

# Digital Natives and Specialised Digital Libraries: A Study of Europeana Users

## Dijital Yerliler ve Özelleşmiş Dijital Kütüphaneler: Europeana Kullanıcıları Üzerine Bir Çalışma

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**Abstract:** *The alignment of user needs with the technical capabilities of modern digital libraries is an area attracting the interest of researchers and practitioners. Europeana, conceived with the intention of offering a single access point to European cultural heritage, has been developed in recent years with a continuous effort to identify and respond to the needs of a range of users. This paper presents a study of two user communities – young people and the general public. The study, conducted between October 2009 and January 2010, comprised a series of focus groups and media labs in Bulgaria, Italy, the Netherlands and the UK. A distinctive aspect of this study is that it combines questionnaire-based and verbal feedback gathered from users with evidence of user actions whilst undertaking a well-defined task. The paper presents the context and the methodology of the study, and some of the data gathered within the study which helps to understand better the attitude of digital natives towards specialised digital libraries. The data analysis supports several conclusions: specialised digital libraries require strong advocacy to target the “digital natives”<sup>1</sup> generation which tends to prefer general purpose search engines to specialised resources; young users are confident that they know how to use advanced search yet there is little evidence of their applying these skills in contrast to general public users; the perception of digital libraries differs in groups from different countries. The study contributes to the better understanding of some behavioural characteristics of users of digital libraries.*

**Keywords:** *Digital libraries, Europeana, user groups, user characteristics, user study methodology*

**Öz:** *Modern dijital kütüphanelerin teknik kapasiteleri ile kullanıcı ihtiyaçlarının uyumu, araştırmacıların ve uygulamacıların ilgisini çeken bir alandır. Avrupa kültürel mirasına tek bir noktadan erişim sağlamak amacı ile tasarlanan Europeana, kullanıcıların çeşitli ihtiyaçlarını tanımlamak ve bu ihtiyaçlara cevap vermek için sürekli bir çaba ile geliştirilmiştir. Bu bildiri iki kullanıcı topluluğu (gençler ve genel) ile ilgili çalışma sunulmaktadır. Ekim 2009 ve Ocak 2010 tarihleri arasında gerçekleştirilen araştırmada, Bulgaristan, İtalya, Hollanda ve Birleşik Krallık'tan seçilen odak gruplarına ve medya laboratuvar çalışmalarına yer verilmektedir. Çalışmanın ayırt edici özelliği, önceden tanımlanmış görevlerin yerine getirilmesi sırasında sergilenen kullanıcı davranışlarının kullanıcılardan anket yoluyla ve sözlü olarak alınan geri bildirimlerin birleştirilmesidir. Bildiri çalışmanın içeriğini, yöntemini ve çalışma sırasında toplanan ve özelleştirilmiş dijital kütüphanelere karşı dijital yerlilerin davranışlarını daha iyi anlamaya yardım eden bazı verileri sunmaktadır. Veri analizleri çeşitli sonuçları desteklemektedir: Özelleştirilmiş dijital kütüphanelerin, özelleştirilmiş kaynaklar yerine genel arama motorlarını tercih eden “dijital yerlileri” hedef alan güçlü bir savunmaya ihtiyacı vardır. Gelişmiş aramayı nasıl kullanacaklarını bildikleri konusunda kendilerinden emin olmalarına rağmen, genel kullanıcı kitlesinin aksine genç*

<sup>1</sup> The expression was introduced by Mark Prensky, see (Prensky 2001).

*kullanıcıların uygulamada bu bilgilerine başvurdukları konusunda çok az kanıt bulunmaktadır. Dijital kütüphane algısı farklı ülkelerdeki gruplara göre farklılık göstermektedir.*

**Anahtar sözcükler:** *Dijital kütüphaneler, Europeana, kullanıcı grupları, kullanıcı özellikleri, kullanıcı araştırmaları yöntemi*

## Background and Purpose

The modern digital libraries have to address multiple diverging requirements and expectations of the users and at the same time accommodate the rapidly changing technological novelties. Currently it seems that digital libraries are built basically to fill in specific gaps of provision and/or to find out how a specific technological solution could improve the functionality of a digital library. As Khoo, Buchanan and Cunningham noted “*In the case of digital library researchers, the focus of research is often on technical issues (e.g., information retrieval methods, software architecture, etc.) rather than on user-centered issues. When these researchers turn to user based evaluations, they therefore often lack the necessary expertise to develop robust Human Computer Interaction (HCI) experiments, and their goals are typically limited to "proof of concept" tests, rather than prescribing user motivations or cognitive impacts.*” (Khoo, Buchanan, & Cunningham, 2009).

User needs are always mentioned amongst the priorities in the multitude of policy documents which shape the scope and characteristics of digitisation and accessibility online. However, in reality, users seem not to be consulted in detail. For example, in a review of the use of records in archival collections, A. Sundqvist wrote that “the general knowledge of user behaviour is a mixture of common sense, presumptions and prejudices” (Sundqvist, 2007, p. 624). The findings of the Institute of Museum and Library Services (IMLS) reported that “The most frequently-used needs assessment methods do not directly involve the users” (IMLS, 2003, p. 2).

One possible explanation of the scarcity of user studies in the digital libraries domain is that many digital libraries exist to address “content gaps” and are built under the assumption that the user needs of professionals will cover the range of uses of the digital library. However, in the current setting when digital libraries also are used in a multicultural environment (which also includes the issue of multilinguality) user studies are needed to tailor digital libraries better to different user communities and to the individual users.

The currently existing models of digital libraries address users. For example, Users is one of the six domains within the DELOS DLRM (Digital Library Reference Model) alongside Content, Functionality, Quality, Policy and Architecture (Candela et al., 2008). The 5S model introduces the basic notions of Streams, Structures, Spaces, Scenarios and Societies where users are part of the Societies (Goncalves, Fox, Watson, & Kipp, 2004).

Gathering evidence based, qualitative insights into the information behaviour of contemporary users would have very real impact on the future of *interface functionality, digital library policy, data quality* and possibly even on the *architecture* of digital libraries.

Recent developments in digital library design concentrate effort on the use of innovative search and browse tools, streamlined techniques for navigation and display, and the provision of personalised areas for search management and information sharing; such developments, however, remain unaligned to any thorough understanding of exactly *how* end users make use of such advanced tools, deploy new functionalities as part of search strategies and select resources for use – in other words how user behaviour alters depending on the scenario of use. Recently, an impressive range of projects undertook evaluations of digital libraries and digitisation projects paying attention to various user-related issues:

- A *high-level formative evaluation* of the JISC Digitisation Programme Phase 2 (JISC, 2009a) in the UK was made, addressing five key areas: *content creation; adoption of standards; innovation in sustainability and business models; resource discovery, personalisation and contextualisation; capacity building.*
- The academic impact of five projects undertaken in phase one has been evaluated within the University of Oxford’s Survey on the Use of Digitised Resources (Meyer, Eccles, Thelwall, & Madsen, 2009) which released a *toolkit for the impact of digitised scholarly resources* (TIDSR).
- The Intute/JISC Digitisation Dissemination Project (IJDDiP) (JISC, 2009b) identified *common research themes across digitisation projects*; addressed the issues of *reusability of online materials* and initiated scholarly discussion on *new collections and their impact on research.*
- The issues of *digitisation, curation and models for community engagement and involvement of the wider public* were also analysed in depth (Digitisation, 2009).
- The DiSCmap project (JISC, 2009c) studied in detail the user needs for digitisation of special collections and produced a user-driven framework of priorities for digitisation alongside a list of collections nominated for digitisation.

Other recent studies such as the “Sustainability and Revenue Models for Online Academic Resources” (Guthrie, Griffiths, & Maron, 2008), commissioned by the Strategic Content Alliance (SCA) in the UK, suggested business models to be used in the creation of online academic resources designed to take ephemeral ideas like “value”, “impact” and “usage” and apply them in practice.

Amongst the range of issues related to the benefits of digitisation, a clear and detailed understanding of the ways in which the users interact with digitised content is of central importance when considering issues relating to digital libraries. For example the LAIRAH Project (Warwick et al., 2006) applied *log analysis* with the primary aim being to study factors contributing to the success and popularity of digital humanities resources. The impact of digitised collections on research and teaching was recently presented by OCLC (Proffitt & Schaffner, 2008), and a comprehensive overview the web interaction methods addressing user needs in the cultural domain was produced by the MINERVA project (Handbook, 2008). The TIDSR project synthesised quantitative and qualitative metrics for the impact of digitised resources.

These studies address different aspects of user interaction with the digital library. They can be positioned within the wider digital environment using the Information Triptych Model (Fuhr et al., 2007) which seeks to make clear the connection between User, Content and System. Fig. 1 contextualizes these areas and the evaluation metrics which could be used to assess the quality of digital libraries. Although multiple recent studies address the users, the information behaviour of different types of users as introduced by Wilson (2009) still needs to be studied in more detail.

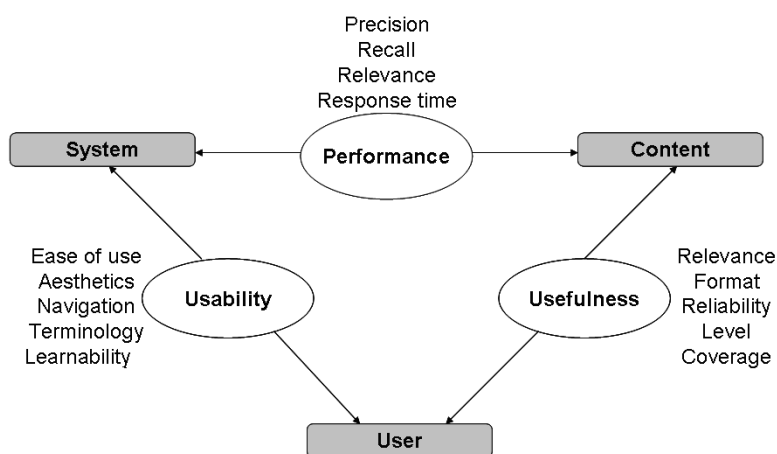


Figure 1. Metrics related to usability, usefulness and performance mapped to the interaction triptych model

This paper presents a user study on one specific digital library, Europeana, and looks in more detail at the behaviour of young users.

### Europeana and User Studies

Europeana<sup>2</sup> is a single access point for digitised cultural heritage materials provided by various European libraries, museums, archives, galleries, audiovisual collections and other memory institutions. This specialised digital library was launched by the President of the European Commission (EC) in November 2008. Currently it provides access to over 4.6 million objects with the aim of reaching a target of 10 million objects in 2010; more than 1000 institutions are providers of the cultural content in Europeana and their number and geographic coverage are steadily growing.

Europeana brings together an unprecedented amount of materials and thus plays the role of the major specialised aggregator in the cultural heritage domain for Europe. Europeana is able to offer a considerable range of content and is currently expanding through contributions made by projects from the Europeana group<sup>3</sup>, supported by the EC and involving local and regional institutions and through the aggregation of content of various types (from libraries, archives, travel, cinema & TV, musical instruments, etc.). Europeana is more than an aggregator, however, since it also seeks to provide innovative ways of searching and visualising the rich cultural contents. This is being achieved through the gradual development of new versions of the interface with improved data organisation, search and browsing functionalities (the next one will be Europeana Rhine (Bloomberg et al., 2009) which will be released later

<sup>2</sup> <http://www.europeana.eu/portal/>; see also (Europeana, 2010)

<sup>3</sup> These projects are presented on <http://group.europeana.eu/>

in 2010). Stakeholders developing Europeana are in regular discussion regarding how best to approach and serve its users. In fact, the concept itself of a “portal” includes the mission of “service provider”, an added value with respect to single sites. This extra sets aside the identity of the individual cultural subjects providing their data and deals directly with customer satisfaction.<sup>4</sup> User studies for Europeana involve a combination of methods including gathering expert opinion, organising focus groups, carrying out observations of users and conducting a web survey. In the future Europeana will enrich knowledge of its users through log analysis; it also plans to work on the development of formal models of users (personae).

This paper presents some of the outcomes from a Europeana User and Functionality Study (Dobрева et al., 2010), which was coordinated by the Centre for Digital Library Research<sup>5</sup> at the University of Strathclyde in Glasgow and implemented jointly with the University of Macerata,<sup>6</sup> Italy, and the Emotion Lab<sup>7</sup> of Glasgow Caledonian University.

### *The Europeana User and Functionality Study in the context of previous studies of Europeana*

This study aimed to address two specific user communities (young people and members of the general public) across four countries through a series of focus groups and media labs. Its purpose was to establish a better understanding of users’ expectations as well as the difficulties and stumbling blocks encountered while using the Europeana prototype.

The choice of countries in which focus groups and media labs were organised was informed by the outcomes of the preceding web survey of Europeana (Europeana – Online Visitor Survey, 2009). The Netherlands, the UK, Italy and Bulgaria were selected because they had differing response rates to the web survey (low, medium and high) and also different levels of contribution to Europeana in terms of resource provision. Their being geographically distinct and having different educational systems, especially in the area of information and computer literacy, also serves to create diverse conditions for the study. The school curricula in information technology differ both in terms of content covered and in terms of flexibility; information technologies is a mandatory subject in Bulgarian and Italian secondary schools. Roughly sixty percent of all secondary schools in The Netherlands now offer informatics as part of their curriculum (Leeuw & Ponse, 2008); in the UK it is optional; the exact coverage of the subject in Scotland is not specified, although the skills that need to be developed are clearly stated (see 5 to 14 Curriculum<sup>8</sup>). This could provide a basis to analyse whether the skills of young users as well as their expectations differ substantially between countries and how educational background may be influencing them.

The study involved approximately the same number of participants in each of the different countries. Groups with secondary school children were studied in Sofia, Bulgaria and in Amsterdam, The Netherlands. University students were targeted in Fermo, Italy and members of the general public were recruited for the groups in Glasgow, Scotland. All group sessions were held between October 2009 and 15 December 2009.

The involvement of two types of user in the study – young people and members of the general public - was purposeful to provide a basis for analysing whether there are substantial differences within, and between, the user types. Unlike other Europeana studies, this study:

- addressed participants’ responses combined with analysis of the evidence of user actions during the completion of a standardised task in all the groups;
- included homogeneous groups and an equal distribution of the number of participants in each of the four countries.

The number of participants (total 89) is not sufficient to come to any statistically significant conclusions but the opinions and observations gathered are of interest and can be compared with the outcomes of other current user studies.

## **Study Methodology**

All focus groups and media labs followed the same protocol:

1. Introduction to the study by the group moderator.

<sup>4</sup> “For the users, a portal is surely only useful if it meets a real need that users have, and in a way with which they are comfortable. As such, the portal needs to do more than any of the current offers being presented. To facilitate this, there is need for continued work on ensuring interoperability of systems” (Miller, 2001).

<sup>5</sup> <http://www.strath.ac.uk/cdlr/>

<sup>6</sup> <http://www.unimc.it/>

<sup>7</sup> <http://www.gcal.ac.uk/creates/centres/emotionlab.html>

<sup>8</sup> <http://www.ltsotland.org.uk/5to14/resources/index.asp>

2. Completion of a pre-questionnaire (providing basic demographic information, indication on familiarity with Europeana, online search experience and cultural attitudes).
3. A concise introduction to Europeana, provided by the group moderator.
4. Discussion 1 (to gather first impressions of Europeana following a brief look at the site and its key features).
5. Completion of questionnaire 2 (to provide written feedback of first impressions).
6. Assignment (compiling a PowerPoint presentation about the local city).
7. Discussion 2 (to gather deeper impressions of Europeana following approximately 30 minutes' interaction with the resource).
8. Completion of questionnaire 3 (to provide written feedback on deeper impressions of Europeana).
9. Conclusion of study, by moderator.

In the case of media labs, discussions took the form of a conversation between the moderator and the participant. In the case of the focus groups, these were common discussions with all group members facilitated by the moderator.

The assignment was designed to incorporate eight different usage scenarios designed to encourage the participants to search for different types of objects on a predefined topic. For all groups the general assignment was to build a virtual portrait of their city. More specifically, the users were required to search for texts (hinted at by a slide entitled “What people write about Sofia/Rome/Amsterdam/Glasgow”); images; audio and/or video; materials on the same object from different times; materials on a very specific predefined subject (like a landmark or an event or a person – e.g. Glasgow School of Art); a particular historical event where primary resources were expected to be gathered; materials of personal choice related to the presentation theme; and finally, identifying the providers of digital objects who contributed the highest number of objects on a particular topic, identifying what was found to be most useful about Europeana and suggesting areas in which material may be lacking – which encouraged reflective practice by the students. This range of scenarios required users to formulate searches that target a range of metadata fields to retrieve various types of materials; some searches would be more efficient if the users employed advanced search options. This approach facilitated an assessment of which usage scenarios are easy to satisfy and the stumbling blocks that users of the Europeana prototype may encounter.

A distinguishing feature of this study is that it combines feedback gathered from users with evidence for their behaviour and reported views. Contributions to discussions were supplemented by responses to questionnaires and further consolidated by their search strategies and subsequent selection of materials held within Europeana (which were able to be assessed by accessing participants' MyEuropeana results) and by examining the content transferred from Europeana to their PowerPoint presentations. The protocol was designed so that feedback gathered from the users at various stages of the study effectively reflected their *first impressions* and expectations (following a brief presentation providing an overview of Europeana and its key features) before the actual assignment; *deeper impressions* (after the users worked on the assignment) which help to ascertain whether or not the nature of the service and its delivery met the expectations expressed earlier, and *lasting impressions*, showing the intentions to use Europeana in the future, following completion of the assignment and participation in a subsequent group discussion (or individual discussion, as in the case of the media labs). The series of media labs conducted in Glasgow provided an additional means of feedback due to the collection of physiological data. Facilities enabled eye tracking data to be gathered, pinpointing the gaze of participants throughout the assignment, as well as the duration of their focus on any one area of the screen/interface.

The study aimed to gather evidence and observations on the information behaviour of the participants and to see if there are substantial differences across countries; it did not formulate any particular hypotheses in advance. Although interest in the “digital natives” is considerable, little research has been undertaken to address the existing gap in knowledge between understanding digital natives' behaviour and the development of digital libraries to provide the functionality and usability needed to satisfy these behaviours (Tonta, 2009).

### **Demographic Characteristics of the Participants**

The participants were resident in four countries. The total number of participants was 22 in Bulgaria, 20 in Italy, 23 in the Netherlands and 24 in the UK. About half of the participants were aged between 15 and 18 (46%); almost one third were 19-24 (28%). 44% of all participants were male and 56% were female. More than three quarters of the participants were students (79%), the rest were members of the general public with an interest in art and culture.

Most of the participants (98%) had not used Europeana before although some had seen it. It was not widely known to the participants, with 91% reporting that they were not familiar with the Europeana logo.

Most of the participants (97%) reported that they frequently search for materials online and 67% of the participants claimed to use advanced online search features. Search by phrase was reported as being used most frequently within

the groups of young users, while search by date and using Boolean operators were more popular amongst the general public users from the UK.

The most searched file types by participants are text (45%) and images (22%), with fewer reporting searching for video clips and audio files (about 17%). Table 1 reports on considerably different proportions in the preferred objects which the participants search for most frequently in the different countries.

Table 1. Objects/file-types searched for on a weekly basis by participants

Object	Country									
	Bulgaria		Italy		The Netherlands		UK		Total	
	N	%	N	%	N	%	N	%	N	%
Texts	14	26.9	18	60.0	22	46.8	22	53.7	76	44.7
Images	15	28.8	3	10.0	9	19.1	10	24.4	37	21.8
Video clips	11	21.2	3	10.0	10	21.3	5	12.2	29	17.1
Audio files	12	23.1	6	20.0	6	12.8	4	9.8	28	16.5
<b>Total</b>	<b>52</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>	<b>47</b>	<b>100.0</b>	<b>41</b>	<b>100.0</b>	<b>170</b>	<b>100.0</b>

## Findings

### *Specialised Digital Libraries Need Strong Advocacy to target “Digital Natives”*

The study aimed to ascertain the extent to which a specialised digital library like Europeana, providing access to shared European cultural heritage materials, is attractive to young users. The very idea of using specialised websites was not very popular with the young participants in the study. Asked about the type of websites they would use to search for a specific type of digital resources (e.g. images), the young users in all countries showed clear preference to general search engines (91.3% in Bulgaria, 90.0% in Italy, 78.6% in the Netherlands) and not to specialised websites (e.g. Flickr<sup>9</sup>). The Bulgarian and Dutch groups consisted of secondary school students who seemed to be most happy with the use of general purpose search engines even when searching for a specific type of resources. Younger users, in fact, came to Europeana with the expectation that, regardless of its domain or specialism, an online resource should incorporate the variety of interface features and Web 2.0 functionalities found on more general sites. The general public users showed highest (25.5%) preference for the use of specialised web sites in such cases.

This observation based on the questionnaire responses of the participants was echoed by their responses to an open-ended question about their website preferences (see Figure 2).

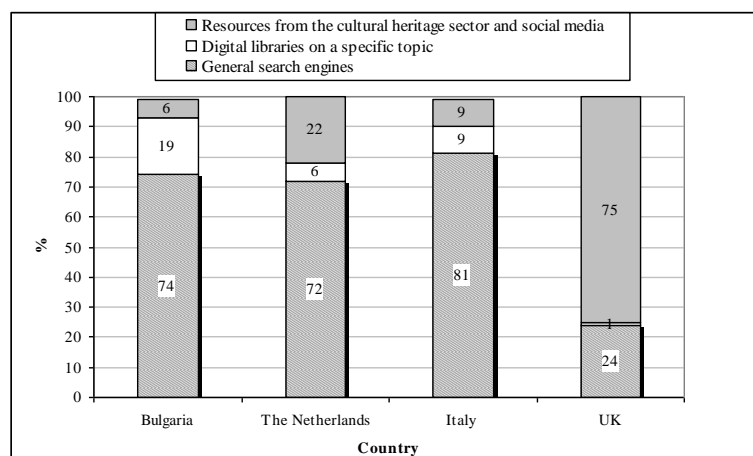


Figure 2. Preferences for the use of different types of resources

<sup>9</sup> <http://www.flickr.com/>

Table 2. Data on preferred websites for school/work use

General search engines	Bulgaria		The Netherlands		Italy		UK		Total	
	N	%	N	%	N	%	N	%	N	%
Google	16	70	21	57	13	50	15	79	65	62
Wikipedia	7	30	14	38	13	50	4	21	38	36
Yahoo	-	-	2	5	-	-	-	-	2	2
<b>Total</b>	23	100	37	100	26	100	19	100	105	100
Digital libraries on a specific topic	Bulgaria		The Netherlands		Italy		UK		Total	
	N	%	N	%	N	%	N	%	N	%
Pomagalo	4	67	-	-	-	-	-	-	4	31
Deviantart	2	33	-	-	-	-	-	-	2	15
Flickr	-	-	-	-	1	33	1	100	2	15
arte e motori	-	-	-	-	1	33	-	-	1	8
Photobucket	-	-	1	33	-	-	-	-	1	8
Encyclopedia drammatica	-	-	1	33	-	-	-	-	1	8
Youtube	-	-	1	33	-	-	-	-	1	8
MSN encarta	-	-	-	-	1	33	-	-	1	8
<b>Total</b>	6	100	3	100	3	100	1	100	13	100
Resources from the cultural heritage sector and social media	Bulgaria		The Netherlands		Italy		UK		Total	
	N	%	N	%	N	%	N	%	N	%
Provider for cultural sector	-	-	-	-	1	33	18	31	19	25
Online Educational/Academic resource	-	-	1	9	-	-	11	19	12	16
National / University Library Service	-	-	-	-	-	-	11	10	11	15
Broadcast and Print Media online sources	-	-	-	-	-	-	6	10	6	8
Social Networking sites	-	-	-	-	-	-	5	8	5	7
OPAC	-	-	-	-	1	33	-	-	1	1
Other	2	100	10	91	1	33	8	14	21	28
<b>Total</b>	2	100	11	100	3	100	59	100	75	100

All websites appearing in participants' responses are summarised in Table 2. Again, the responses of digital natives show clear preference for general purpose websites. Amongst the search engines, Google is the most popular across all groups (62%); Wikipedia is the second most popular (36%). In the UK the participants had other preferences which could be attributed to the background of the group i.e. members of the general public with cultural interests. In the discussions within the focus groups it was noticeable that there is a tendency to compare Europeana with Google or Wikipedia. This is understandable, and suggests that any specialised digital library would be more attractive to digital natives if it can clearly communicate its advantages.

Another indication of the difficulty in introducing specialised digital libraries to digital natives was the response to the question asking whether or not the participants would use Europeana in the future. Here the groups showed significant differences. The most positive response was received in Italy where three quarters of the participants replied that they would use Europeana in the future; in Bulgaria half of the participants claimed to be happy to use Europeana again. Responses in Amsterdam were mostly negative with 30 statements about what they do not like about Europeana (ranging from criticisms on its content to critiques on the functionality); in the UK there were 19 negative and 12 positive statements.

The general preference of young people, even when required to search for a specific type of resource, is to use a general search engine. Hence the strategy to introduce the use of a specialised digital library like Europeana needs to be very well-targeted and compelling. *Such specialised digital libraries should have very strong advocacy policies which should clearly show the resource's advantages. Simply building a good and trustworthy resource is not enough to attract the young users.*

### *Information Literacy: Skills of Young Users can be Improved*

Another area of the study concerned existing online search competence of users - an important aspect of their information literacy skills. 72% of participants in Bulgaria, together with 60% in Italy, 57% in the Netherlands and 75% in the UK reported that they frequently use advanced online search features and in general, young users seem reasonably confident about their online search skills. Advanced search is used very often or often by 77.3% of the respondents in Bulgaria, 60% in Italy, 56.6% in the Netherlands and 75% in the UK. Here the levels of confidence are slightly different but still relatively high for all of the participating countries.

Relating to the use of advanced search features, and which of these features users feel confident with, young users' responses indicated a strong preference for *searching by phrase* (90.9% in Bulgaria, 87.5% in Italy, 81.8% in the Netherlands and 43.8% in the UK). *Searching by date* was the second most popular type of search reportedly used and the reported use of *Boolean operators* was low amongst young users (0% in Bulgaria, 4% in Italy, 13% in the Netherlands) compared to 63% in the general public group in the UK. This suggests that general public and older people are really using advanced search features while young people seem confident in their use but there is a lack of correspondence with the levels of response on the use of Boolean operators.

We compared the initial data collected using questionnaires with the queries saved by participants during the assignment (all participants registered in MyEuropeana and were asked to save their searches). Analysis of the queries recorded by participants shows that although their level of confidence in the use of advanced search was high, the actual searches run by young users were ONLY simple searches. A total of 17 Boolean searches were conducted by members of the general public and not by the young users. Examples include: 'Pere Lachaise OR La Chaise'; 'Glasgow AND school AND art'; 'Glasgow AND South Africa'; 'Glasgow AND George Square AND 191\*'.

A summary of the types of searches saved during the focus groups is presented in Table 3. Most popular amongst digital natives were the searches on proper nouns, corresponding to the nature of the task.

Table 3. Types of searches

	Sofia FG		Amsterdam FG		Glasgow FG		Glasgow ML		Total	
	N	%	N	%	N	%	N	%	N	%
<b>Linguistic breakdown</b>										
<b>Proper nouns</b>	41	85	32	53	67	64	63	65	203	65
Examples: Sofia; Royal Palace; Glasgow School of Art; Buchanan Street										
<b>Nouns</b>	2	4	1	2	0	0	0	0	3	1
Examples: Palace; Marijuana										
<b>Two-word compound nouns</b>	2	4	17	28	22	21	18	19	59	19
Examples: Sofia culture; coffee shop; art nouveau; Glasgow fashion										
<b>Phrases</b>	3	6	10	17	15	14	18	19	46	15
Examples: Amsterdam civilian perspective; Glasgow city of culture; Sounds from Sophia										
<b>Total</b>	48	100	60	100	104	100	99	100	311	100

From the evidence of user searches it can be concluded that although young users are confident in their online search skills, the actual use of a well developed resource like Europeana did not illustrate efficient use of the extent of search functionality provided; in contrast, the group of general users did employ the advanced search options. *This probably means that the information literacy of the young generation can be improved upon.*

### *Perceptions of Digital Libraries Differ in Different Environments*

The study included participants from four countries and although the number of participants is not sufficient for statistically significant results, the study provides some indication of areas where differences between user groups exist and which may be of interest to study further. One such area is the perception and expectations of Europeana,



found to vary between the participants from the Netherlands, Italy and UK, shown when asked to express their initial impressions and ideas about the website after being familiarised with it.

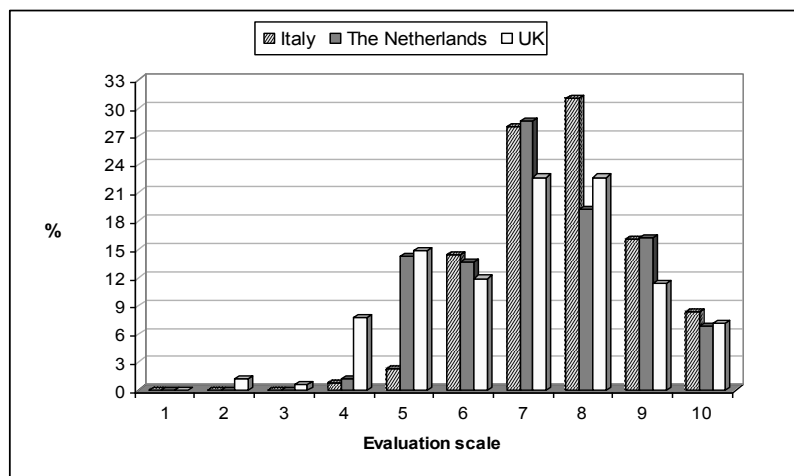


Figure 3. Summary of responses on dichotomic pairs

In Bulgaria, initial impressions were captured by asking participants to select the most relevant description of Europeana from a list of dichotomic pairs (words with opposite meanings, e.g. “dull” – “exciting”). The most popular choice in Bulgaria was “easy to use” (19 of 22 participants), and one quarter of the participants also chose the terms “unique”, “attractive”, and “exciting”. Each of the following descriptions was chosen once: “similar to other sites”, “fun”, “badly organized”.

Fig. 3 summarizes the overall estimates given by participants for all dichotomic pairs by country. The higher the estimation is, the more positive (the “negative” word was at the low end of the scale – 1, and the “positive” was at the highest value of 10). The results show differences in the perception of Europeana: generally the UK participants were more critical in their initial reaction to it while Italian participants seemed to be more excited about Europeana.

The reasons why some groups are more critical than others requires further study (one possible explanation could be that more experienced users are more critical, but this seems simplistic and is not supported by enough evidence). Further research on the country-specific perception of digital libraries would help to fine-tune *personalisation of digital library interfaces, not only to the personal characteristics of the users but also to their cultural background.*

## Discussion

The understanding of the digital libraries’ users and their information behaviour is far from simple. While positioned as a priority, users of cultural heritage materials have not been consulted in detail and their information behaviour is not well studied. The digital library community should be better informed about the mechanisms capable of increasing interest in such specialised resources for digital natives. Although a very detailed understanding on the specific characteristics of digital natives does not yet exist, it seems that we know about typical information behaviour and suppose that it is homogeneous, mostly in terms of information skills – but there is no extensive evidence to back up such beliefs.

The study presented in this paper involved a relatively small number of participants and yet one of its interesting features was the combination of methods where the self-evaluation of participants could be compared to their actual information seeking behaviour. A popular recent study based on log analysis, CIBER’s “Google Generation” (CIBER, 2008) started to build a portrait of contemporary internet users. It showed that information seeking is horizontal (“people view just one or two pages from an academic site and then ‘bounce’ out, perhaps never to return”; users spend most of their time on navigation and not on the actual use of resources; the users act as viewers – spending time which is obviously not sufficient to read the documents they are viewing; and they develop “squirreling behaviour” – downloading multiple documents (it is difficult to study how many of those are used afterwards and how).

We could add several characteristics to this profile of digital natives in the context of specialised electronic library usage:

1. Preference for general search engines. Digital natives prefer to use general search engines such as Google and Wikipedia rather than specialised resources.
2. High search confidence is not necessarily backed up with skills. Young users are confident in their skills for online searching, but in carrying out tasks which hinted at using advanced searches within a digital library which supports them, not one participant amongst the young users taking part in the study ran an advanced search. This could suggest that young users need to undertake more practical tasks, enabling them to practice their online searching skills.
3. Users in different countries perceive digital libraries in different ways. Some users are more critical than others. This is definitely an area where more research is needed. The differences in the education in information technologies in the participating countries does not seem to correlate with the different perceptions. Variance could be attributed to individual differences, rather than to geographical diversity, but further investigation is required.

One of the strengths of this study is that data supplied by the participants through questionnaires and discussions is backed up with an analysis of the evidence on user actions, such as queries, populated presentations and eye tracking data. Although user study methods are generally well-established and described (Bryan-Kinns & Blandford, 2000), an area where more guidance is needed is how to combine different user study methods efficiently. The principle of evidence-based research was followed in the present study, which helped to identify some differences between the self-estimation of the participants and their actual behaviour. Such studies provide valuable findings which can be integrated with the recommendations in existing handbooks on cultural web user interaction (see Feliciati & Natale, 2008).

## Conclusions

The methodological approach in this study addresses a clear objective and involves well-defined user groups.

The alignment of user needs with the technical and political capabilities of the modern digital library is a complicated and usually expensive task. Specific user needs should be studied in relation to particular foci, including (1) ease of use and intuitiveness of the digital library; (2) identification of 'future' user needs as the young generation grows up; (3) styles of use of the Europeana prototype for knowledge discovery amongst young users; (4) expectations and trustworthiness; (5) similarities and differences in the groups from different countries; (6) possible recommendations for prototype development in line with user needs.

As a matter of priority, the needs of disparate, yet specific, user groups need to be studied in depth. The digital natives' generation is of key interest because it has current expectations and also typifies the nature of a wide range of future users (general as well as professional) of Web content.

The study involved two user groups, young people and members of the general public with a clear interest in the culture/arts domain. This facilitated a comparison of user characteristics, and although the study involved a relatively small number of participants, it provided helpful feedback for Europeana and raised some significant questions for the continued study of the digital natives' information behaviour.

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