Complicated	Very complicated
Very useful	Useful	Neutral	Useless	Completely useless
Very inventive	Inventive	Neutral	Conventional	Very conventional

Did *Collecting items* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Annotating items* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Adding items to a path* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Re-ordering items in a path* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Describing a path* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Saving a path* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Editing a path* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

Did *Sharing a path* seem?

Very easy	Easy	Neutral	Complicated	Very complicated
-----------	------	---------	-------------	------------------

How would you prefer to Share a path? (Tick only one)

Share your path for reuse and allow others to edit in the future

Share your path but not allow editing

Keep your path private

Another way _____

Could we improve the *Path Creation* function?

Yes No

If Yes, please tell us how _____

Would you want to use PATHS (please tick <i>all</i> that apply):				
	To Search?	To Explore?	To find & follow a path?	To create a path?
On a desktop computer				
On a laptop/netbook				
On a mobile device, a phone a tablet computer				
On a Microsoft Surface Table				
On a kiosk style touch screen				
Using something else, please tell us _____ _____				

Would you want to use PATHS (please tick <i>all</i> that apply):				
	To Search?	To Explore?	To find & follow a path?	To create a path?
On Facebook				
On any other social media, please tell us _____ _____ _____				

Having spent more time on PATHS what are your final views? Do you think it is :

Attractive						Unattractive
3	2	1	0	1	2	3
Exciting						Boring
3	2	1	0	1	2	3
Organised						Cluttered
3	2	1	0	1	2	3
Interesting						Not interesting
3	2	1	0	1	2	3
Understandable						Not understandable
3	2	1	0	1	2	3
Creative						Dull
3	2	1	0	1	2	3
Efficient						Inefficient
3	2	1	0	1	2	3
Enjoyable						Annoying
3	2	1	0	1	2	3
Meets expectations						Does not meet expectations
3	2	1	0	1	2	3
Supportive						Obstructive
3	2	1	0	1	2	3
Likeable						Unlikeable
3	2	1	0	1	2	3
Inventive						Conventional
3	2	1	0	1	2	3
Easy						Complicated
3	2	1	0	1	2	3
Useful						Useless
3	2	1	0	1	2	3
Fast						Slow
3	2	1	0	1	2	3
Familiar						Unfamiliar
3	2	1	0	1	2	3

If familiar, what did it remind you of? _____

That's all the form filling done, thanks!

PATHS Project User Evaluation Moderator Pack

This document comprises the notes for the Moderators of the Demonstrations, including:

**Information notes
Script for the introduction
Two demonstrations
Two focus group discussions
Concluding remarks**

Points are indicated at which questionnaire completion is requested, please refer to the separate questionnaire document.

FINAL

P1 demonstration evaluation

1. 10.00 Introduction to the study by the group moderator. 10MINS FOR 1-3.
2. Distribution of **Participant Information Sheet** and **Consent Form**.
3. Completion of **section 1 of the individual questionnaire** (providing basic demographic information, nickname to identify their questionnaire should they wish to withdraw, country within which the evaluation activity is taking place, online search experience and cultural attitudes).
4. 10.10 **Demonstration** and introduction to PATHS, a tour of the system and the key features, including: 10MINS.
 - Homepage – welcome to PATHS
 - What does PATHS do?
 - Show the Paths section
 - Show the Explore section
 - Show the Search section
 - Show Registration
 - Show Profile creationProvided by the group moderator.
5. 10.20 **Group Discussion 1** (to gather first impressions of PATHS). **Use of a focus group schedule.** Discussion to be recorded. 20MINS.

Points 4 and 5 for the demos only, not for the lab evaluations.

6. 10.40 Then we will ask participants to complete **section 2 of the questionnaire** (to provide written feedback of first impressions). SAME questionnaire to keep data together. 5MINS.



Time for section 1 = 45 MINS

- 10.45 **Demonstration** of a number of Tasks. 20MINS.
7. 11.05 **Group Discussion 2** (to gather deeper impressions of PATHS). Use of a **focus group schedule**. Discussion to be recorded. 20MINS.
 8. 11.25 Completion of **section 3 of the questionnaire** (to provide written feedback on deeper impressions of PATHS). SAME questionnaire to keep data together. 5MINS.



Time for section 2 = 45 MINS.

9. 11.30 Conclusion of study, by moderators.



TOTAL TIME =90 MINS (1 ½ hours)

10.00: Start

If the demonstration sessions starts at 10.00am then timings would be as indicated throughout this document – please adjust as necessary.

1. **Introduction to the study by the group moderator. 10MINS FOR 1-3.**
2. Distribution of **Participant Information Sheet** and **Consent Form** – **Distribute *Participant Information Sheet* and *Consent form* now.**
3. Completion of **section 1 of the individual questionnaire** (providing basic demographic information, nickname to identify their questionnaire should they wish to withdraw, country within which the evaluation activity is taking place, online search experience and attitudes and experience with cultural heritage).

Objective	This part provides a broad introduction to the research. It should orientate the participants but not be so specific as to influence the results. It should also establish a friendly and collaborative atmosphere.
Actors	<ol style="list-style-type: none"> 1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	10 min

Notes to the Moderator:

Suggested timings are provided by each section.

Normal text is a note for the Moderator, Bold text can be read out to the participants.

Where appropriate, the **most important questions** in each area are highlighted in **yellow**.

Demos are highlighted in **blue**.

Place name cards at each place and invite participants to sit at their place.

Responding to Participant Comments:

- Head Nodding
 - if slow continuous nod given to everyone, often signals encouragement
 - fast head nod probably signals agreement, and, as a result, tends to elicit additional comments of the same type: moderators should try to restrict it
- Short Verbal Responses
 - neutral responses such as “Okay”, “Yes” or “Uh huh” are okay
 - avoid responses that suggest accuracy or agreement (“correct”, “that’s good”, “excellent”)
- Humour
 - smiles typically connote warmth, caring and empathy and are powerful factors in promoting conversation.
 - humour is a powerful bonding agent too, but can fall flat when used excessively

Responding to Participants' Questions:

Questions before the focus group begins

- often about the purpose of the focus group, about who's using the results etc.
- give answers but not give information that might be leading!

Questions after the introduction

- Don't invite these questions: risky, because there are a number of questions you may not want to answer until the end of the group. This can make the moderator appear defensive, evasive and apologetic.
- The moderators introduction usually takes only a few minutes and you should move directly into the opening questions.

If someone does ask a question:

- if it's a straightforward question that won't bias the discussion: answer it
- if it could influence the group, delay; say something like: "I'd love to answer that question at the end of our discussion. Remind me and we'll talk about it then."

Questions during the focus group

Can relate to a variety of topics, moderator will have to consider each of these individually.

Questions at the conclusion of the group

- are welcomed and encouraged
- If a questions was postponed, be sure to bring it up at the end of the focus group
- Here you can tell more about the study: what other groups have said etc.

Hello, my name is xxxx and we are here (with your teacher/curator – if with schoolchildren) to find out if a new way of finding and organising/collecting material from museums, archives, libraries and audio visual collections works for you. We highly appreciate your participation, and the opportunity to learn from you.

We are going to search for cultural materials using a new system called PATHS. This is not the final finished system, it is the first version we have built and we need feedback from you to tell us what works well, and what we could improve.

There are no right or wrong answers. We expect that you will have different points of view. Please feel free to share your point of view even if it differs from what others have said. Don't feel like you have to respond to me all the time. If you want to follow up on something that someone has said, you want to agree, or disagree, or give an example, feel free to do that. Feel free to have a conversation with one another about these questions. I'm here to ask questions, listen and make sure everyone has a chance to share. We're interested in hearing from each of you. So if you're talking a lot, I may ask you to give others a chance. And if you aren't saying much I may call on you. We just want to make sure all of you have a chance to share your ideas. This is an activity in which we want to learn from you. You are part of a set of focus groups. We have groups running in the UK, Italy and Spain. And we have some work being done in a computer lab in Sheffield, UK.

So we are going to start with each of you doing a little bit of form filling. This is so that we can make you all into statistics and make the methodology work.

Then we are going to have a first look at the PATHS system, looking at the main sections and we'll ask you what your first impressions are. After that we'll start trying to find some information on the site and creating a sort of pathway of the information, to tell the story of what we have found and what we would like to share with other people.

Finally we will have an open discussion on what you liked or disliked.....so feel free to note things down as we are going through the demonstration.

As you see we are making a video/audio recording of our session; this will be used only by our colleagues who are not able to be in xxxxx today but also would like to learn from your experience. It is sort of an additional set of notes. All video footage / audio recordings and data collected will be treated in confidence. We will not disclose any of the video or data collected to others. All data collected through questionnaires and your responses will be anonymised.

Before we start with our demonstration, I would like to say that what we do is for the purposes of a study and will not be used for any other purpose – we are not going to publish anything about you individually but we might show the video at conferences when we are discussing user thoughts, behaviour and wishes. If we especially like something you have done we will ask you for permission to share it on the Internet.

Also you are welcome to ask questions and if you have a different opinion from someone else please share your thoughts! May I only ask you not to talk at once?

Ice Breaker, to get the conversation going, go around the table getting people to introduce themselves:

Please could you say who you are, and a little bit about yourself?

Thank you everyone, let's fill out the formsthis form gives some information about you. I also would like to ask you to sign a consent form and we are ready to start!

Participant Information Sheet

Consent form

Individual questionnaire section 1

10.10: Demo start

Demonstration and introduction to PATHS, a tour of the system and the key features, including: **10MINS.**

Objective	This part provides an overview demonstration to the PATHS system. It should demonstrate the main functions of the system and give sufficient information so that the participants understand the system at a basic level..
Actors	<ol style="list-style-type: none"> 1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	10 min

Thank you for doing that, now we are going to show you a brief overview of the PATHS system, and then ask you what your first impressions are before we look at some things a little deeper.

Please remember:

The 5-second pause (before asking next question):

- often used after a participant comment;
- often prompts additional points of view or agreement with previously mentioned position.

The probe:

- request for additional information, e.g. Would you explain further? / Can you give us an example? / Tell us more. / Is there anything else? / Please describe what you mean. / I don't understand.
- Use the probe a few times early in the discussions to communicate the importance of precision in responses.

First impressions of PATHS – go to demo website and show (also have screen shots in PowerPoint in case of internet connection problems – these will be developed and distributed prior to the evaluations):

- **Homepage** - - Talk about PATHS, what it does, the purpose
- **Show the Search section**
- **Show the Explore section**
- **Show the Paths section**

10.20: Discussion 1 start

Group Discussion 1 (to gather first impressions of PATHS). Discussion to be recorded. 20MINS.

Objective	This part is a focus group discussion to capture the first impressions of the PATHS system and to identify what participant’s cultural heritage information behaviour is.
Actors	1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	20 min

Now, you have seen an overview of PATHS what are your first impressions?

- For example, do you like the interface?
- Do you think it will be useful for you?
- How exactly – for example can you use it when you have to write an essay/within your work/for your personal interest?
- From what you have seen, is there anything which is not clear or you do not like?

Where would you start when you wish to develop a:

- **new exhibit**
- **complete an assignment**
- **find information on your topic of interest**
- **develop teaching materials?**

CHANGE THE EXAMPLE TO SUIT THE GROUP

We have some cards with different things you might do when you are using cultural heritage resources and we’d like you to place these in the order you would do them, from first to last.

ASK THE GROUP TO PLACE THESE IN ORDER AND ASSISTANT MODERATOR NOTE ORDER.

HAVE A4 SIZE CARDS ON THE TABLE WITH:

- Developing an overall concept or idea [concept]
- By collecting/searching for specific items you know you want to use [collect]
- Browsing for items that may be interesting to use [collect]
- By linking items together in a meaningful order/sequence [create]
- Adding titles, descriptions and other contextual information [create]
- Saving or bookmarking items for later use [create]
- Updating and modifying your resource [create]
- By sharing/showing your resource with other people [communicate]
- By Viewing existing resources [consume]

And where would you typically carry out these activities?

WRITE ONLINE and/or OFFLINE ON THE CARDS AND ASSISTANT MODERATOR TAKE NOTE.

Now we are going to ask you to fill in some answers on your questionnaire again so that we can also see your own view of PATHS.

10.40: Questionnaire filling start

Section 2 of the questionnaire (to provide written feedback of first impressions). 5MINS.

Objective	This part requires participants to complete Section 2 of the Individual questionnaire to record their first impressions of the PATHS system.
Actors	<ol style="list-style-type: none"> 1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	5 min

10.45: Demonstration 2 start

Demonstration of a number of Tasks as detailed below

- Alternate demonstrating tasks on Alinari content and then on the Europeana content in order to identify evaluation of system rather than content. 15MINS.
- Allow some discussion after demonstrating each Task
- Then ask them to answer the relevant section of the questionnaire

Objective	This part provides a deeper demonstration of the PATHS system. It should demonstrate the main functions of the system and give sufficient information so that the participants understand the system at a deeper level.
Actors	<ol style="list-style-type: none"> 1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	20 min

Task 3 Explore: Demonstrate the Explore function using the following tasks:

- 3.1 Find examples of church architecture, focussing on church spires – on Europeana content
- 3.2 Find examples of bridges, particularly railway bridges, and those showing trains – on Alinari content

Show PowerPoint screen shot of the image and tag cloud



What did you think of the Explore function? Do you prefer the image cloud or the tag/word cloud?

Allow some discussion, then ask them to fill in the *Explore* section on the questionnaire.

Task 4 Search: Demonstrate the Search function using the following tasks:

- 4.1 Find the organisation who holds the Owner’s Rights of the image of a painting by Edgar Degas of his sister Marguerite , and save some items to the Workspace – Europeana content
- 4.2 Which artist painted ‘Fields in the Spring Sun’ , and save some items to the Workspace – Alinari content

What did you think of the Search function? What do you think of how items are displayed?

Allow some discussion, then ask them to fill in the *Search* section AND *Item Record* questions on the questionnaire.

Task 5 Consume: Demonstrate following a pre-specified path:

- 4.1 **PARTNERS** – find and then follow one of your own paths – on either the Europeana or Alinari prototype
View the Path, its content, move backwards and forwards along the Path and view any related information you find of interest.

What did you think of following a path?

Allow some discussion, then ask them to fill in the *Finding/following a path* section on the questionnaire.

Task 6 Create Path: Demonstrate the Create Path function.

Create a simulated, pre-assigned path

- Use 5 of the items in the PATHS workspace
- Order the items into a meaningful sequence
- Add supporting text using the tools provided

TAILOR THE SCENARIO BELOW:

(A scenario is offered based upon the following, amend according to the particular group, eg if with students/schoolchildren then 'You need to develop a talk about your local area for an assignment for your teacher. If with Curators, 'You are developing materials to support a new exhibition ...')

You need to develop a.... talk/exhibition/publication/learning resource/research paper/blog post/tour guide

about a... xxxxxx

for an audience of... general public/friends & family/tourists/art lovers/students/subject experts/local historians/

Then demonstrate:

- **CREATE** a path based upon the above scenario – using a pre-defined path (with Powerpoint copy as back up in case of technical difficulties). **RE-CREATE YOUR OWN PATH with the items you already know about.**
- Discuss the elements of the topic you wish to focus on
- Explore the content in PATHS to find approximately 5 items that illustrate the topic
- Add items of interest into the workspace
- Order the selected items into a meaningful sequence
- Add supporting text using the tools provided – enough for users to follow your path as a standalone resource.
- Once you have completed your path please **SAVE** it.
- Then, go back to your path and **EDIT** or change one of the items or some of the narrative you have written. Then **SAVE** it.
- Then Share it.

What did you think of creating a path?

Allow some discussion, then ask them to fill in the *Path Creation* section on the questionnaire.

11.00: Discussion 2 start

Group Discussion 2 (to gather deeper impressions of PATHS). Discussion to be recorded. 20MINS.

Objective	This part is a focus group discussion to capture the deeper impressions of the PATHS system.
Actors	1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	20 min

Now you are a little more familiar with the concept of a Path I'm going to ask if you think that a Path format is suitable for different types of resources:

HAVE THE FOLLOWING ON A4 CARDS AND ASK THEM TO AGREE AS TO SUITABLE OR NOT SUITABLE FOR A PATH. ASSISTANT MODERATOR TO WRITE ON CARDS WHETHER GROUP AGREED SUITABLE/NOT SUITABLE/MIXED VIEW.

So, would a Path be suitable for:

MODERATOR TO USE 'WHY' / 'WHY NOT' PROBES

- An Exhibition?
- A Guided tour?
- An Interactive display?
- An Activity trail?
- A Learning activity?
- A school assignment?
- An academic lecture?
- A lecture for the general public or group of enthusiasts?
- A lesson for students in school?
- A lesson for students in college or university?
- A Timeline?
- A Podcast?
- A Story or narrative?
- A feature article?
- A Newsletter?
- A Promotional leaflet?
- A Web site?

Is there anything else you might use a Path for that we have not covered?

11.25: Questionnaire 3 start

Section 3 of the questionnaire (to provide written feedback on deeper impressions of PATHS). SAME questionnaire to keep data together. 10MINS.

Objective	This part requires participants to complete Section 3 of the Individual questionnaire to record their deeper impressions of the PATHS system.
Actors	<ol style="list-style-type: none"> 1. Moderator 2. Second moderator taking notes (and distributing and collecting forms) 3. Teacher and/or Curator (if with children) 4. c. 5-10 participants in the focus group
Duration	5 min

Once Section 3 of the questionnaire is complete then:

11.30:

Final comments

Is there anything we haven't covered that you would like to discuss?

Answer any final questions.

Thank the group for participating and wish them a safe journey home.

Appendix 3 Laboratory Profile Questionnaire

Participant ID Number:

Gender

1. Female
2. Male
3. Prefer not to say

Age group:

1. Under 18 years
2. 18-25 years
3. 26-35 years
4. 36-50 years
5. 51-65 years
6. Over 65 years
7. Prefer not to say

What is your current main occupation or status?

1. Student at school
2. Student at College /University
3. Lecturer/Professor
4. School Teacher
5. Librarian/Information specialist
6. Curator/Archivist
7. Researcher
8. Creative
9. Manager / Administrator
10. Marketing / Promotion
11. Retired
12. Carer / Parent
13. Not employed / Not in education
14. Other

How experienced are you in using the internet?

1. Advanced user
2. Intermediate user
3. Basic user
4. No experience

How experienced are you in using web search engines?

1. Advanced user
2. Intermediate user
3. Basic user
4. No experience

How often do you search for cultural heritage information online?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very often

Have you used any of the following websites for information about cultural heritage?

	For work	For study	For leisure	Never used
Wikipedia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Europeana	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Twitter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YouTube	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flickr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LinkedIn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blogs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local authority sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tourism and travel sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What's on guides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Online news and magazines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please state:

Do you look for any of the following types of cultural heritage information? (Tick all that apply)

	For work	For study	For leisure	N/A
News	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reports and data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Magazine style features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio / podcasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catalogue of items in a collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detailed description of items in a collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Images of items in a collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Academic literature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expert comments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General user comments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please state:

How often do you look for cultural heritage information online? (Tick all that apply)

	Often	Sometimes	Occasionally	Never
General interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entertainment / enjoyment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparing for a visit in person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Following up from a visit in person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchasing tickets, gifts or publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research for work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research for study	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research for leisure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with enthusiasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with experts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please state:

When looking for cultural heritage information online:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I want to see everything that is available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I only want to see the highlights of the collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I only want to see items with images	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I want to get to the relevant facts as quickly as possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often browse around a topic to build up a more detailed picture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am confident in finding what I am looking for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is too much information and I don't know what to select	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to follow a guided tour or trail on a specific theme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to save or bookmark items to view again later	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to share interesting things I find with other people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Have you ever used items from online cultural heritage collections to create any of the following?
(Tick all that apply)

	Often	Sometimes	Occasionally	Never
Exhibition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guided tour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interactive display	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Activity trail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Learning activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lecture - academic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lecture - public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lesson - students under 18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lesson - students over 18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Podcast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Story or narrative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feature article	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newsletter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promotional leaflet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please state:

1. PATHS P1 Profile

Appendix 4 Laboratory evaluation Task Feedback Questionnaire

Participant ID Number:

Answer/comments on Task A:

Rate your experience of Task A against the following criteria:

	Familiar +3	+2	+1	0	-1	-2	Unfamiliar- 3
Your familiarity with the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Easy +3	+2	+1	0	-1	-2	Complicat ed-3
How easy was it to complete the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Enjoyable +3	+2	+1	0	-1	-2	Annoying- 3
How enjoyable was your experience of doing the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer/comments on Task B:

Rate your experience of Task B against the following criteria:

	Familiar +3	+2	+1	0	-1	-2	Unfamiliar- 3
Your familiarity with the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Easy +3	+2	+1	0	-1	-2	Complicat ed-3
How easy was it to complete the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Enjoyable+3	+2	+1	0	-1	-2	Annoying-3
How enjoyable was your experience of doing the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer/comments on Task C:

Rate your experience of Task C against the following criteria:

	Familiar+3	+2	+1	0	-1	-2	Unfamiliar-3
Your familiarity with the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Easy +3	+2	+1	0	-1	-2	Complicated-3
How easy was it to complete the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Enjoyable+3	+2	+1	0	-1	-2	Annoying-3
How enjoyable was your experience of doing the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer/comments on Task D:

Rate your experience of Task D against the following criteria:

	Familiar+3	+2	+1	0	-1	-2	Unfamiliar-3
Your familiarity with the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Easy +3	+2	+1	0	-1	-2	Complicated-3
How easy was it to complete the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Enjoyable +3	+2	+1	0	-1	-2	Annoying -3
How enjoyable was your experience of doing the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What is the title of your path?

Rate your experience of the Path Creation Task against the following criteria:

	Familiar +3	+2	+1	0	-1	-2	Unfamiliar -3
Your familiarity with the subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Easy +3	+2	+1	0	-1	-2	Complicated -3
How easy was it to complete the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Enjoyable +3	+2	+1	0	-1	-2	Annoying -3
How enjoyable was your experience of doing the task?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How would you rate the quality of your path on a scale of 1-10?

Given more time, and/or additional tools and resources, what could you have done to improve the quality of your path?

1. PATHS P1 Tasks

Appendix 5 Laboratory evaluation Feedback Questionnaire
Participant ID Number:

Rate your overall experience of using PATHS against the following criteria:

	Attractive +3	+2	+1	0	-1	-2	Unattractive -3
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Exciting +3	+2	+1	0	-1	-2	Boring-3
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Organised +3	+2	+1	0	-1	-2	Cluttered -3
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Interestin g +3	+2	+1	0	-1	-2	Not interesting -3
d	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Understand able +3	+2	+1	0	-1	-2	Not understand able-3
e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Creative +3	+2	+1	0	-1	-2	Dull-3
f	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Efficient +3	+2	+1	0	-1	-2	Inefficient -3
g	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Enjoyable +3	+2	+1	0	-1	-2	Annoying -3
h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Meets expectations +3	+2	+1	0	-1	-2	Does not meet expectations- 3
i	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Supportive +3	+2	+1	0	-1	-2	Obstructive- 3
j	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Likeable+ 3	+2	+1	0	-1	-2	Unlikeabl e-3
k	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Inventive +3	+2	+1	0	-1	-2	Conventi onal-3
l	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Easy+3	+2	+1	0	-1	-2	Complica ted-3
m	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Useful+3	+2	+1	0	-1	-2	Useless- 3
n	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fast+3	+2	+1	0	-1	-2	Slow-3
o	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Familiar+ 3	+2	+1	0	-1	-2	Unfamiliar -3
p	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If familiar, what did it remind you of?

In your opinion, how well does PATHS support each of the following tasks?

	Very well	Quite well	Neutral	Not very well	Not at all
Fact-finding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finding items related to a topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exploring what content is available in the collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Serendipity / discovering new things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developing ideas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creating resources from cultural heritage collections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sharing content with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with other users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using content created by other users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Which tasks would you be most likely to use PATHS for? (select up to three choices, numbered 1-3, where 1 is most likely)

- Fact-finding _____
- Finding items related to a topic _____
- Exploring what content is available in the collection _____
- Serendipity / discovering new things _____
- Developing ideas _____
- Creating resources from cultural heritage collections _____
- Sharing content with others _____
- Communicating with other users _____
- Using content created by other users _____

Thinking of the tag/word cloud - did the Explore function seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How would you prefer to explore items - using an image cloud (see example below) or using a tag cloud?

1. Image cloud
2. Tag/word cloud
3. Both

Could we improve the Explore function?

1. Yes
2. No

If Yes, please tell us how:

Did the Search function seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Could we improve the Search function?

1. Yes
2. No

If Yes, please tell us how:

Did the layout of the Search Results page seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Could we improve the layout of the Search Results page?

1. Yes
2. No

If Yes, please tell us how:

Did the content of the Search Results page seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Could we improve the content of the Search Results page?

1. Yes
2. No

If Yes, please tell us how:

Did the layout of the Item Record page seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Could we improve the layout of the Item Record page?

1. Yes
2. No

If Yes, please tell us how:

Did the content of the Item Record page seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Could we improve the content of the Item Record page?

1. Yes
2. No

If Yes, please tell us how:

Did finding a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did following a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you feel that there is flexibility in how you can follow a Path? For example, moving between items on the Path, changing direction or be able to stop, start and go backwards?

1. Very flexible
2. Flexible
3. Neutral
4. Limited flexibility
5. No flexibility

Could we improve following a path?

1. Yes
2. No

If Yes, please tell us how:



How likely are you to comment on a Path?

1. Highly likely
2. Likely
3. Neutral
4. Unlikely
5. Highly unlikely

How likely are you to rate a Path?

1. Highly likely
2. Likely
3. Neutral
4. Unlikely
5. Highly unlikely

How likely are you to tag items in a Path?

1. Highly likely
2. Likely
3. Neutral
4. Unlikely
5. Highly unlikely

Could you see who created a path?

1. Yes
2. No

Would you want to see other paths from the same person?

1. Yes
2. No

Who would you want to see paths by? (tick all that apply)

1. Cultural organisations
2. Museum/Gallery Curators
3. Museum/Gallery Educators
4. Teachers
5. Students
6. Researchers
7. Other users
8. None of these

Would it be useful to see related items or related paths?

1. Very useful
2. Useful
3. Neutral
4. Not useful
5. Completely useless

Would it be useful to see related external content (e.g. from Wikipedia)?

1. Very useful
2. Useful
3. Neutral
4. Not useful
5. Completely useless

Did the Create a Path function seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very useful	Useful	Neutral	Useless	Completely useless
b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very inventive	Inventive	Neutral	Conventional	Very conventional
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Could we improve the Create a Path function?

1. Yes
2. No

If Yes, please tell us how:

Did collecting items for a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did annotating items in a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did adding items to a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did re-ordering items in a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did describing a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did saving a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did editing a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did sharing a path seem:

	Very easy	Easy	Neutral	Complicated	Very complicated
a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How would you most prefer to share a path?

1. Share your path for reuse and allow others to edit in the future
2. Share your path but not allow editing
3. Keep your path private
4. Another way

Could we improve the Path Creation function?

1. Yes
2. No

Please comment:

Would you want to use PATHS... (please tick all that apply)

	To Search	To Explore	To Find & Follow a path	To Create a path
On a desktop computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On a laptop/netbook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On a mobile device - phone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On a mobile device - tablet computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On a Microsoft Surface Table	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On a kiosk style touch screen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using something else	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Something else - please tell us...

Would you want to use PATHS... (please tick all that apply)

	To Search	To Explore	To Find & Follow a path	To Create a path
On Facebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On any other social media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other social media - please tell us...

1. PATHS P1 Feedback

Appendix 6 Laboratory evaluation Interview Schedule

Lab Evaluation Post Task Interview

Think-after protocol

Replay screen capture of path creation:

Ask open-ended questions to clarify actions

Prompts for discussion:

What topic did you choose for your path?

Why did you decide on this topic?

Did you modify the topic as you progressed through the task?

Who might be interested in your path and what would they use it for?

How did you find suitable content items for your path?

Ask about specific search tactics/keywords used/reformulating/browsing activity...

What criteria did you use for choosing items for your path?

How did you decide you had enough items?

How did you order/organise the items in your path?

To what extent does your path develop a story or narrative?

What story or ideas is it trying to get across?

Do you think it is successful in telling this story?

What would improve it?

Additional questions

What was the simplest aspect of the path creation activity?

What was the most difficult aspect of the path creation activity?

What was the most enjoyable aspect of the path creation activity?

What was the least enjoyable aspect of the path creation activity?

What did you think of PATHS overall?

Who do you think is most likely to use PATHS and in what context?

Appendix 7 Laboratory evaluation tasks

Instructions for PATHS User Study

IMPORTANT: Following each task, complete the relevant questions in the online form provided.

Intro:

[Time Allowed: 10 minutes]

Take a few minutes to explore PATHS and familiarise yourself with the functionality offered.

- Try out each of the three main sections – Paths, Explore, Search
 - Follow a path of your choice
 - If you see any items of interest, add them to your workspace
 - Try commenting, rating or tagging items of interest
 - View your workspace by clicking on the tab at the right hand side of your screen
 - Once you have finished familiarisation, Clear your workspace
-

A) Answer any THREE of the following questions:

[Time Allowed: 5 minutes]

[Type your answer into the online form provided, and add the items you used to answer this question into your workspace]

- a) Which artist painted 'The Blaydon Races'?
 - b) What slogan was used on wartime posters to recruit women into the ATS?
 - c) Which railway company built the art deco concourse at Leeds station?
 - d) In which museum collection can you find a painting by Edgar Degas of his sister Marguerite?
 - e) At what location was the Morley Industrial Co-operative Society originally based in 1869?
-

B) Complete any ONE of the following tasks:

[Time Allowed: 5 minutes]

[Add relevant items to your workspace and briefly describe what you have chosen in the online form provided]

- a) Find several items illustrating aspects of daily life during war-time Britain, and save to your workspace.
- b) Find as many examples as you can of people engaged in different leisure activities, and save to your workspace.

IMPORTANT: Following each task, complete the relevant questions in the online form provided.

C) Answer any ONE of the following questions:

[Time Allowed: 5 minutes]

[Type your answer into the online form provided and add the items you used to answer this question into your workspace]

- a) Which of the following landscape painters were NOT working during the 19th century?
 - Henry Moret
 - Salomon Rombouts
 - Carlo Antonio Tavella
 - Edmond de Schamphaleer
 - Jean-Baptiste-Camille Corot
- b) Identify at least six English towns in which trams were once operational.

D) Complete any ONE of the following tasks:

[Time Allowed: 5 minutes]

[Save the item to your workspace and comment upon it in the online form provided]

- a) Find an artwork you would like to display in your own home
- b) Find a photograph that reminds you of a holiday or trip you have taken
- c) Find something that demonstrates the horror of war
- d) Find an object or scene that you think epitomises 'happiness'

When you have completed all of the tasks A-D, clear your PATHS workspace and wait for further instructions.

**Path-Creation Task:
minutes]****[Time Allowed: 30****What is a path?**

A path is set of selected items in a cultural heritage digital library. These items are usually ordered in some way (e.g. by theme, date...), and supported by contextual information and descriptions that enable the user to work through the path without expert assistance.

A path is created around a topic of interest (e.g. a person, place, art movement, event, subject...). It might be used as an online exhibition, a learning resource, a summary of the collection highlights, a guided tour, a promotional instrument, a reference work, or even as a story-telling device. Whatever the purpose of the path, it is likely that it is designed for a specific audience (e.g. museum visitors, students or school children, tourists, local history enthusiasts, research community...).

Scenario – General User:

For this exercise you should imagine you are a history or art enthusiast who wants to share their knowledge and interests with friends and other web users. You are to create a path which you will share via a blog and/or social media, on a topic such as a famous person or event from history, an artist or art topic, or a historical guide to a place, activity or object. Your goal is to create a path which is interesting and/or thought-provoking, and will be shared and discussed amongst other like-minded people.

Instructions:

- Create a path on a topic of your choice.
- Use the various search and browse options in PATHS to find items for your path.
- When you find items you want to include, add them to your PATHS workspace.
- Use your PATHS workspace to construct your path (see next page for tips on use).

Tips:

The path-creation task is open to personal interpretation, but in order to complete it you may wish to consider the following actions

- Decide on a topic of interest (e.g. a subject, place, person, event, artwork)
- Define your target audience and consider their needs
- Think about what aspects of this topic you want to cover and what messages you want to convey.

IMPORTANT: When you have finished this task to your satisfaction, please do the following:

- **PUBLISH your path**
- **Complete the relevant questions in the online form provided**

Using The PATHS Workspace

- For a quick view of your workspace at any time, click on the tab at the right hand side of your screen
- To create a path, add items to your workspace, then click on the Create Path button
- The Create Path workspace is illustrated below
- In the Create Path workspace you can annotate, edit, re-order and delete items, according to your needs
- When you initially use the Create Path button it includes all items from your workspace
- You can add additional items to your path at a later stage
- Once created and/or published, your path will appear under the My Paths tab at the right hand side of your screen

The screenshot shows the PATHS workspace interface. At the top, there is a navigation bar with the PATHS logo, a search bar, and user information (Paula, Logout). Below this is a secondary navigation bar with tabs for 'Paths', 'Explore', and 'Search'. The main workspace contains a list of items with 'Save' and 'Unpublish' buttons. Three callout boxes provide instructions:

- Callout 1 (Left):** "Add a Title, Description & Tags to your path to help people decide whether they want to follow it". It points to the 'A Tour of Leeds Landmarks' item, which has a description box containing "A whistle-stop tour of some of Leeds most famous landmarks past and present." and a tags box containing "Leeds Yorkshire landmarks local".
- Callout 2 (Top Right):** "Add annotations to include as titles and descriptions for each of the items in your path". It points to the 'Leeds Town Hall' item, which has a title box containing "Leeds Town Hall" and a description box containing "One of the few instantly recognisable landmarks in Leeds, the Town Hall clock is a permanent feature on the city skyline."
- Callout 3 (Bottom Right):** "Click & hold an item, then drag & drop to move it to a new position within your path". It points to the 'Leeds City Art Gallery interior' item, which is highlighted in yellow.

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Appendix 8 Laboratory evaluation Participant Information Sheet

PATHS Project User Study Research Information Sheet

1. Research Project Title: PATHS – Personalised Access to Cultural Heritage Spaces: User Study

2. Invitation paragraph

You are being invited to take part in PATHS, an EU-funded collaborative research project between the University of Sheffield and five other organisations; University of the Basque Country, MDR Partners, Asplan Viak Internet Ltd, i-Sieve Technologies Ltd, and Alinari 24 Ore Spa. Before you decide to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, which explains what will be involved and how the information you provide might be used in support of the research goals. Thank you for reading this.

3. What is the project's purpose?

Nowadays, significant amounts of cultural heritage materials exist online (e.g. collections from museums, art galleries, archives, libraries and historic sites), offering a wealth of rich data to a wide variety of potential users. Information is available through web sites, digital libraries, encyclopaedic resources such as Wikipedia, as well as portals such as Europeana, and is offered in many different formats, with varying amounts of supporting descriptions. However, given the sheer volume and diversity of information, users may find it difficult to navigate the collections to locate exact items of interest and to interpret their meaning. For example, keyword-based searches provide limited forms of access; many users may be unfamiliar with cultural heritage terms and concepts, and often there is limited support for users as they gather information to extend their knowledge and learn new things. At the same time, cultural heritage institutions are looking at new ways for users to experience their collections and are using technologies such as social networks, user participation and personalisation to enrich the online experience and to encourage deeper engagement.

We aim to build a system that will address these issues by enabling exploration of digital cultural heritage collections, enhanced by personalisation and recommendations, along with tools for information organisation and sharing, and supporting the processes of knowledge discovery and learning. More information about PATHS can be found at the project website <http://www.paths-project.eu/>. This project will end in 2013.

4. Why have I been chosen?

We aim to build a system that fully supports users' information needs and preferences and for this to be achieved, we need to get input from a wide variety of users, both expert and non-expert, in areas such as cultural heritage, education, media and tourism professions, as well as a wide variety of general users with an enthusiasm for or interest in using cultural heritage collections for leisure, entertainment, study or personal research. You have been identified as potentially belonging to one of these expert or non-expert user categories.

5. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be required to sign a consent form in advance, or in the case of online research to tick a box to the same effect. You are free to withdraw from the research at any time. You do not have to give a reason.

6. What will happen to me if I take part?

If you agree to take part in the study you will be asked to undertake the following activities:

- A short preliminary questionnaire to profile your prior experience online and in cultural heritage activities
- A number of tasks which involve using the PATHS prototype system
- Additional post-task questionnaire and/or interview to discuss your experience of the tasks

Whilst you are completing the tasks we will also record your on-screen activities to help prompt the discussion of your experience, and for future reference.

7. What do I have to do?

Before you agree to take part you will be provided with full details of the format of the PATHS user study activities, with an opportunity to ask questions and clarify anything about which you are unsure. During the evaluation we ask that any information you provide is accurate to the best of your knowledge, and where your opinion is sought that you provide honest and frank responses. You will be given specific tasks to complete to the best of your ability and in any way you feel is appropriate. There are no right or wrong responses to any of the research exercises and you will not be judged on anything you do or say in this context.

8. What are the possible disadvantages and risks of taking part?

There are no foreseen risks involved in taking part in this study. If there is any information you do not wish to provide, you are free to decline.

9. What are the possible benefits of taking part?

By contributing to this research project it is hoped that we can use your input to refine the new PATHS system. In turn, PATHS aims to improve access to cultural heritage resources, supporting exploration of collections and creative use of materials in new ways that may be of use to yourself and others in the context of work, education and/or leisure interests.

10. What happens if the research study stops earlier than expected?

If for any reason the study has to stop, we will announce this on the project website and make sure that all data supplied up to that point is managed in accordance with the University of Sheffield's research ethics procedures.

11. What if something goes wrong?

If you have any questions about the study or wish to make any complaint, please contact Dr. Paul Clough at the University of Sheffield on 0114 222 2664, or email p.d.clough@sheffield.ac.uk. Your question/complaint will then be handled accordingly. If, however, you feel your complaint has not been handled satisfactorily then you can contact the University's 'Registrar and Secretary'.

12. Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential and will be managed in accordance with the University of Sheffield's research ethics procedures. All information you provide will be anonymised before analysis takes place, and you will not be able to be identified in any reports or publications resulting from the research.

13. What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

The information sought from you is about your needs, preferences and experiences in using cultural heritage collections online, and in particular via the new PATHS system. Input from representative end users is vital in building and refining a system that is easy to use and that provides information and tools to support the various types of activities that its users may wish to complete, in the way that feels most comfortable and useful to them.

14. What will happen to the results of the research project?

The information you provide will be combined with that from other participants and once analysed will be used to make recommendations for the refinement and ongoing development of the PATHS system.

15. Who is organising and funding the research?

This work is supported by funding from the European Union under the Seventh Framework Programme (FP7). Information on this programme is available at http://cordis.europa.eu/fp7/home_en.html.

16. Who has ethically reviewed the project?

This project has been ethically approved via the ethics review procedure operated in the Department of Information Studies at the University of Sheffield. The University's Research Ethics Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

17. Contact for further information

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Thank you for taking part in this project!

