PATHS in context: User characteristics and the construction of cultural heritage narratives

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Abstract

There is ample evidence of the influence of individual differences on information-seeking behaviours. Trailways and paths are increasingly important objects to support internet navigation. The EU-funded PATHS (Personalised Access to Cultural Heritage Spaces) project is investigating ways of assisting users with exploring a large collection of cultural heritage material taken from Europeana, the European aggregator for museums, archives, libraries, and galleries. A prototype system has been developed that includes innovative functionality for exploring the collection based on Google map-style interfaces, data-driven taxonomies, and supporting the manual creation of guided tours or paths along with the use of personalised (and nonpersonalised) recommendations to promote information discovery. After analysing the paths created by participants during an extended user evaluation, this paper discusses the effect of individual differences on path creation and characteristics.
Keywords: digital libraries, individual differences, interactive evaluation
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1 Introduction

As the amount of information available through the internet grows and its complexity increases, so too does the necessity of helping users navigate the cultural heritage information space (Brenner & Mihalega, 2006). Traditional information retrieval behaviours may be appropriate for domain experts who are performing known-item searches (Sutcliffe & Ennis, 1998), but novice users need guidance and assistance to achieve their information goals. Walden's Paths was the first system to offer manually curated paths through a digital collection (Shipman et al., 1996). Based on a user requirements analysis (Goodale et al., 2011), the PATHS[1] system has been developed to support a number of activities to help users make sense of Europeana,[2] including path creation by expert and non-expert users, path facilitation by teachers and cultural heritage educators, and path consumption by students and visitors.

In this paper we present an initial analysis of the paths that have been created with the second prototype of the PATHS system. Based on feedback from the first prototype (Fernie et al., 2012), the paths editing functionality was expanded, allowing users to create branching and complex paths. The question that we address here is thus whether people use the more updated functionality and if so, then how this impacts the paths they create.

2 Methodology

2.1 Sample

Participants were selected by a non-probability convenience sampling method (Bryman, 2012). The main body of participants was recruited on a convenience basis via university staff and student volunteer email lists; additional expert participants were recruited on an ad hoc basis through existing contacts known to the evaluation team.

In total, 34 participants (19 women) completed the full evaluation protocol. Of these participants, 10 were classified as domain or subject experts. The other 24 were classified as non-experts (novices).

[1] http://www.paths-project.eu/
[2] http://europeana.eu/

Participants also rated their level of internet experience on a four-point scale: Advanced (74%), Intermediate (24%), Basic (2%), and No experience (0%). Participants' ages ranged from 18-25 years (23.5%), 26-35 (23.5%), 36-50 (23.5%), 51-65 (23.5%), to over 65 years (5.9%).

2.2 Study design

To investigate this study's research question, an experiment was conducted in which participants were asked to use the PATHS system under controlled laboratory circumstances. During the evaluation, participants were asked to complete five short navigational and information-seeking tasks to familiarise themselves with the mechanics of the system, including finding and following paths, and finding and collecting individual items. The main task (30 minutes) was a creative and exploratory simulated work task, informed by the Interactive IR evaluation framework (Borlund 2003): participants were asked to create a path based on a historical or art-focussed topic in order to stimulate discussion and to encourage further use of cultural heritage resources.

Participants subsequently completed an online feedback questionnaire and were interviewed on a semi-structured basis (15-30 minutes) about their experience. All of the data collection instruments are available as appendices in Griffiths et al. (forthcoming).

3 Results

3.1 Path Structure

All of the paths created by participants were manually classified into three types, depending on the nature of their structure. Linear paths (24%) have at most one branching node, which is defined as a place where a user could follow two items from a single item. Branching paths (29%) have two or more instances of branching nodes. Complex branching paths (47%) have at least one instance of a branching node off of a branching node. Examples of all of the types of paths created by participants are shown in figures 1 to 4.

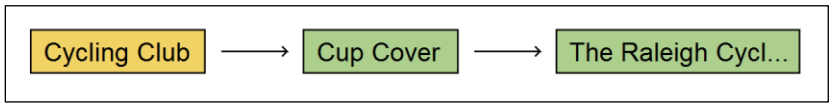

Figure 1: Example of a Linear path: Horizontal

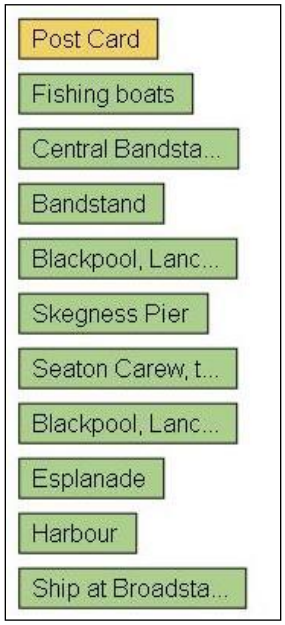

Figure 2: Example of a Linear path: Vertical

Figure 3: Example of a Branching path

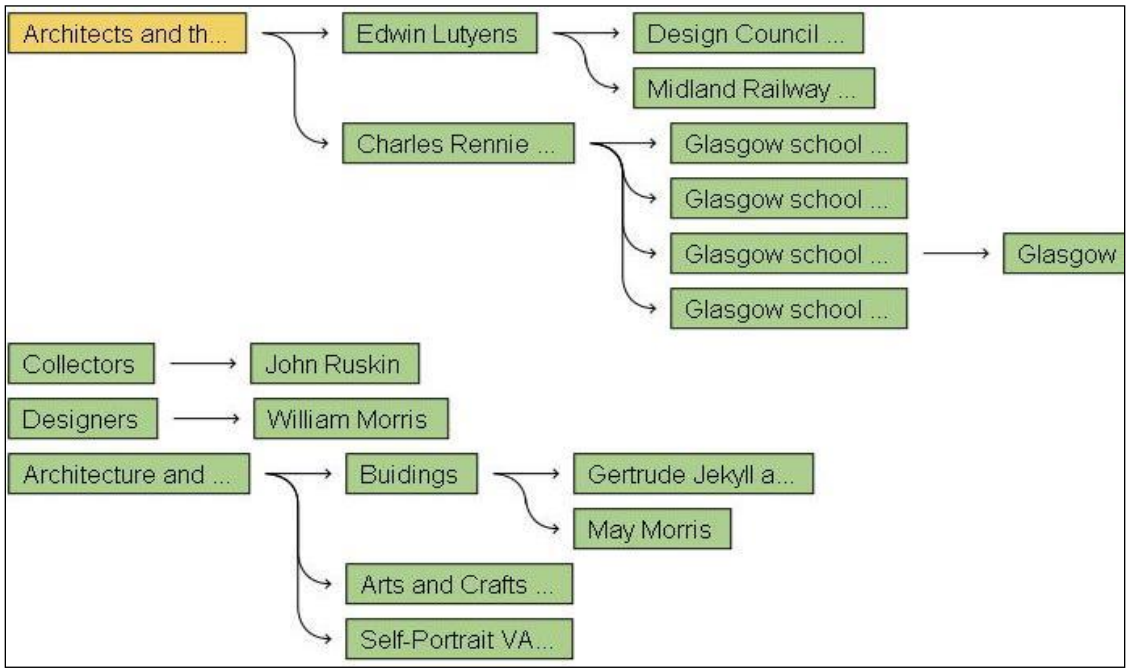

Figure 4: Example of a Complex Branching path

The use of branching hierarchical structures in the path allowed for more complex narratives to be constructed, and 23% of paths were ordered by narrative or story. Other organisational schema included thematically (50%), chronologically (9%), by location (6%), “importance” of items (3%), and no particular order (6%).

3.2 Age

As the age of participants increased, they tended to create simpler and more linear paths. No participants under age 25 created linear paths, but 25% of participants aged 26-65 years and all participants older than 65 years created linear paths. Participants aged 18-25 also had the highest percentage of complex branching paths (62.5%). Furthermore, age is negatively associated with both the total number of nodes participants included in their paths ($r = -.38$, $p = .029$) and the number of titles they changed ($r = -.38$, $p = .028$).

3.3 Gender

Overall, female participants created more linear (26%) and branching (32%) paths than complex branching (42%) paths, while male participants created fewer linear (20%) and branching (27%) paths than complex branching (53%) paths. We also found that women added a greater number of descriptions (approximately 40% more) to individual nodes than men.

3.4 Internet experience and domain-specific knowledge

As might be expected, the more experienced with using the internet participants were, the more likely they were to add text nodes (an aspect of PATHS functionality that is relatively non-obvious). No users with basic internet experience added text nodes, but 29% of intermediate and 46% of advanced users did. Further, only advanced internet users included “composite” nodes in their path. A standard path node consists of a single item; composite nodes are created when an entire page of search results or

thesaurus topic items is added as a whole to a user's workspace. No domain experts used these information-rich but specificity-poor "composite" nodes. Figure 5 shows a standard path node; note the rich metadata in the "About the original item" section. Figure 6 shows a composite path node.

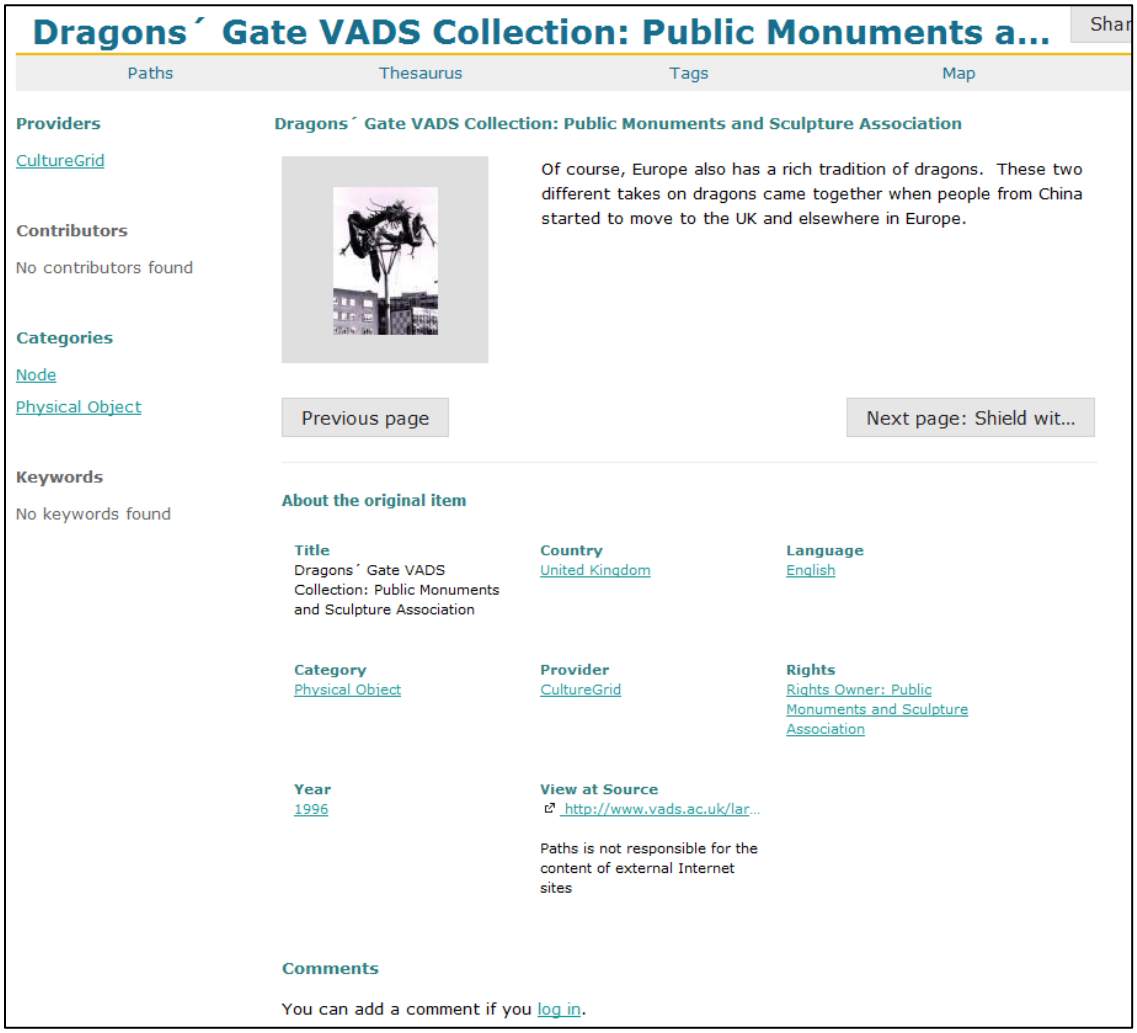

Figure 5: Example of a standard path node.

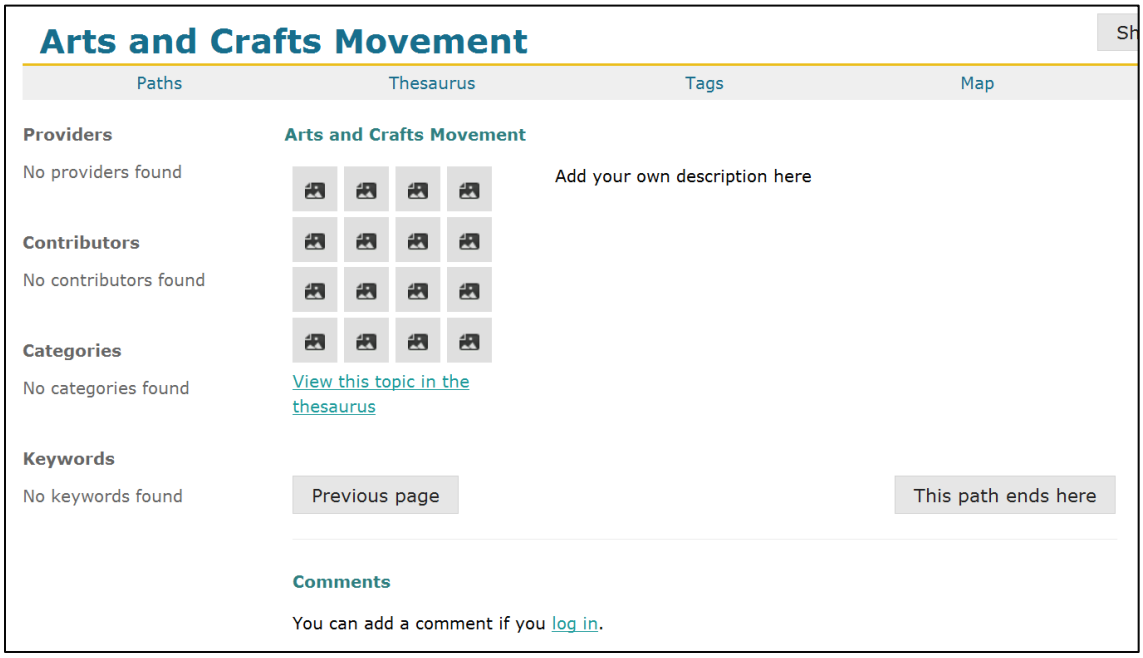

Figure 6: Example of a composite node (based on a thesaurus topic)

4 Discussion

It seems that age, gender, internet experience, and domain knowledge all have a role to play in understanding how people use the PATHS system and create trails or paths. Table 1 shows which user characteristics have shown an influence on path creation behaviours.

	Age	Gender	Internet experience	Domain novice/expert
Path structure	X	X		
No. of nodes	X			
No. of titles changed	X			
No. of descriptions added		X		
No. of text nodes added			X	
No. of composite nodes			X	X

Table 1: User characteristics that influence path creation behaviours

Given the system's computer-based nature, it is unsurprising that older participants tended to create simpler and less feature-rich paths. Age of user could be a key concern when PATHS moves beyond the prototype stage. Similarly, it was observed that more advanced internet users tended to include more complex nodes (both textual nodes and composite nodes). Perhaps because they reflect a lack of discernment, composite nodes, which include much immaterial information, were spurned by expert users.

Gender seemed to be related to two PATHS behaviours: adding descriptions and structuring paths. First, women added more descriptions to their nodes than did men. Second, men created proportionally fewer linear and simple branching paths than women, but proportionally more complex branching paths. This difference may reflect a fundamental psychological distinction between men and women. Systemising is an individual-difference dimension defined as the drive to analyse or construct systematic relationships in non-social domains (Baron-Cohen et al., 2003). Men have consistently been shown to score higher on this dimension than women, which has been conceptually linked to the degree to which people engage with activities such as car repair or computing. Baron-Cohen et al. have also suggested that it is associated with the desire to build and perfect collections of items. The PATHS system is fertile ground for the manifestation of systemising traits, and the task given to participants essentially requires them to build a collection of items. Given this, it is unsurprising that men were more likely to create more structurally complex paths. In the post-task interview, one male participant declared "I was organizing [the nodes] similarly to the way they appeared originally in the menu, so I was following

that structure". Another male participant said "I wanted to get to the end of [the path creation task] to show that I had understood it".

When asked why they added two pages of search results and two sets of thesaurus topics as nodes in a path, one participant replied "I was thinking, 'Somebody else is going to use this and come across it, so if they are looking for Monet, they might get part way down the path and want related artists'. And instead of having to go down and bookmark every single one, it was easier to do the search". Another participant added everything they could find on the chosen topic as a composite node because they felt the selection was limited, so they wanted to capture all of the available data.

5 Conclusion

This study has brought to light a number of important user characteristics that must be considered for future iterations of the PATHS system. However, further evaluations are still necessary. For example, will the observed differences persist with a larger sample size, and when participants use the system in a more naturalistic setting, such as an extended field trial? In addition, this study is based on data derived from a task in which users generated their own paths. It has yet to be seen whether these results will generalise to situations where users follow paths created by others.

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PATHS in context: User characteristics and the construction of cultural heritage narratives

Paths
Personalised access to cultural heritage spaces

The PATHS (Personalised Access to Cultural Heritage Spaces) project is investigating ways to help users explore cultural heritage material taken from Europeana, the European aggregator for museums, archives, libraries, and galleries.

A prototype system has been developed that includes innovative Google map-style interfaces and data-driven taxonomies to explore the collection. It also allows users to create paths (see definition in Methodology section).

This poster presents some of the paths created during an extended user evaluation and analyses the paths in light of the participants' individual differences.

Methodology

Thirty-four participants with a range of internet experience and subject knowledge evaluated the system. Of these participants, 10 were classified as subject experts (cultural heritage professionals) and 24 were novices (students or members of the public). They all completed five short navigational and information-seeking tasks and one creative, exploratory simulated work task. The creative task was as follows:

F) Path-Creation Task: **[Time Allowed: 30 minutes]**

What is a path?

A path is a set of selected items in a cultural heritage digital library. These items are usually ordered in some way (e.g., by theme, date, etc.), and supported by contextual information and descriptions that enable the user to work through the path without assistance.
A path is created around a topic of interest (e.g., a person, place, art movement, event, subject, etc.). 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.

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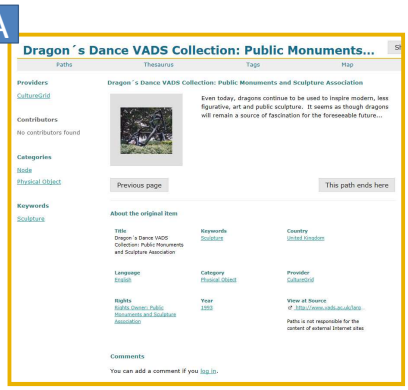
Scenario:

For this exercise, you should imagine that 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.

Node types

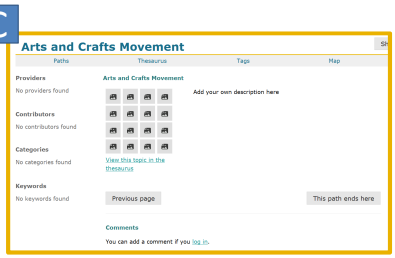
Three types of nodes can be created within PATHS:
- image nodes, which are generated from the existing collection (example A)
- text nodes, which are created by users during path creation (example B)
- composite nodes, which are generated when an entire page of search results is added to a path (example C).

A



B

C



Internet experience:

- All paths included at least one image node (A), but no users with basic internet experience added text nodes (B).
- Participants with more internet experience were more likely to add text nodes.
- Only advanced internet users included composite nodes (C). In the post-task interview, one advanced internet user explained that she had added two pages of search results and two sets of thesaurus topics as nodes in her path because "Somebody else is going to use this and come across it, so if they are looking for Monet, they might get part way down the path and want related artists. And instead of having to go down and bookmark every single one, it is easier to do the search".

Domain expertise:

- No domain or subject experts used composite nodes in their paths (C). This may be because the composite nodes are rich in information but poor in specificity, and subject experts are less likely to find such broad items useful in a specific path on a particular topic.

Key findings

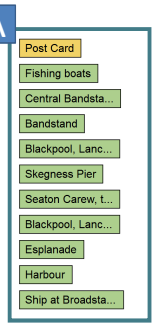
Age, gender, internet experience, and domain expertise all have a role to play in understanding how people use the PATHS system to create paths. This table shows which user characteristics have a measurable influence on path creation behaviours.

	Age	Gender	Internet experience	Domain novice/expert
Path structure	X	X		
No. of nodes	X			
No. of titles changed	X			
No. of descriptions added		X		
No. of text nodes added			X	
No. of composite nodes			X	X

Path structures

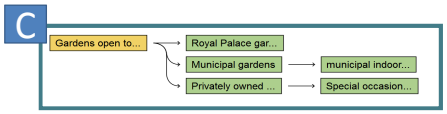
All of the paths created by participants were manually classified into three types, depending on their structure:
- linear paths (24%) have at most one branching node (examples A and B)
- branching paths (29%) have two or more instances of branching nodes (example C)
- complex branching paths (47%) have at least one instance of a branching node off of a branching node (example D).

A

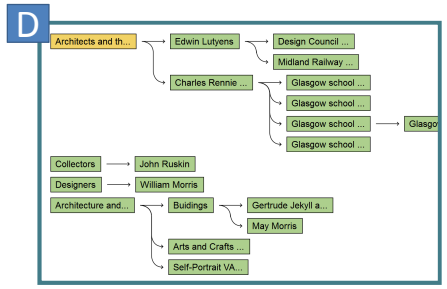


B

C



D



Age :

- Older participants created simpler and more linear paths (A and B): all of the participants older than 65 years created linear paths.
- Older participants used fewer nodes ($r = -.38$, $p = .029$) in their paths.

Gender:

- Women added 40% more textual descriptions to individual nodes than men.
- Only 42% of women made complex branching paths (D), while 53% of men did. This may reflect men's tendency toward systemising, which is the drive to analyse or construct systematic relationships in non-social domains (Baron-Cohen et al., 2003). One male participant declared "I was organising [the nodes] similarly to the way they appeared originally in the menu, so I was following that structure"; another confirmed "I wanted to get to the end of [the path creation task] to show that I had understood it".

Conclusion

This study has brought to light several important user characteristics that must be considered for future iterations of the PATHS system. However, further evaluations are still necessary. For example, will the observed differences persist with a larger sample size, and when participants use the system for a longer period of time in a more naturalistic setting? The next phase of investigation will involve a field trial with a diary study.

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