

## EuropeanaConnect

### D3.4.4 – Report on user evaluation of mobile interfaces

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This project is funded under the eContentplus programme,  
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exploitable.



## D3.4.4 – Report on user evaluation of mobile interfaces

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This document describes the activities and results of the user evaluation of the mobile interfaces for Europeana.



co-funded by the European Union

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## Summary

This deliverable summarizes the evaluation of the interfaces for mobile access to Europeana as part of work package 3.4. We start with the description of the human-centred design process, which was used for the development of the Europeana mobile client. As an outcome of a workshop to plan this evaluation, we identified three evaluation methods for this deliverable. We therefore describe the setup, design and results of a usability evaluation in our lab, the outcome of an online questionnaire conducted with participants in the EuropeanaConnect Registry, and the results of a log file analysis focused particularly on the mobile usage of Europeana. We continue with a review of the requirements identified in our first deliverable D3.4.1. Based on these results, we discuss potential improvements and features for future work to ensure the developments of task 3.4 can keep up with the technological developments in the next years.

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## 1. Introduction

The overall goal of EuropeanaConnect Task 3.4 is to make the rich cultural content of Europeana available to a broad spectrum of users in mobile scenarios. With the development of mobile access channels for Europeana, we enable users to access the material inside the Europeana database and benefit from the cultural content inside Europeana using their mobile clients when the use of stationary PCs is either impossible or unwanted. For reading convenience, we will refer to the Europeana mobile client application as *eMobile*, *mobile interface* or *mobile client* in the following. This document describes task 3.4.4, the user evaluation of the mobile interfaces developed in subtasks 3.4.2 and 3.4.3.

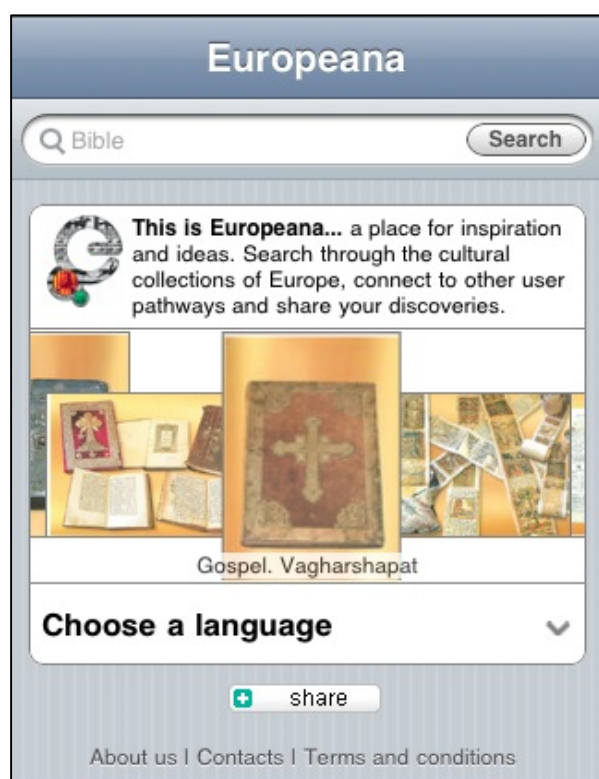


Figure 1. Advanced Interface: Index page

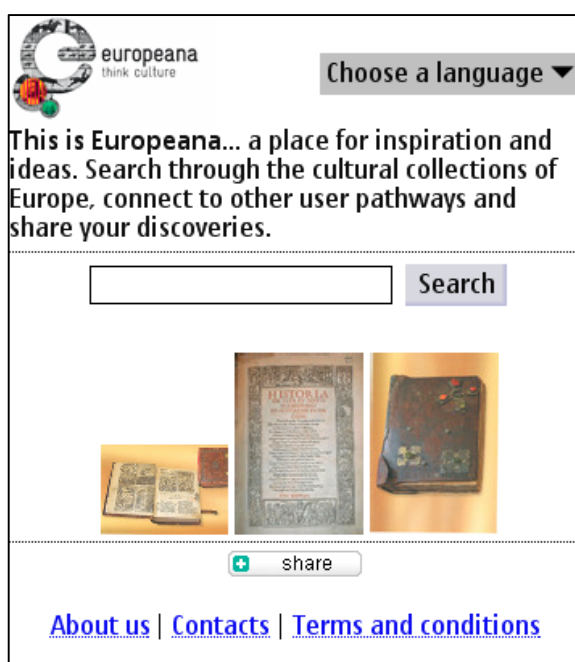


Figure 2. Basic Interface: Index page

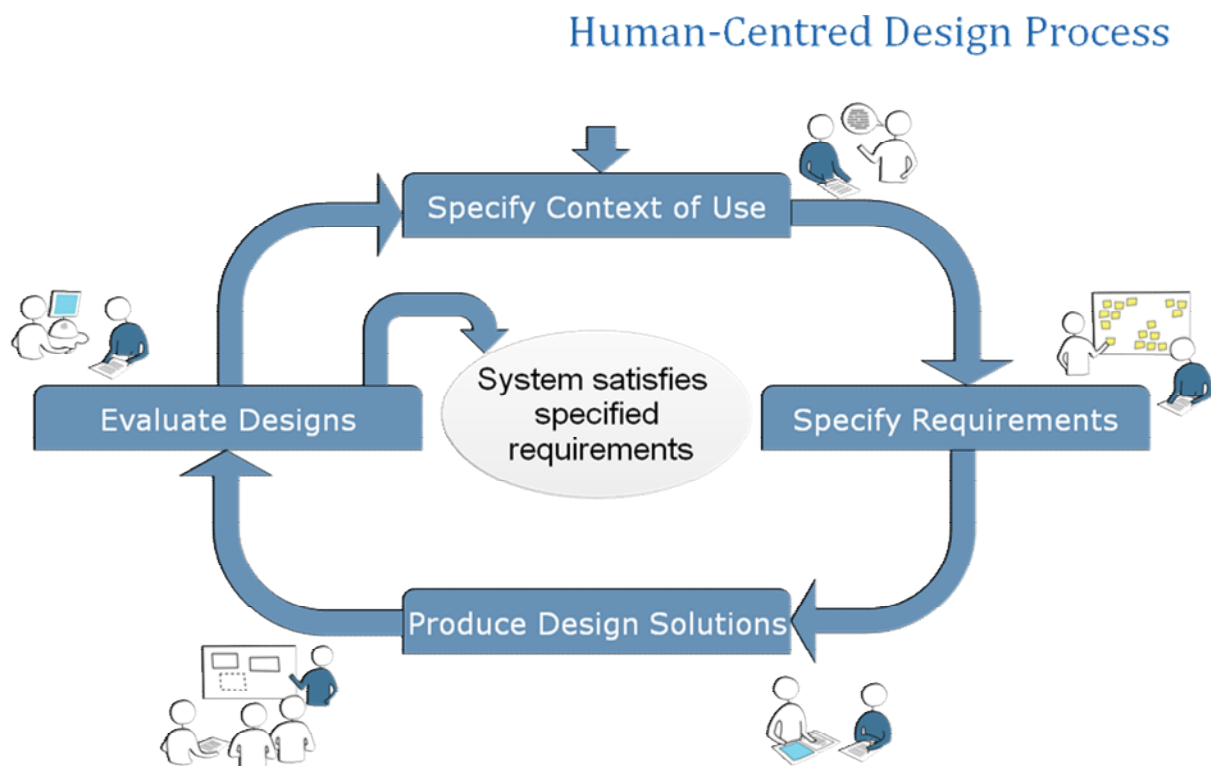
*Changes in production environment:* After we delivered the code of 3.4.2 and 3.4.3, some changes have been applied to the mobile client by Europeana Office. Thus, the mobile layout presented on the Europeana portal now differs slightly from the screenshots in this document. However, the suggestions and results of this evaluation are also applicable to the redesigned interface and were written with this modification in mind.

## 2. Process Model

In this chapter we describe the approach used to define the requirements for the development of *eMobile*, the mobile access client for Europeana.

### *Human-Centred Design process*

The design of an interactive system, in this case a mobile web application, is no trivial task. To ensure the development of a highly usable system that is efficient, effective and satisfying, which are the three main criteria for usability as defined in ISO 9241-11 (ISO, 1998), the application design needs to follow a defined process model. The document at hand is the result of the application of the human-centred design (HCD) process, as specified in ISO 13407 (ISO, 1999). It is particularly well suited for the design of interactive systems, as it incorporates user feedback in all stages of development, which can be considered one of the most crucial aspects in software engineering.



**Figure 3. Human-Centred Design Process**

The HCD process is illustrated in Figure 3. It consists of four steps:

1. *Specify Context of Use*. In this step, the stakeholders of the product are identified and the user environment is described. This step gives developers a “big picture” of the product and its users.
2. *Specify requirements*. The specification of requirements is the most essential step to create highly usable products. In this step, the goals of the product’s users will be gathered and described in a standardized format.

3. *Produce design solutions.* Based on the first steps, the development of the actual software version is carried out.
4. *Evaluate design.* A crucial step to measure the usability of a product and to improve the product usability-wise is to perform evaluations on the product, which are conducted in this step.

The process is then repeated until the developed system satisfies the formerly specified requirements. In Deliverable 3.4.1 – Catalogue of user requirements, we have specified the Context of Use and the Requirements for a mobile client for Europeana (OFFIS Institute for Information Technology, 2009). The actual design and implementation documentation of the mobile client, which builds on the requirements defined before, was split into two documents: In Deliverable 3.4.2 – Middleware and web server for accessing Europeana, we described the basic functionality of the mobile client, including the Middleware and Web Server functionality, which provides basic search functions to mobile users (OFFIS Institute for Information Technology, 2010a). In Deliverable 3.4.3 – Rich mobile client for accessing Europeana, we reported on functions for rich mobile devices and smartphones, including location-aware searching of Europeana content (OFFIS Institute for Information Technology, 2010b). This document describes the evaluation of the formerly developed clients in task 3.4.4, according to the last step of the HCD process.

### 3. Evaluation

According to the Description of Work, *“the goal of the evaluation is to investigate if the applications satisfy the requirements which have been identified in task 3.4.1. Additionally, the requirements themselves will be subject to evaluation with the goal of revealing potential future improvements and extensions.”*

In order to complete this task and to identify potential activities, we conducted a workshop with participants of OFFIS and our work package lead, the Royal Library of Denmark.

The result of the workshop was the identification of three studies (OFFIS Institute for Information Technology, 2010c) which contributed to the evaluation of the system: In a controlled usability test in our lab we aimed for qualitative feedback, while we used an online questionnaire and the EuropeanaConnect Registry to consult a larger group of potential participants. With the help of a log file analysis, we were able to utilize statistical “real-world” data for this evaluation.

Figure 4 shows the services and interfaces developed in task 3.4 in a nutshell. It shows the two *interfaces* we developed: the *basic interface* for modern smartphones that makes use of the *basic services* and the *advanced interface*, developed for high-end devices like the iPhone and latest Android devices which is able to use both, the *basic* and *advanced services*.






Web-based Interfaces		
Device Recognition		
Services	Basic	Advanced
	 Modern smartphones	 iPhone Android 2.x
	Basic (Rhine) D3.4.2 <ul style="list-style-type: none"> <li>• Simple search</li> <li>• Language selection</li> <li>• Treasures</li> <li>• Social Bookmark</li> </ul> 	
Services	Advanced (proof of concept) D3.4.3 <ul style="list-style-type: none"> <li>• Enhanced search</li> <li>• Location-aware search</li> <li>• Result visualization in a map</li> </ul>	

Figure 4. Services and Interfaces developed in Task 3.4

### 3.1. Usability Evaluation

With a usability test in our lab we aimed for qualitative feedback on the mobile interfaces. In this chapter we will present the Personas used to plan the recruitment of participants for our evaluation, and the server setup and task design applicable to both the usability evaluation and the online questionnaire. After presentation of the results, we conclude with a discussion on the combined findings (evaluation, questionnaire and log file analysis).

#### 3.1.1. Personas

The Personas identified in WP 3.2 provided a means to plan the evaluation and helped us to identify suitable test subjects for the evaluation. In our workshop we discovered three types of users that are summarized in Petersen, 2010 as follows:

*Peter (15 years old):*

Currently in school, Peter has a major interest in games, role playing and music. A true part of the **Google generation**, the **internet is his second nature**. He **skips and skims** the web for interesting or entertaining content.

*Jukka (43 years old):*

Has a PhD in music and works as professor at a university. He is very **confident** about technology and **always on the look-out for new stuff** and new ways of communicating, on the computer as well as on his iPhone. He is also **very confident about searching** and finding useful and relevant results.

*Maria (25 years old):*

Is a school teacher, and is **comfortable** with computers and the internet. Happily **googles** but also is frequently having a **specific target** for her searches as she **prepares for work**. She uses her **mobile** to update her Facebook status, but mostly for calling and texting. Her aim is often to **prepare for classes**, but also to find new ways of motivating her pupils.



### 3.1.2. Participants

For the usability evaluation, we recruited 8 participants (4 female), mean age 32.4 years (sd= 0.82) that matched the criteria specified by the personas.

The demographic questionnaire (see Appendix B) showed a mixed group from young apprentices (2) to university graduates (5) and PhDs (1). None of them had used Europeana before, but claimed to be technology-savvy and confident in internet searching techniques.

All participants stated that they own a mobile phone which is capable of browsing the internet. They signed an informed consent (see Appendix A) that explained the context of the study, the data collected during the evaluation and their rights before starting the survey.

### 3.1.3. Setup

For the study we had our participants complete the tasks with a device that was provided by us to achieve comparable results. While the basic interface was evaluated using a Nokia 5800 mobile, the advanced interface was tested using an iPod Touch that uses the same web browser as an iPhone. Both devices used a WiFi connection to browse our test server.

The evaluation was conducted using a test server provided by OFFIS that was running the latest mobile location aware version of the Europeana portal (Revision 2493, available at [http://europeanalabs.eu/browser/europeana/branches/mobile\\_location\\_aware?rev=2493](http://europeanalabs.eu/browser/europeana/branches/mobile_location_aware?rev=2493)). Using the information provided by (Concordia, 2010) we added real datasets to our search index, resulting in a demo system offering more than 50.000 objects, most of them with thumbnails. Since these datasets did not contain geographic information, we manually added coordinates of Europeana's content providers.

### 3.1.4. Design

Unfortunately, only one participant agreed to capture audio and video during his session. Think-aloud protocols were taken for his and all other meetings. After the participants filled out a demographic questionnaire (see Appendix B), we gave them time to get acquainted with Europeana and the mobile interface, before we handed out the list of tasks (see Appendix C/D). After task completion we handed out a System Usability Scale (SUS) questionnaire (see Appendix E) to gather standardized measures regarding the usability of the systems.



**Figure 5. Camera still of video recorded during usability study**

In total, we conducted 8 sessions, 5 for the advanced interface and 3 for the basic interface. We defined three tasks to be completed on a mobile device with both, the advanced and basic interface and two additional tasks only for the advanced interface. The tasks were designed to cover all use cases defined in our requirements analysis. Screenshots of all tasks can be found in the appendix (C/D for usability study in our lab, F for online questionnaire). The tasks are described in detail in the following:

*Task 1: Search for a keyword and answer question with the help of returned search results*

This task was designed for both interfaces. It covered the first use case, defined in our Catalogue of User requirements (OFFIS Institute for Information Technology, 2009), **UC 1.1 Simple search**: The system shall allow the user to do a simple keyword search.

*Task 2: Search for a keyword and switch result visualization*

Designed for both interfaces, this task covered three use cases:

- **UC 2.1 Visualization of Search Results in text-only List**  
The system shall allow the user to visualize results in a text-only perspective
- **UC 2.2 Visualization of Search Results in gallery list**  
The system shall allow the user to visualize results in an image-only gallery perspective
- **UC 2.3 Visualization of Search Results in Mixed list**  
The system shall allow the user to visualize results in a mixed image/text perspective

*Task 3: Search for a specific painting, find information and share with social network*

Again, applicable to both interfaces, this task covered **UC 3 Visualize details of an item in the search results**: The system should allow the user to visualize details of a selected item in the

*search results*. Additionally, it allowed us to evaluate a feature that was requested during the course of the project, the integration of a social bookmarking widget.

*Task 4: Use enhanced search and show results in a map*

In this task, applicable to the advanced interface only, two use cases were tested:

- **UC 1.2 Enhanced search**  
The system shall allow the user to do an enhanced search over different categories
- **UC 2.4 Visualization of Search Results in a map**  
The system shall allow the user to visualize results in a map, showing entries in a specified perimeter around his / her current location.

*Task 5: Perform a location based search*

This last task was again specifically designed for the advanced interface and covered **UC 1.3 Location aware search**: *The system shall allow the user to do a location aware search based on the user's current position*

### 3.1.5. Results

All participants were able to complete the given tasks and answered the questions satisfyingly. While the advanced interface reached a SUS score of 88, the basic interface was rated 79.2. Readability for the advanced interface received an overall good rating of 4.8 on a Likert scale from 1 (bad) to 5 (good), while the basic interface was rated only average with a score of 3. We suspect that particularly the bigger resolution of the advanced interface might have contributed to these results. Regarding the speed of the interfaces, they were rated 3.4 (advanced interface) and 3.3 (basic interface) on the same scale.

#### *Advanced interface*

All users of the advanced interface particularly liked the look and feel of a real “app” and recognized the icons to navigate between pages from other applications or their everyday work with windows software. They found it easy to switch the interface language, to perform searches and liked the image-only presentation of results as well as the amount of information presented on the mixed and text-only perspective and found the size of buttons and text appropriate.

During the explore phase, all participants found out the purpose of the map icon. However, four of them stated that this is the only unintuitive icon, which should probably be redesigned to show a compass or a globe image. Two participants also expected a slightly different workflow for the location aware search: Instead of a map with institutions to select from, they expected a list of museums that would then switch to a map if one item of this list was selected.

In addition to that, none of the participants found the advanced search feature. Instead, they used the regular search box to enter a combination of key words that we asked them to look. Addressing this aspect, they answered that they would only use it if it would be faster to use and deliver better results than just entering all keywords in the regular search box (e.g. “Mozart Requiem 1791” compared to selecting fields and enter corresponding keyword like: Creator: “Mozart”, Title: “Requiem”, Date: “1791”). Our findings regarding advanced search match with results presented by (J. Nielsen, 2001), stating that advanced search is a feature merely used by professional users in rare cases. Thus, we believe that our approach of offering simple search functionality as default and offering an advanced search function on demand only, is feasible.

Two participants showed an interesting approach to complete *Task 1*: Instead of browsing to page 2 of the results, they went back to the main page and entered the keywords for the given task to start a new search. Afterwards, we found out that – starting from the mixed perspective which shows 6 out of 12 items per page – they did not scroll down enough to see the next / previous page icons.

One user spotted an inconsistency with the “Return Home” Button (see icon with house symbol on Figure 6 and Figure 7) in the breadcrumb navigation, which changes position between the result page and the full item view, and expected it to always appear at the same place.



**Figure 6. Navigation bar on result page**

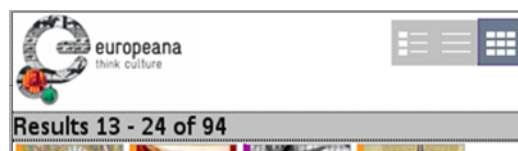


**Figure 7. Navigation bar on full item view**

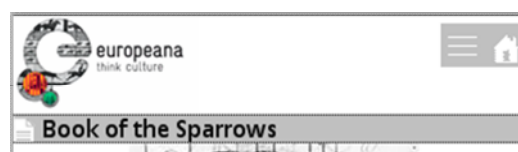
The social bookmark button, a 3<sup>rd</sup> party widget provided by addthis.com, unfortunately often did not work as expected. Sometimes, it did not react to a press on the touch-screen; another time, it opened a new browser window instead of an overlay so users did not know where the Europeana site “was”.

#### *Basic interface*

While nearly all positive aspects for the advanced interface were also mentioned by users of the basic interface, the button layout for navigation between main page, results and item presentation was criticized: Due to limited screen space, we had to remove the home button and used the Europeana logo to go back to the main page. However, some participants did not recognize this and used the back button provided by the mobile browser. Besides, they mentioned the font being slightly too small so that they sometimes needed the browser’s zoom feature and the navigation icons having too little contrast (light-grey buttons on white background, see Figure 8 and Figure 9).



**Figure 8. Basic interface: Navigation bar on result page**



**Figure 9. Basic interface: Navigation bar on full item view**

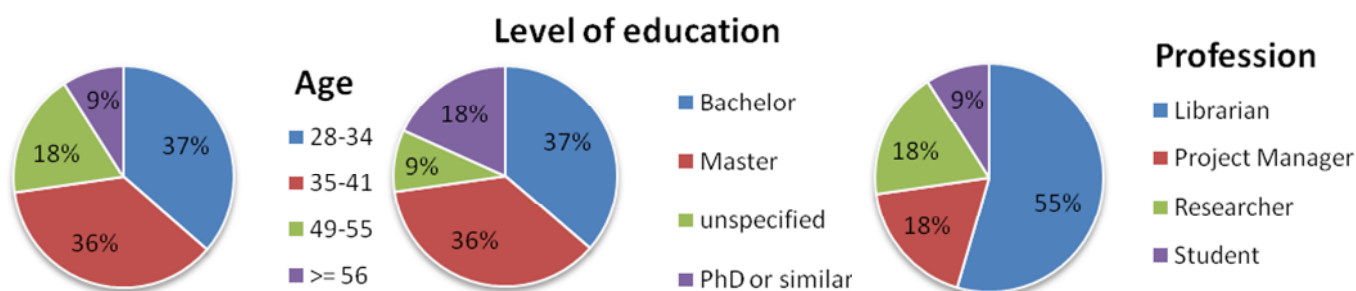
Again, a major flaw was the social bookmark button, which was hardly usable. If it reacted to a click at all, it either showed a black box or opened a new page, as for the advanced interface.

### **3.2. Online questionnaire**

While the usability evaluation was used to gather qualitative feedback, the goal for the online questionnaire was to gain quantitative feedback. Thus, we made use of the *EuropeanaConnect Test User Registry*, established and maintained by the Royal Library of Denmark as part of their work in WP 3.2 – Methodologies and tools for user involvement.

### 3.2.1. Participants

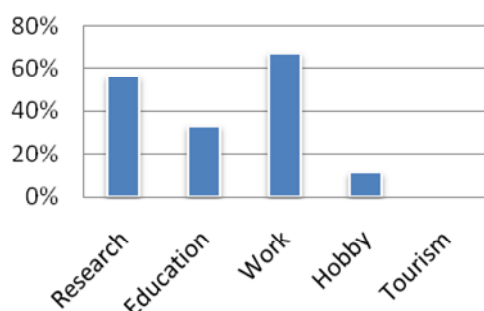
In an initial “recruitment” survey, users for the EuropeanaConnect Registry were asked for general demographic information as well as their usage of mobile phones and Europeana in general. This survey, realized using the Zoomerang (<http://www.zoomerang.com>) tool for online questionnaires, was conducted from February, 26<sup>th</sup> till June, 21<sup>st</sup> 2010 and allowed us to choose participants from a group of 114 users for the evaluation.



**Figure 10. Demographic statistics**

All participants had a mobile device, and 32 (28%) of them used it to browse the internet.

Whereas the test user registry group almost had a 1 to 1 ratio between male and female users, we had 36% male and 64% female participants in the survey. Average age was 40.2 years (SD = 0.98).



**Figure 11. Europeana usage**

Figure 10 shows some general statistics on demographic data and reveals a rather biased group of librarians with an academic education without younger persons (e.g. pupils), which has already been identified as a potential issue by the registry's initiators.

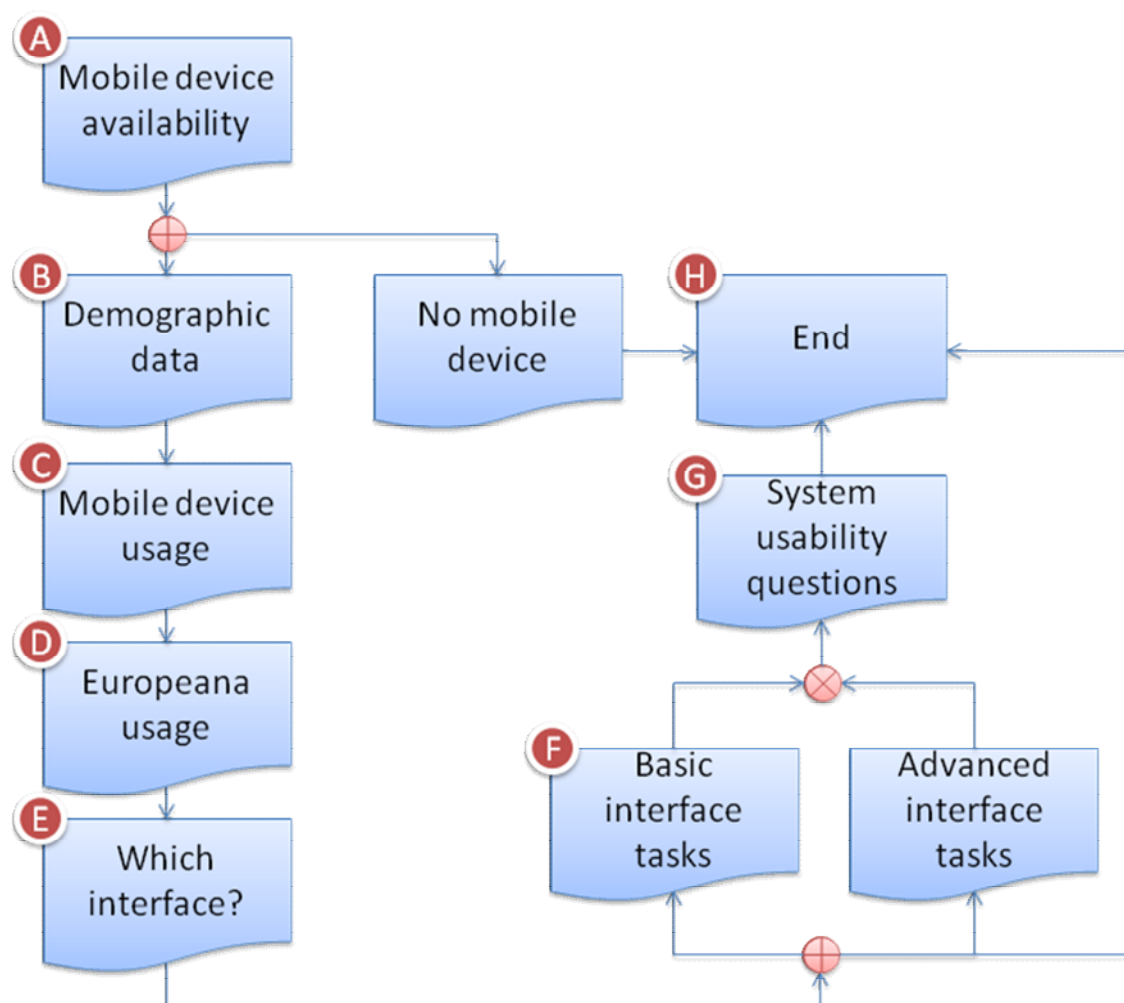
Even though all participants have been using the Europeana website before, the main purposes were for research, work and education which may likely be related to the profession of the participants and their involvement in Europeana (56%).



### 3.2.2. Setup and Design

For the online questionnaire, we used the same setup and set of questions and tasks as in the usability evaluation. Figure 12 shows the sequence of questionnaire pages used.

In step A, participants that did not own a mobile device or had one that was not capable of browsing the internet were not considered and were redirected to the end page. After questions on basic demographic information (age, gender, profession...) (B), mobile device- (C) and



**Figure 12. Sequence of questionnaire pages**

Europeana (D) usage, we presented a screenshot of both mobile interfaces and the desktop portal (E). We asked the participants to use their own device to open a link to our test server and compare the result with the screenshot. We were then able to link to different tasks in step F. If a user's device was not identified correctly and was redirected to the desktop interface, he was sent to the end page. If not, both task pages link to the same feedback form (G) used to collect written feedback as well as a standard usability scale questionnaire. For a collection of screenshots for the entire questionnaire, see Appendix E To avoid confusion, we added a disclaimer to the questionnaire (before step E) to inform all participants that the interface they will be presented may differ from the final product and that they are using a test server with a significant smaller dataset compared to the actual Europeana portal.

In order to receive a large number of responses and because of the fact that some of the participants without a mobile device in the initial survey may have bought a phone in-between, we decided to send out the link to the online survey to all participants in the *EuropeanaConnect Registry* on October, 15<sup>th</sup> 2010. The survey was open for 25 days and was closed on November, 8<sup>th</sup> 2010.

### 3.2.3. Results



**Figure 13. Participation and survey completion rates**

Figure 13 summarizes the response rate to the survey. 97 (78%) out of 114 registered test users did not respond at all, while 27 (22%) users visited the online questionnaire after the invitation. Out of this group, the results of 9 users (33%) were not usable, while a group – each of 6 users (22%) – either completed the full questionnaire, only parts or just read the introductory text.

All participants that had decided to answer the survey stated that they own a mobile phone, but only 72% of them had a device capable of browsing the internet, which means that 28% of all participants already left the questionnaire after the first question. Interestingly, these numbers already show the increasing popularity of internet-capable devices when compared with the recruitment survey where only 29% of all phone-owners stated to have a device of that class.

#### *Task completion and System usability*

Only one user evaluated the basic interface, which may be explained by the small number of participants or the larger market share of high-end devices on which the advanced interface is displayed. However, all participants have been able to complete the given tasks.

The average SUS score was a little lower than in the usability evaluation and ranged from 65 (advanced interface) to 67,5 (basic interface), as well as the readability and speed scores of 3,2.

In particular, two participants liked the location based tools, even though only points of interest for Germany were available on the test server. In general, the different result perspectives and the interface layout on the main page and item presentation were very well received by all participants and easy to use. The rather light file size/traffic was also mentioned positively by two users. However, users also identified some potential improvements, like in the usability evaluation: While the icons are clearly identifiable in the advanced interface, the basic interface icons could use a slightly adjusted colour to have a better contrast from the background. Again, the “Return Home” button was mentioned as missing element and the Europeana Logo was perceived as too big. The social bookmark sharing icon did not work properly for three participants. One user criticized a serious lack of performance, which may be due to our test server configuration or a larger number of concurrent requests. Given the fact that our server machine is not comparable to Europeana’s production environment, this issue seems negligible.

### 3.3. Log file analysis

The aggregated log files provided by the EuropeanaConnect partner UCL (University College London) are based on over 150 million requests to the Europeana servers during the time of October 2009 to September 2010. These log files allowed us to analyze Europeana usage particularly related to mobile users and their devices. In this chapter we will present some of the results and the conclusions that can be drawn from them.

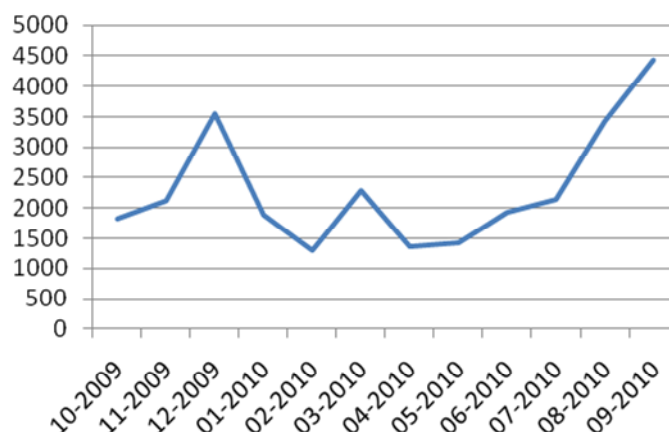


Figure 14. Mobile requests over time

Figure 14 shows the mobile access of Europeana during the observation period. While the overall graph shows a few peaks on Europeana related press releases, e.g.

- 23 December 2009: *EU will fund projects to increase Europeana digital resources...*
- 08 March 2010: *Annual report published*
- 14 Jun 2010: *1 million new digital resources in Europeana,*

mobile access has been constantly increasing in the last six month of the observation period starting with 1800 requests in April 2010 to 4400 requests in September 2010. This may be due to the release of new devices, particularly those from Apple (like the iPad and iPhone 4), in spring/summer 2010, which is supported by looking at the distribution of accesses to Europeana per type of mobile device (see Figure 15).

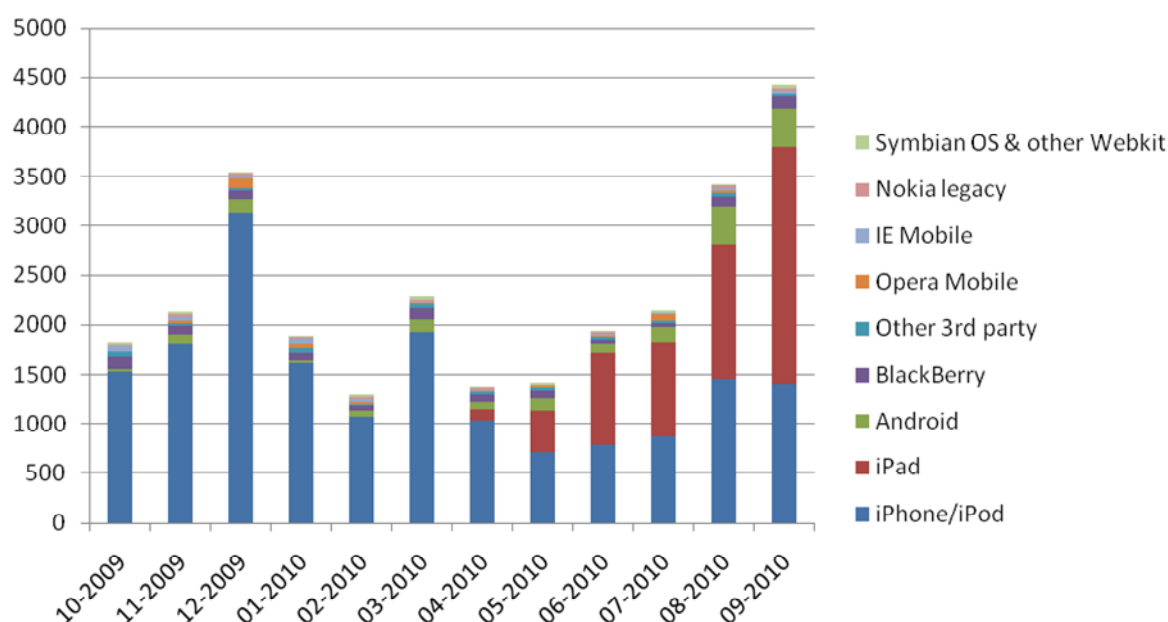


Figure 15. Mobile requests per platform/browser over time

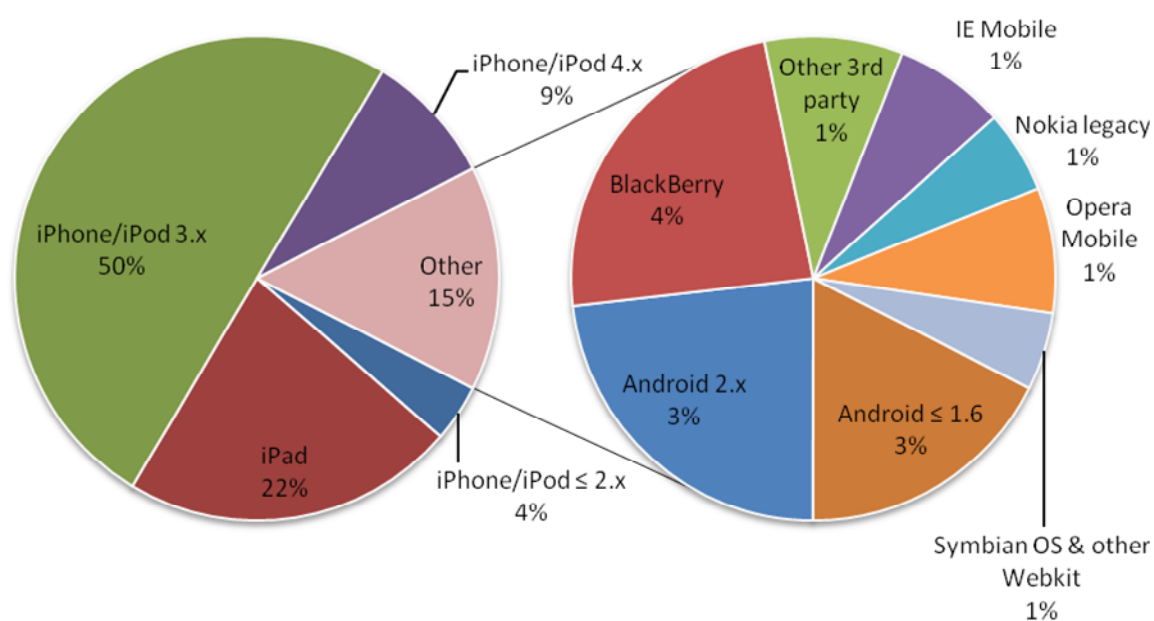
The development of the mobile clients for Europeana was based upon extensive research of the browsers of the most popular devices. Even though there are different browser engines for the five major mobile operating systems (iPhone OS, Android, BlackBerry OS, Windows Mobile and



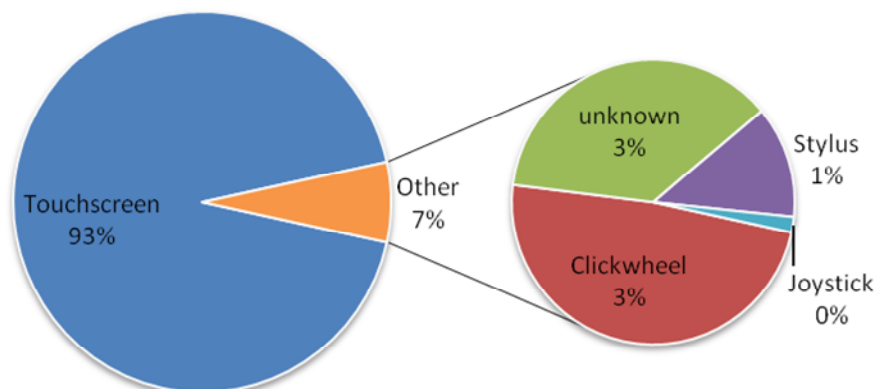
Symbian), only one seems relevant: Figure 15 shows a statistic on Europeana portal requests sorted by mobile platforms over the course of 12 months. Obviously, the iPhone/iPod chart – both are running the same software and browser engine – is outstanding and shows peaks on every new operating system or device generation release. Starting in April 2010, the amount of requests by iPad users is continuously increasing. The third noticeable chart is the Android line that slowly increases towards the end of the observation period. The last notable graph is the BlackBerry chart, which is more or less constant on a slightly lower level. The interesting fact is that all three platforms mentioned first are running browsers based on the WebKit engine (on BlackBerry devices, WebKit was introduced in mid-2010). In order to provide a good browsing experience for most users, the mobile interface should be designed to look good on browsers running this engine, while optimizations or workarounds for other browsers like the mobile Internet Explorer or Opera mobile do not seem to be important.

Figure 16 shows a more detailed breakdown based on the total requests per platform and version. 85% of all requests are made by Apple devices like the iPhone, iPod or iPad. The combined percentage of all Android devices makes up 6% of all requests while only 4% of the other users have a BlackBerry device.

Unfortunately, there is not only “one” WebKit engine, since device manufacturers often only use the core functions of the engine and build their own browser “around” it. Thus, the browser used in some Symbian devices is not capable of interpreting some special WebKit stylesheet extensions even though it is based on the same engine. Additionally, the features supported by a browser usually changes with every major operating system or device generation release. For example, Apple introduced the Geolocation API with version 3.0 of their iPhone OS, allowing to query a user’s position through a simple JavaScript call from a website. Therefore, Figure 16 also provides details on operating system version.

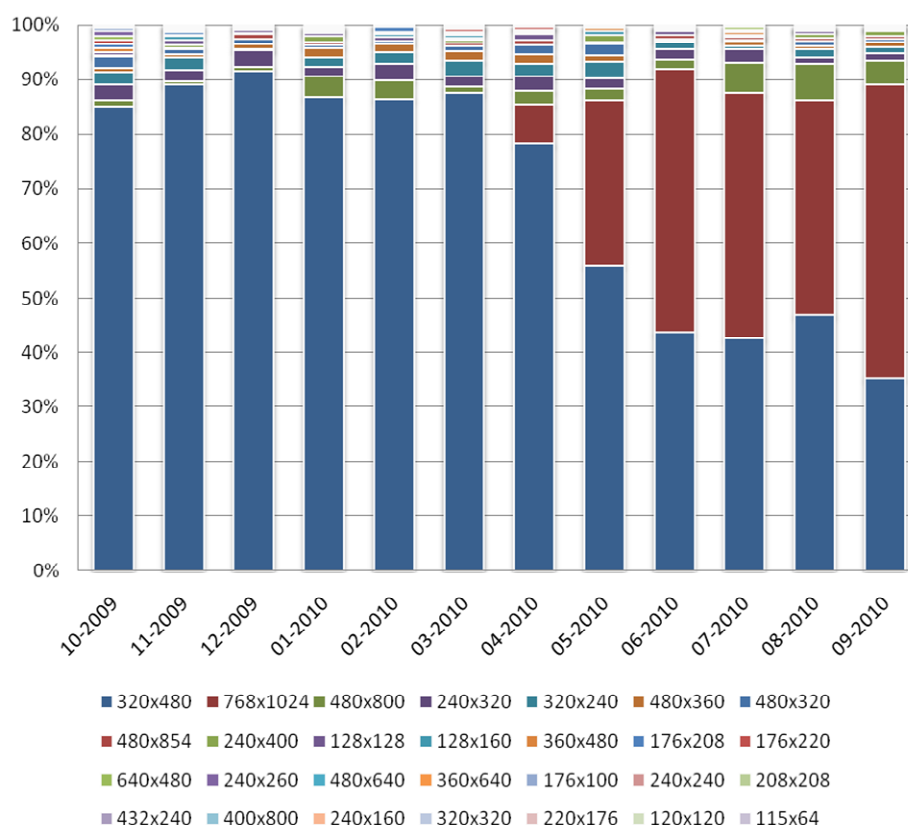


**Figure 16. Mobile platform/browser requests**



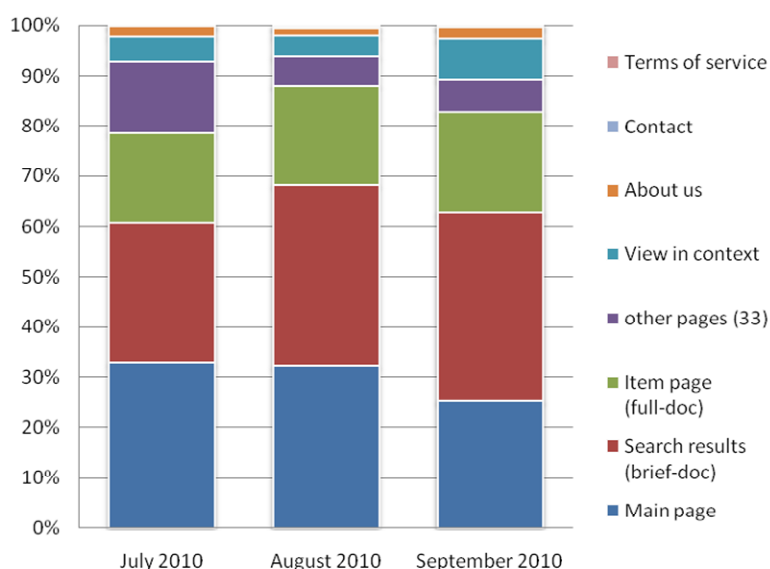
**Figure 17. Pointing method**

Using the database the device detection is based on, we were able to identify the input methods implemented in the devices used to access Europeana. Figure 17 shows a statistic on this information, which is particularly useful when it comes to the design of site navigation or button sizes. Currently, most of the devices (93%) are touch screen-based. Therefore, buttons and other interactive objects should be designed to be operated by touch-based interaction. Figure 18 may be a helpful resource for this task. It shows the trend of screen sizes over the course of twelve months. Having a large group of iPhone users, the largest amount of requests was done by devices with a screen size of 320x480 pixels. Starting in April 2010, some of these users switched to the iPad which has a significantly larger screen size (768x1024). The next notable group of devices features a screen size of 480x800, while the long-time default size of 240x320 / 320x240 or smaller is becoming more and more obsolete.

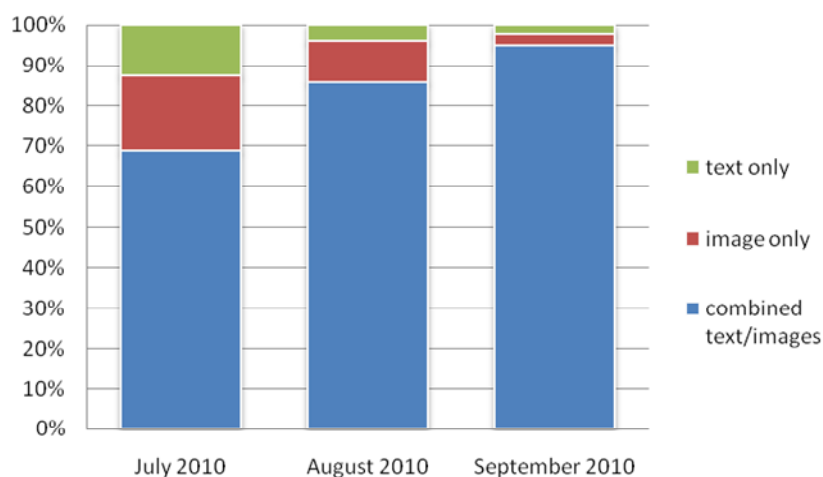


**Figure 18. Screen sizes**

Figure 19 and Figure 20 are based on a time span from July 2010 to September 2010, as the mobile interface was enabled in Europeana's production environment after the first half of July. Looking at Figure 19, it is possible to determine the most used Europeana pages in a mobile context. Not surprisingly, the most requested pages are the main page, as well as the search results and item pages. While in July the amount of requests for main page and search results are almost equal, the number of search result requests has slightly increased towards September. There are two possible explanations: Either users are performing more than one search or they need to browse through more results, due to more objects in the index. Since the ratio of item page requests, recorded when a user found his desired object after a search and decided to view its details, is more or less constant over the observed period, the latter explanation seems more probable. Finally, more and more users decide to view the object in its original context, indicated by the light blue bar. The number of page requests for static pages like "contact" or "terms of service" is at a low ratio. The slightly higher amount of requests for "other pages" in July may be explained as requests to pages that were only accessible in the beginning of that month where users were still browsing the desktop interface and had the opportunity to log in to "My Europeana" or view the timeline feature.



**Figure 19. Mobile requests per page**



**Figure 20. Mobile result perspective switches**

In Figure 20, we take a closer look at the search results and the different presentation methods in particular. In order to provide a good browsing experience for all mobile users, we have created different perspectives for the result page:

- Result visualization in combined image/text perspective. This perspective is the default presentation; it combines a thumbnail-sized image preview with the most important item information.
- Result visualization in text-only perspective: This perspective offers a light-weight way to review search results that is useful for lower bandwidth-conditions or older devices.
- Result visualization in image-only gallery perspective: This perspective offers the most graphical representation with a list of images that is displayed in a lightbox way.

The figure shows a trend towards the default presentation, meaning that most users have not switched the perspective at all. The larger amount of “result switchers” in July could again be explained by the fact that the mobile interface was not available in the beginning of that month and user had to use the regular interface that worked a little better with a “switched” perspective.

### 3.4. Evaluation of requirements

In D3.4.1 we have identified a catalogue of requirements in form of functional requirements / use cases and non-functional requirements, based on a user survey and a state of the art analysis of the mobile web. In the following, we summarize each requirement and comment on the achieved results.

#### 3.4.1. Functional Requirements / Use Cases

Each of the functional requirements, formalized in use cases, is commented in the following (see (OFFIS Institute for Information Technology, 2009) for a more detailed description of each use case).

**UC 1.1 Simple search:** The system shall allow the user to do a simple keyword search

This is the most common use case and an important key feature of the mobile interface and Europeana itself.

**UC 1.2 Enhanced search:** The system shall allow the user to do an enhanced search over different categories

This use case has proven to be slightly less important. As most participants were able to complete the given tasks by using the “standard” search feature, they probably do not need an enhanced search or at least not in its current design.

**UC 1.3 Location aware search:** The system shall allow the user to do a location aware search based on the user’s current position

In order to support the touristic usage of Europeana, this may be the most important use case. All of the usability evaluation participants stated that they liked the ability to search for interesting places around their current location and the interface we have designed for it. However, there are still some potential improvements left, which are explained in more detail in a separate chapter.

**UC 2.1 Visualization of Search Results in text-only List:** The system shall allow the user to visualize results in a text-only perspective

Even though – according to the log file analysis – this method of visualization was not used very often, it offers a lightweight alternative for users that do not own a high-end device or need to consider a lower bandwidth as stated by online questionnaire participants.

**UC 2.2 Visualization of Search Results in gallery list:** The system shall allow the user to visualize results in an image-only gallery perspective

Again, a rather unused method of visualization, this perspective was nevertheless popular among four out of five of the usability evaluation participants.

**UC 2.3 Visualization of Search Results in Mixed list:** The system shall allow the user to visualize results in a mixed image/text perspective

Being the default method for result presentation, this perspective has proven to offer the most effective usage of available screen space with a decent amount of information and a thumbnail on each object.

**UC 2.4 Visualization of Search Results in a map:** The system shall allow the user to visualize results in a map, showing entries in a specified perimeter around his / her current location.

Related to UC 1.3, this perspective is required to provide a location based service that wants to adhere to established standards.

**UC 3 Visualize details of an item in the search results:** The system should allow the user visualize details of a selected item in the search results

This feature is required to complete a standard “search workflow”: providing a search method, result browsing and detailed information on a selected object.

### 3.4.2. Non-functional requirements

In contrast to functional requirements, non-functional requirements do not make a statement about the behaviour of the system, but about its quality. They are an essential part of the requirements definition, particularly in the context of larger projects as Europeana, in which thousands of users are potentially working with the system each day.

The following requirements have been identified as part of the user requirements definition.

#### Usability

*The usability of the mobile client is a critical aspect that demands special attention. According to DIN EN ISO 9241-11, usability is defined as the “extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.”*

According to the user centred design process, the usability of the system was evaluated in a user study as part of this Deliverable. It concludes with recommendations about future improvements of the system.

#### Security

*One of the most important non-functional requirements is security. Therefore, the system shall not store any personal information about a certain user that cannot be changed by the user him/herself. It shall not allow unauthorized individuals or programs access to any communication.*

The mobile interfaces build on top of the Europeana framework and make use of the same security mechanisms implemented for the portal. Since the “My Europeana” feature is currently

not provided for mobile users, no personal information is stored for the basic features. However, the location aware service makes use of such information: It needs the user's position to determine institutions around his location. Thus, all browsers that implement this feature ask the user to permit usage of this information, before this service can be used.

### **Scalability, Extensibility and Maintainability**

*Scalability* is a critical issue for all developments in the EuropeanaConnect project. Europeana will become a central service for all Europeans and is therefore likely to experience heavy traffic from day to day. This also holds true for the mobile web client developed in this task, it thus needs to be made sure that eMobile will be scalable according to the increasing popularity of Europeana.

*Extensibility* is a quality of design that takes possible future advances into consideration and attempts to accommodate them. The system shall therefore be able to allow the addition of features without influencing existing system functions. The usage of SPRING as a framework, as recommended by the Europeana Office, assists in keeping the system flexible and extendable.

The code developed in this task needs to be *maintained* by external institutions, i. e. the Europeana Office, after the project. To ensure this, we support the development architecture proposed by the Europeana Office, concerning development platforms and tools, as well as programming language and frameworks as good as possible.

Due to the fact that the mobile interfaces are implemented using the same template engine the desktop interface uses and the tight integration of the device integration into the portal, we can make use of the same scaling methods implemented and already in place for Europeana.

By following the proposed Spring approach and an early integration into the portal, extensibility is ensured and possible without too much effort for new features and maintenance for existing code.

### **Testability**

To ensure a proper *testability* of the code, we have developed unit tests for all critical parts of the software. Unit tests can be executed automatically to confirm the correct operation of the code after changing parts of the system.

We have provided unit tests and frequently conducted user evaluations and tests. We have furthermore tested the operation of the system manually to ensure proper operation from a user centric point of view.

### **Platform Compatibility**

By adhering to the conventions established by the Europeana Office, we ensure compatibility with the already established platform and reduce the effort for integration.

### **Performance**

To ensure a satisfying user experience, the system needs to respond within a certain period of time.

By carefully choosing a backend concept agreed with Europeana developers at the first developer's meeting and subsequent mail exchange, the system is able to deal with large amounts of data. The implementation of a modular and scalable system allows us to provide a service that can handle an increasing number of concurrent users.



## 4. Discussion

### *Native application vs. “web app”*

During the development process, we had to decide early whether to implement a native application for the most popular devices at that time (iPhone, Android) or create a solution that allowed us to implement the desired features while lowering the maintenance effort.

In October 2010, the developers of TweetDeck, a popular social network client, published an interesting statistic after release of their Android version (TweetDeck Inc., 2010): They had to deal with an extreme fragmentation of the Android ecosystem. According to their log files, there are more than 100 different Android versions used on all sorts of phones. The number of custom firmwares, exotic phones and general level of customization of Android would seriously increase the effort for maintaining a native application. Looking at this statistics and the development of mobile devices in general, we therefore suggest the further development of a web-based interface that adheres to standards like CSS and HTML, instead of dealing with various programming languages. With the “web app” we have successfully mimicked the look and feel of a native application while building on top of the existing Europeana framework.

### *General suggestions*

A serious issue that was identified in both the usability evaluation and the online questionnaire was the integration of the social bookmark feature in its current form. Apart from failures the amount (>300) of supported bookmarking services and social networks is not suitable for mobile devices. As one user pointed out, we suggest supporting only a limited number of about five to ten services. By providing an own social bookmark feature, it would then be possible to remove the 3<sup>rd</sup> party widget and better integrate it in the portal, as one user even thought it was an advertisement.

Currently, a user needs to navigate back to the main page to refine a search. Starting from an item presentation, he would have to go back to the search results first and switch to the main page afterwards. We therefore recommend thinking of a way that allows performing a new search from every page. Figure 21 shows a mock-up of a search button that could be integrated in the upper right region on result and item pages. On a click, this button could then show an overlay that provides a textbox to enter keywords.



**Figure 21. Mock-up of Search button in navigation bar**

### *Main Page*

Due to the fact that no user could find the enhanced search feature, but all were able to complete the given tasks nevertheless, this feature needs a redesign and needs to be presented more prominently in order to be noticed, or should be removed completely.

Regarding the treasures presentation on the main page, one user suggested to populate this gallery of iconic objects with items shown in an institution close to his current location (if this information is available).

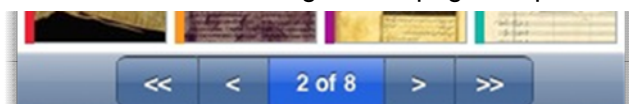
In the time between Deliverable 3.4.3 – Rich mobile client for accessing Europeana and the writing of this document, the search suggestions feature, which was demanded by three test

users has been implemented for the desktop portal, but not for the mobile interfaces: While typing a search keyword, the system should already provide a list of common terms for the entered text and help users to specify their queries.

### Search results

To further reduce traffic size, we suggest considering a modified default view for search results on devices showing the basic interface. Currently, results are displayed in a mixed text/image perspective. Since the device detection redirects high-end devices with a large screen to the advanced service, the basic interface is usually shown on older phones with rather small displays. The text-only perspective may be a better default view for these devices, providing the most important information without thumbnail images at a glance.

As stated in chapter 3.1.5, a few participants did not scroll down enough to see the navigation controls to browse through result pages. A potential workaround could be the implementation of a

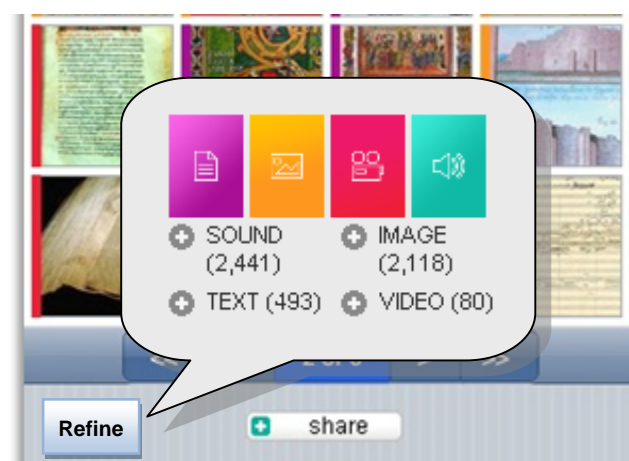


**Figure 22. Pagination buttons**

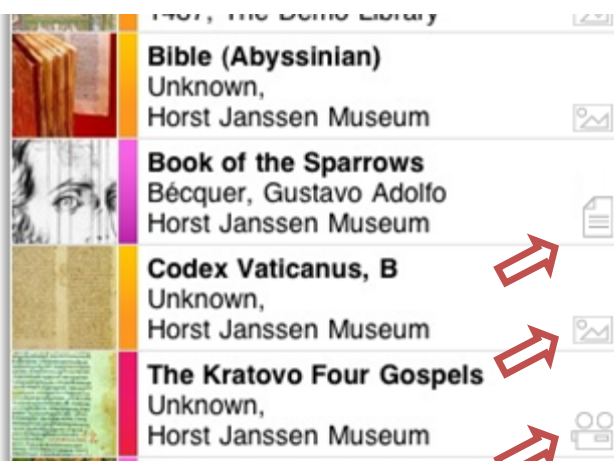
dynamic loading mechanism that would automatically load the next chunk of results as soon as the user scrolls down to a certain point or the end of a page. Instead of browsing multiple pages of results, the

result would be a single page that would be extended dynamically. However, this approach is only applicable if a device's browser supports the required techniques (JavaScript/AJAX). For the basic interface it may therefore be appropriate to show the pagination buttons on top and bottom of all result pages.

Since zooming and scrolling to capture long texts is sometimes cumbersome on a mobile device, there may be a way to help users find the relevant information in an object description. By highlighting his search keywords in fields like item title, creator or description texts, it would be possible to identify the right section easier.



**Figure 23. Mock-up of "Refine" button**



**Figure 24. Watermark on item summary**

Currently, search results are sorted by relevance to search keywords. Sometimes, a user may want to see only items of a certain type, e.g. only images, texts, or audio documents. Given the limited available screen space and the assumption that most users would not need this feature for every search, we suggest adding a small button at the end of each result page that opens an additional "refine" overlay to (un)-select and filter certain object types. This area could also provide some sort of legend that explains the different



colours used to mark object types (orange = image object, see Figure 23) A different way to indicate an object's type could be a small icon as a watermark on each item (see Figure 24).

#### *Item presentation*

One user mentioned a small addition to the item presentation: On devices that show the advanced interface, this page could also show a button that allows switching to a map. This map could then show the location of the institution exhibiting that object.

#### *Location aware search / map perspective*



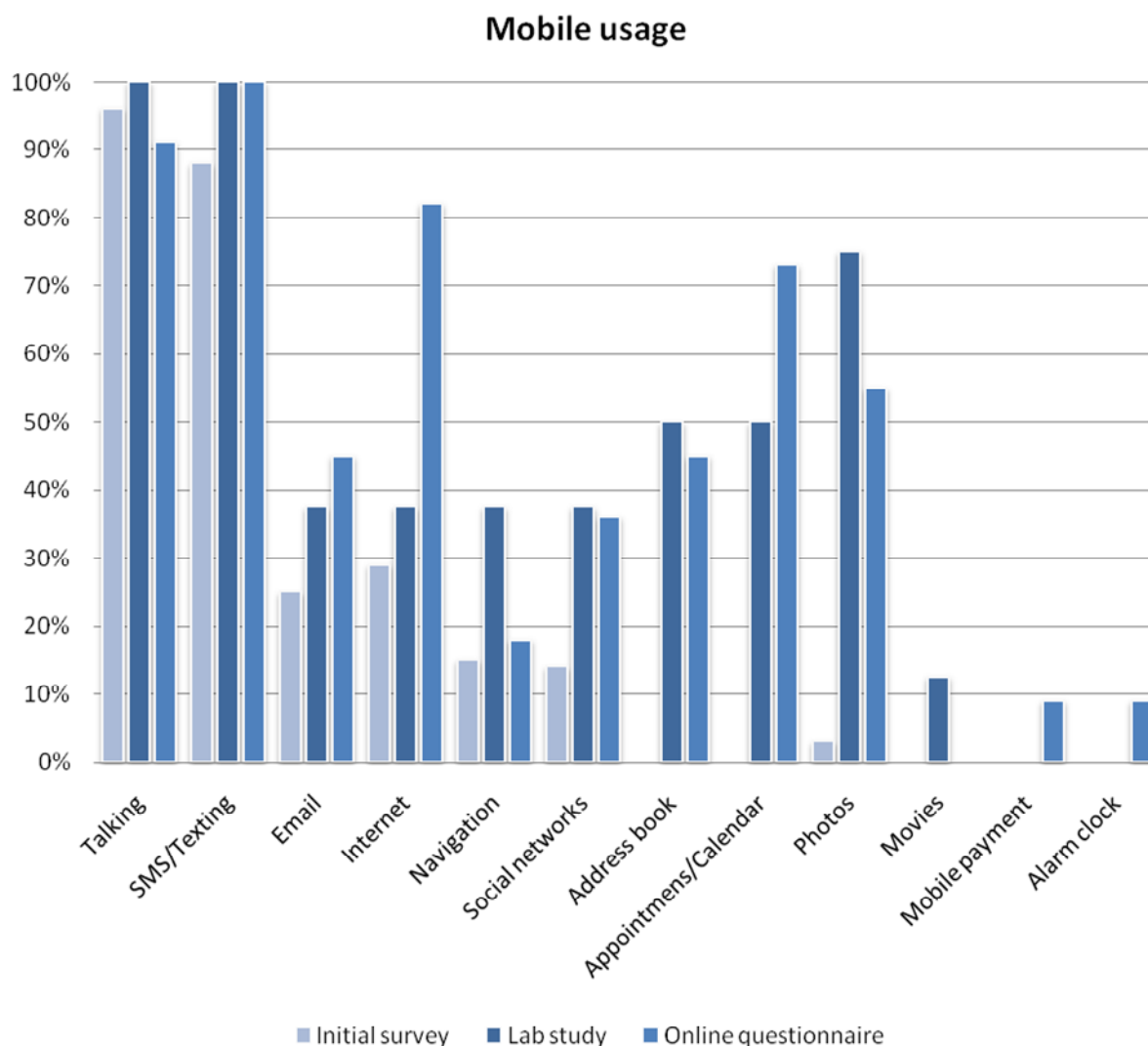
As stated in the results of the usability evaluation, users were not able to identify the purpose of the map button, due to an ambiguous icon showing three map pins. We therefore suggest redesigning this icon to show a small silhouette of Europe or a compass image. To further enhance the touristic aspect and support user in navigation between institutions, the map perspective could also provide text directions.

Currently, the directions service is able to render directions to walk or drive from a user's position to an institution. However, the user's position is only acquired once per session, when he accesses the main page. Fortunately, the library used to determine his coordinates is also able to track changes as the user moves along his way.

#### *Navigation between pages*

Since there were a few comments on the navigation bar by users of the basic interface, these buttons should probably be redesigned and/or rearranged. On a small screen, the Europeana logo is too large and covers parts of the layout switching buttons. As most participants used the "back"-button provided by the browser instead of clicking the logo to go the main page, a separate link with a home-icon may be considered.

Given the fact, that the background of the basic interface is white, a bit more contrast for the navigation icons (currently light grey) seems necessary. Additionally, the font size of the result page browsing area may be slightly increased, making it easier to navigate between pages without the need for zooming.



**Figure 25. Mobile usage statistic**

### *New features*

As shown in Figure 25, the five most used features among usability-study participants and online questionnaire users of the EuropeanaConnect Registry were talking, messaging, photos, address book and appointment managing. While the internet, navigation and social network features are covered by the implemented mobile interfaces, the photo-capability remains unused. This may be an opportunity to improve the hobby and tourism usage of Europeana: with augmentation techniques, users could be able to search the database by uploading a camera picture taken with their mobile phone. Additionally, users may be allowed to upload pictures and connect them with Europeana objects that do not have an image assigned. Unfortunately this would require access to the camera hardware from a browser, which is – by the time of writing of this document – not possible in web apps. But, as technology evolves, this may be feature we may see in future devices and their browsers like the Geolocation API that makes (among other things) use of a device's GPS sensor or the recently introduced DeviceOrientation API which allows accessing the device's accelerometer and gyroscope.

## 5. Conclusion

In this document, we have presented an evaluation of the mobile interfaces, developed as part of our work on Subtasks *3.4.2 Middleware and web server for accessing Europeana* and *3.4.3 Rich mobile client for accessing Europeana*.

We started with a presentation of the underlying design process and a summary of the services and interfaces developed in task 3.4 and the results from an evaluation planning workshop held in conjunction with User Studies experts of our EuropeanaConnect project partner, the Royal Library of Denmark. We then presented the task design used in a usability evaluation at our office and an online questionnaire we conducted among participants in the EuropeanaConnect Registry. Afterwards, we described the usability evaluation setup and results, followed by an analysis of the online survey results. In the following, we took a closer look on the log files collected during a time span of twelve months and examined usage and devices of mobile Europeana users. We then proceeded with a summary of the requirements identified in task 3.4.1 and check them against our results identified in earlier chapters. Finally, we formulated suggestions for future extensions and improvements.

### *Next steps*

Since the Europeana Rhine release with the mobile interfaces went live, the Europeana Office already gained interesting statistics on mobile usage and will even grow this source of information in the future. It will be a useful resource that could – together with user feedback, the results of our evaluation and the suggestions found in this document – form the requirements for future developments of the mobile client and establish eMobile as an important access channel for Europeana.

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## 8. Appendix

Appendix contains different material of user studies on mobile interfaces

# Informationsblatt

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## *Studie „EuropeanaConnect“*

Liebe StudienteilnehmerInnen und InteressentInnen,

Vielen Dank für das Interesse an dieser Studie. Dieses Informationsblatt erklärt kurz die Hintergründe der Studie, erläutert was sie im Falle einer Teilnahme erwartet und informiert sie über ihre Rechte als Studienteilnehmer.

### Hintergrund

Organisiert wird sie von der Forschungsgruppe Intelligente Nutzungsschnittstellen des OFFIS Institut für Informatik. Die Studie ist Teil des Projekts EuropeanaConnect, das von der Europäischen Kommission im Rahmen des eContentplus-Programms gefördert wird.

Das Projekt hat zum Ziel, Kernkomponenten für die Entwicklung und Erweiterung der europäischen digitalen Bibliothek Europeana bereitzustellen. Europeana enthält bereits mehr als 4,6 Millionen digitale Bilder, Texte, Klänge und Videos aus ganz Europa und hat zum Ziel, das reiche Kulturerbe Europas für alle Europäer zugänglich zu machen. OFFIS wird in dem Projekt innovative Benutzerschnittstellen für mobile Endgeräte (z. B. Mobiltelefone) erproben und entwickeln, und es Benutzern so ermöglichen, auch unterwegs jederzeit das reichhaltige Informationsangebot Europeanas zu nutzen.

### Die Studie

In dieser konkreten Studie untersuchen wir eine für Mobiltelefone optimierte Ansicht des Europeana-Portals. Wir werden Ihnen hierzu eine Reihe von Aufgaben stellen um die umgesetzten Funktionen auf Gebrauchstauglichkeit zu testen und Optimierungsvorschläge zu identifizieren. Der genaue Ablauf wird vor der Studie ausführlich erläutert und kann in Ruhe erprobt und getestet werden.

### Datenerhebung

Wie in jeder Studie sind wir auch hier an Daten interessiert. Dabei legen wir allergrößten Wert auf den Schutz der Daten.

Alle Daten werden anonym erhoben. Beispiele sind z.B. welche Suchbegriffe Sie eingegeben haben, welche Links angeklickt wurden, demographische Daten (Alter, Geschlecht) oder allgemeine Daten zur Nutzung Ihres Mobiltelefons. Um die Anonymität der Daten zu gewährleisten, erhalten sie zu Beginn der Studie eine eindeutige Nummer, die anstelle ihres Namens verwendet wird. Sie hilft uns später, die verschiedenen Daten zusammenzuhalten, aber man kann die Daten nicht zu ihrer Person zurückverfolgen.

Veröffentlicht werden Zusammenfassungen der Daten (also z.B. Mittelwerte über alle Teilnehmer) in einem Projektbericht an die Europäische Kommission. Gespeichert werden die Daten auf einem Server, auf den nur von Mitarbeitern des OFFIS Institut für Informatik zugegriffen werden kann.

Wir werden Medienaufzeichnungen (z.B. Video-, Tonaufnahmen) von der Evaluation machen. Sie dienen später dazu, die Auswertung der Daten zu ergänzen und zu erleichtern. Medien, auf denen sie als Person zu erkennen sind, werden ausschließlich mit ihrer expliziten Erlaubnis veröffentlicht.

### Ihre Rechte

Sie können sich jederzeit und ohne Nennung von Gründen aus der Studie zurückziehen. Sollten Sie Fragen haben, beantworten wir sie gerne.

Vielen Dank, dass Sie mit ihrer Zeit unsere Arbeit und damit die Forschung im Bereich der Mensch-Maschine-Interaktion unterstützen!

*Dennis Heinen und Tobias Hesselmann*

### Erklärungen

- 1) Ich bin bereit an der Studie teilzunehmen
- 2) Ich wurde über die Ziele der Evaluation aufgeklärt. Ich fühle mich ausreichend informiert.
- 3) Mir wurde erklärt, dass
  - a. während der Evaluation meine Aktivitäten festgehalten werden und Daten per Fragebogen erhoben werden,
  - b. ich nicht dazu verpflichtet bin, schriftlich und mündlich gestellten Fragen zu beantworten,
  - c. alle persönlichen Informationen unter das Bundesdatenschutzgesetz<sup>1</sup> fallen, was bedeutet, dass meine Identität nicht ohne meine Einwilligung preisgegeben wird,
  - d. alle gesammelten Daten ausschließlich und anonymisiert für wissenschaftliche Zwecke im Rahmen dieser Arbeit verwendet werden,
  - e. ich jederzeit und ohne Begründung eine Aktivität oder die gesamte Teilnahme an der Evaluation abbrechen kann.
- 4) Ich kann die Wissenschaftlichen Mitarbeiter Dennis Heinen<sup>2</sup> oder Tobias Hesselmann<sup>3</sup> kontaktieren, wenn ich Fragen zur Evaluation, dem Projekt oder meiner Teilnahme habe.
- 5) Ich wurde informiert, dass ich für meine Teilnahme nicht bezahlt werde.

Teilnehmer \_\_\_\_\_

Oldenburg, den \_\_\_\_\_

Unterschrift \_\_\_\_\_

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<sup>1</sup> [http://bundesrecht.juris.de/bundesrecht/bdsg\\_1990/gesamt.pdf](http://bundesrecht.juris.de/bundesrecht/bdsg_1990/gesamt.pdf)

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## Demographische Daten

---

Teilnehmer ID: \_\_\_\_\_ (wird von den Versuchsleitern vergeben)

Zutreffendes bitte einkreisen. Wenn eine Frage unzutreffend ist oder nicht beantwortet werden kann/soll/will bitte k. A. für keine Angabe einkreisen.

### Demographische Daten

Bitte geben Sie ihr Alter an

<14	14-20	21-27	28-34	35-41	42-48	49-55	56+	k. A.
-----	-------	-------	-------	-------	-------	-------	-----	-------

Bitte geben Sie ihr Geschlecht an

m	w	k. A.
---	---	-------

### Fragen zur Internet-Nutzung auf Mobiltelefonen (Beispiel)

Bitte schätzen ab, in wie weit folgende Aussagen auf sie zutreffen und kreisen sie die entsprechende Wertung ein:

Ich besitze ein internetfähiges Mobiltelefon

Ja	Nein	k. A.
----	------	-------

Wenn ja, geben Sie Hersteller und Modell an: \_\_\_\_\_

Ich verwende mein Mobiltelefon für (Zutreffendes bitte einkreisen)

Telefonate	SMS	Internet	Navigation	Soziale Netzwerke (Facebook, Twitter etc.)	k. A.
Adressverwaltung	Email	Termine	Fotos		

Sonstiges: \_\_\_\_\_

Wie häufig verwenden Sie Ihr Mobiltelefon?

Mehrmals am Tag	Täglich	1x in der Woche	3-5x in der Woche	seltener	k. A.
-----------------	---------	-----------------	-------------------	----------	-------

Ich verwende mein Mobiltelefon

privat	dienstlich	k. A.
--------	------------	-------

\_\_\_\_\_

## STUDIE „EUROPEANACONNECT“

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### Aufgaben

#### Suche

Die Website ermöglicht die Suche nach kulturellen Werken Europas. Suchergebnisse können in unterschiedlichen Ansichten dargestellt werden. Eine Detaildarstellung bietet weitergehende Informationen zu jedem Objekt.

- Stellen Sie Europeana auf ihre Landessprache um.
- Suchen Sie nach *Bible*. Die Ergebnisse dieser Suche erlauben die Beantwortung dieser Fragen:
  - Wieviele Seiten enthält das *Se Wsi Testamenti* ? \_\_\_\_\_
  - Aus wie vielen Psalmen besteht das *Kiev Psalter* ? \_\_\_\_\_
- Suchen Sie nach *Manuscript*
  - Sie möchten eine visuelleren Version der Suchresultate und daher nur Thumbnails (kleine Vorschaubilder) betrachten. Schalten Sie um auf die „Galerie-Ansicht“.
  - Sie möchten eine leichtgewichtige Version der Suchresultate betrachten. Schalten Sie um auf die „Nur-Text-Ansicht“.
  - Aus welchem Jahrhundert stammt das Manuskript der *La Sphera* von *Leonardo Dati*? \_\_\_\_\_
- Sie befinden sich in einer Ausstellung mit Werken des Künstlers *Magnus Weidemann* und interessieren sich für Hintergrundinformationen zu seinem Gemälde *Sonnenfunken*. Suchen Sie diese in Europeana.
  - Sie finden das Gemälde interessant. Teilen Sie es mit ihrem Social Network.

#### Erweiterte Suche

Die Website ermöglicht die Verknüpfung einiger Suchparameter (Titel, Jahr, ...) um erweiterte Suchen zu ermöglichen. Darüber hinaus erlaubt eine zusätzliche Ansicht die Darstellung der ausstellenden Institution(en) in einer Karte.

- Suchen Sie nach Bildern von *Georg Burmester* aus dem Jahr 1901
  - Sie interessieren sich für den Standort der angezeigten Werke. Schalten Sie um auf die „Karten-Ansicht“ der Ergebnisse.

#### Ortsbasierte Suche

Die ortsbasierte Suche ermöglicht die Suche nach Institutionen und interessanten Objekten in der Nähe Ihres aktuellen Standorts, sowohl mit als auch ohne Angabe eines Suchbegriffs.

- Wechseln Sie auf die Startseite und ermitteln Sie Museen in der Nähe Ihres aktuellen Standorts
  - Sie interessieren sich für die Standortinformationen eines der angezeigten Museen. Wählen Sie ein Museum aus und betrachten Sie diese Informationen (falls vorhanden).
  - Sie haben sich dazu entschieden, dieses Museum zu besuchen. Lassen Sie sich eine Route in der Karte einzeichnen.

## STUDIE „EUROPEANACONNECT“

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### Aufgabe

#### Suche

Die Website ermöglicht die Suche nach kulturellen Werken Europas. Suchergebnisse können in unterschiedlichen Ansichten dargestellt werden. Eine Detaildarstellung bietet weitergehende Informationen zu jedem Objekt.

- Stellen Sie Europeana auf ihre Landessprache um.
- Suchen Sie nach *Art Deco*. Die Ergebnisse dieser Suche erlauben die Beantwortung dieser Fragen:
  - Bis wann lebte *Niklavs Strunke*, Zeichner des Posters *Song festival in Riga*? \_\_\_\_\_
  - Welche Institution hat die Rechte an dem Bild *Vogue*? \_\_\_\_\_
- Suchen Sie nach *Beethoven*
  - Sie möchten eine visuellere Version der Suchresultate und daher nur Thumbnails (kleine Vorschaubilder) betrachten. Schalten Sie um auf die „Galerie-Ansicht“.
  - Sie möchten eine leichtgewichtige Version der Suchresultate betrachten. Schalten Sie um auf die „Nur-Text-Ansicht“.
  - Aus welchem Jahr stammt das Bild *Ludwig van Beethoven* von *Klaus Böttger*? \_\_\_\_\_
- Sie befinden sich in einer Ausstellung mit Werken des Künstlers *Magnus Weidemann* und interessieren sich für Hintergrundinformationen zu seinem Gemälde *Sonnenfunken*. Suchen Sie diese in Europeana.
  - Sie finden das Gemälde interessant. Teilen Sie es mit ihrem Social Network.

### System Usability Scale

Experiment \_\_\_\_\_

Aufgabe \_\_\_\_\_

Teilnehmer ID \_\_\_\_

Stimme nicht zu

Stimme zu

- |  |                      |                      |                      |                      |                      |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1. Ich denke, dass ich diese Website häufig benutzen möchte  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 2. Ich fand die Website unnötig kompliziert  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 3. Ich denke, dass die Website einfach zu benutzen ist   | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 4. Ich denke, dass ich die Hilfe eines Technikers benötigen würde, um die Website zu benutzen              | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 5. Ich finde, dass die verschiedenen Funktionen der Website gut integriert sind                            | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 6. Ich fand die Website zu inkonsistent  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 7. Ich könnte mir vorstellen, dass die meisten Menschen den Umgang mit der Website schnell erlernen würden | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 8. Ich fand die Bedienung der Website umständlich  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 9. Ich fühle mich sehr sicher bei der Bedienung der Website  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 10. Ich musste viele Dinge lernen, before ich die Website benutzen konnte                                  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

Bitte bewerten Sie die einzelnen Aspekte auf einer Skala von 1-5

1 (schlecht)

5 (gut)

Lesbarkeit/Schriftgröße/Darstellung

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------

Bedienbarkeit

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------

Geschwindigkeit

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------



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1 \* Do you own a mobile phone?

- ☐ Yes  
☐ No

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2 \* Is it capable of browsing the internet?

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Page 1 of 7

Survey Page 1



### Personal information

(All the survey information will be treated confidential, and only used in the Europeana group projects).

- 3 You may have answered the questions below in our initial survey earlier this year. You may enter your **email address here** and continue on the next page if nothing has changed inbetween. We can use the information you provided in our previous survey then.

- 4 Gender

- ☐ Female  
☐ Male

- 5 Profession?

- 6 Year of birth (Example 1976)

- 7 Level of education (Choose highest level)

- ☐ Elementary school (1-7 years)  
☐ Secondary school (8-12 years)  
☐ Bachelor  
☐ Master  
☐ PhD or similar  
☐ Practical education  
☐ Other, please specify



We are interested in the usage of your mobile phone. Please answer the questions below.

8 How do you use your mobile phone? (choose one or more options)

- ☐ Talking
- ☐ SMS/texting
- ☐ Email
- ☐ Internet
- ☐ Navigation
- ☐ Social networks such as facebook, twitter, ...
- ☐ Address book
- ☐ Appointments/Calendar
- ☐ Photos
- ☐ Other, please specify

9 How often do you use your mobile phone?

- ☐ Several times a day
- ☐ Once a day
- ☐ Once a week
- ☐ 3-5 times a week
- ☐ 3-5 times a month
- ☐ Once a month
- ☐ Other, please specify

10 In which context do you use your mobile phone? (choose one or more options)

- ☐ A. Private
- ☐ B. Work
- ☐ C. Education

11 Please name the brand of your mobile phone (if known)

For example: Apple, Nokia, HTC...

12 Please name the model of your mobile phone (if known)

For example: iPhone, N70, Touch HD



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Questions on the use of Europeana

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13 Have you ever used the Europeana website (Europeana.eu) before?

- ☐ A. Yes
- ☐ B. No

---

14 Have you ever used the Europeana website for? (choose one or more options)

- ☐ A. Research
- ☐ B. Education
- ☐ C. Work
- ☐ D. Hobby
- ☐ E. Tourism

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15 Are you involved in any way in Europeana group projects?

- ☐ A. Yes
- ☐ B. No

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To properly answer this questionnaire, it is crucial to understand what Europeana is about. If you have no experience with Europeana yet, please take some time and use your **desktop browser** to accommodate yourself with the Europeana portal at <http://europeana.eu>.

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Afterwards, please take your **mobile phone** and use it to browse to

<http://tiny.cc/econnect>

If this address doesn't work, please try

<http://svgschulung01.offis.uni-oldenburg.de/portal/>

Please take your time to get acquainted to the mobile interface for Europeana now. In the next step you'll be given a list of tasks to perform with this website.

Please note: the interface you'll see may differ from the final product. You are browsing on a test server with a significant smaller dataset compared to the actual Europeana portal.



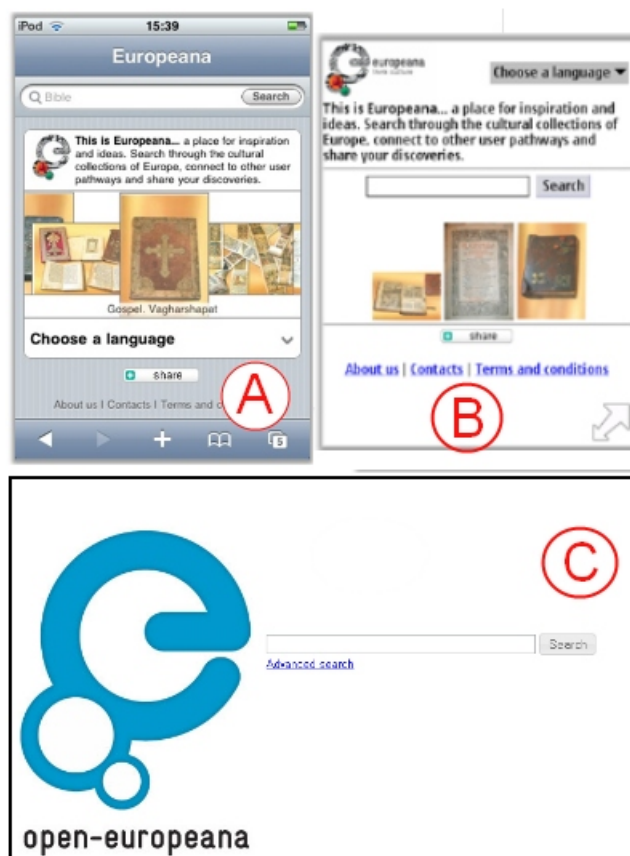


The interface you see on your mobile device is picked according to its capabilities. Below, you see an image that shows different layouts.

A is the **advanced** interface

B is the **basic** interface

C is the **normal** desktop browser interface (on our development server)



16 \* Which interface is displayed on your mobile device?

- ☐ A
- ☐ B
- ☐ C
- ☐ other

Below, you find a list of tasks. Please use your mobile phone to complete them. If at any point you are not able to complete a step of the task or would like to skip it, just go on with the next step. There is no time limit. After completion, we'll ask for your opinion on certain aspects (on the next page).

Open the browser on your **mobile phone** and navigate to the start page at <http://tiny.cc/econnect> if you haven't done yet.

If english is not your native language: Switch the website's interface language to your native language now (if you haven't done yet).

- 17 Search for **Bible**. The result for this search allows answering the questions below.

How many pages  
has the **Se Wsi**  
**Testamenti**?:

Of how many  
psalms consists  
the **Kiev Psalter**?:

- 18 Search for **Manuscript**. The result for this search allows answering the questions and completing the tasks below.

- You would like to have a more visual version of the search results and like to see only thumbnails. Switch to "Gallery"-view
- Now you would like to have a more lightweight version of the search results. Switch to text-only view
- Which institution shows the **Van Hulthem Manuscript**?  
Enter the answer to this question in the box below.

You are visiting an exhibition with paintings from the artist **Magnus Weidemann** and are interested in background information on his painting **Sonnenfunken**.

- Find this information in Europeana.
- You like the painting. Share it with your social network using the means provided by the europeana website.

The advanced interface offers a few additional features. The following tasks are specifically designed for this interface.

One of these features is the enhanced search that allows combining search parameters (title, year...).

- Search for the works of **Georg Burmester** from **1901**.
- You are interested in the location of the displayed results. Switch the result page to the "Map"-view.

The other feature is a location based service that allows searching for institutions and interesting places around your current location with and without a search keyword. This feature is enabled only on modern devices (like the iPhone) and will prompt to use your location when you access the main page. If allowed and your position was determined, an "Around me" button will be displayed next to the normal Search button.

If this button is visible, please continue with the tasks below. Otherwise skip them.

- Perform an "Around me" search
- If you're not from Germany, you may need to move the map to a german city. (currently only german institutions are shown)
- You are interested in detailed information on one of the displayed museums. Pick a museum and check if there is additional information available.
- You have decided to visit this museum. Use one of the directions buttons to show a route.

If you have completed the tasks above, go to the next page.

Below, you find a list of tasks. Please use your mobile phone to complete them. If at any point you are not able to complete a step of the task or would like to skip it, just go on with the next step. There is no time limit. After completion, we'll ask for your opinion on certain aspects (on the next page).

Open the browser on your **mobile phone** and navigate to the start page at <http://tiny.cc/econnect> if you haven't done yet.

If english is not your native language: Switch the website's interface language to your native language now.

- 19 Search for **Bible**. The result for this search allows answering the questions below.

How many pages  
has the **Se Wsi**  
**Testamenti**?

Of how many  
psalms consists  
the **Kiev Psalter**?

- 20 Search for **Manuscript**. The result for this search allows answering the questions and completing the tasks below.

- You would like to have a more visual version of the search results and like to see only thumbnails. Switch to "Gallery"-view
- Now you would like to have a more lightweight version of the search results. Switch to text-only view
- Which institution shows the **Van Hulthem Manuscript**?  
Enter the answer to this question in the box below.

You are visiting an exhibition with paintings from the artist **Magnus Weidemann** and are interested in background information on his painting **Sonnenfunken**.

- Find this information in Europeana.
- You like the painting. Share it with your social network using the means provided by the europeana website.

If you have completed the tasks above, go to the next page.

- 21 We would like to know what you **liked** or found **useful**. Please describe as detailed as possible.

- 22 We are also interested in things you **didn't** like. Please describe as detailed as possible.

### 23 System Usability

Please state your opinion on each of the following statements.

1 Disagree	2	3	4	5 Agree	N/A
I think that I would like to use this website frequently					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the website unnecessarily complex					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought the website was easy to use					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think I would need the support of a technical person to be able to use this website					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the various functions in this website were well integrated					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought this website was too inconsistent					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would image that most people would learn to use this website quickly					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the website very cumbersome to use					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt very confident using the website					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I needed to learn a lot about this website before I could effectively use it					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 24 Please rate the following aspects on a scale from 1 (poor) to 5 (good)

1 poor	2	3	4	5 good	N/A
Readability					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speed					
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 25 Do you have additional comments? Or features you would like to see in the future? Please describe all of your thoughts thoroughly and be as detailed as possible.