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SUMMARY

This deliverable contains the final user requirements report. Each chapter discusses the studies undertaken to formulate the requirements for each system: AXES PRO (Chapter 1), AXES RESEARCH (chapter 2) and AXES HOME (chapter 3). All studies are mentioned and the results of the most recent studies are discussed. The deliverable is closed by the final requirements list.

1 INTRODUCTION

The AXES Project aims at three types of users: Professional users, Research users and Home users. In this deliverable D1.6 we present the final requirements report. In previous requirements deliverables D1.2 and D1.3, we published interim reports that provided the technical partners with input to develop AXES PRO and AXES RESEARCH. In this deliverable we present the results of all requirements studies in which a total of 1.743 users participated. We summarize previous studies, describe the results of our ongoing requirements studies for all systems and present the final list of requirements. A first version of the requirements list was enclosed in D1.2. We discussed this list within the consortium by organizing an internal prioritization and discussing the outcomes during two consortium meetings (see D1.3-paragraph 2.2). The additional studies we undertook in the last year focused on the outcomes of those discussions.

In D1.2 we formulated the differences between the three different systems by assigning keywords per system (see table 1). We will follow this approach in this deliverable by further investigating the key differences between the three systems since the whole consortium perceived this approach as useful when further designing the different systems.

Pro Users				
	Media Archivist Annotate		Broadcast Professional Reuse	
Research Users				
	Academic Researcher Investigate	Academic Teacher Educate	Academic Student Investigate	Journalist Research
Home Users				
	Home users Entertain & Edutain			

Table 1. The different user groups, visualized by the images of the personas (See D1.2) and differentiated by keyword.

1.1 Set-up deliverable

We concluded D1.3 with a description of the activities that were taking place at that moment (table 2). In D1.3 the status of all the activities was 'ongoing' but they all have now been finalized. The results of these additional requirements studies will be described in this deliverable. All activities focused on the three AXES systems. We therefore divided this deliverable accordingly. Each chapter focuses on its own system and will first give a brief overview of all activities that are undertaken to formulate the

user requirements during the complete project period. The main focus will be on describing the recent results that have not yet been included in official deliverables. Several results have already been published in academic journals, which will be referred to. An overview of all WP1 publications is listed in the literature section and will also be included in D9.5.

Activity	Aim	Target user group	Status
External prioritization user requirements by user	Ranking and prioritizing the requirements	Media professionals, researchers & educators, Home users	Finalized
Surveys	How are contemporary search engines and databases used? Which experience do they have? How do they decide to use a certain search engine or database?	Academic researchers & teachers	Finalized
		Journalists	Finalized
Additional studies home users	Formulating additional requirements & examine if requirements have been changed compared to the outcomes of the survey in year 1.	Home Users	Finalized
Interaction scenarios home users	A description of hypothetic situation that should help the technical partners to discover the requirements	Home Users	Finalized

Table 2. The activities we were undertaking when D1.3 was delivered. The current status of all activities is now finalized.

Chapter 1 focuses on AXES PRO and describes the outcomes of the external prioritization that helped to further differentiate the three AXES systems. In chapter 2 the outcomes of the surveys amongst academics and journalists are presented. Chapter 3 describes the outcomes of the additional studies of home users and the interaction scenarios are provided. Similar scenarios for AXES PRO and RESEARCH were included in D1.3. WP7 experienced these as very valuable while designing the interface for each system. We therefore included a similar like scenario in this deliverable.

We end this deliverable with the final requirements list. D1.2 contained a first version of this list and was discussed consortium wide. Since the project is in its third year, we can now determine which requirements are feasible within this project and which should further be discussed within the consortium.

2 REQUIREMENTS PRO USER

2.1 Overview requirements studies: PRO user

In Year 1 and 2 of the project, several studies have been undertaken to formulate the user requirements of the PRO users in which a total number of 91 users were involved. See the table below with an overview and the deliverables in which the results are described.

	Requirements Studies	No. users involved	Reporter in Deliverables
Broadcast professionals	Inventory existing requirements	-	D1.2-Paragraph 1.1.1
	TRECVid benchmark session	14	D1.2-Pararaph 1.1.4.1
	Observations	6	D1.2-Paragraph 1.1.4.2
	Group elicitation	6	D1.2-Paragraph 1.1.4.3
Media Archivists	Inventory existing requirements	-	D1.2-Paragraph 1.2.1
	Observations	3	D1.2-Paragraph 1.2.4.3
	Group sessions (15)	15	D1.2-Paragraph 1.2.4.5
All users	External prioritization using Concept Mapping	47	D1.3-Paragraph 2.3 & D1.6-Paragraph 2.2
		91	

Table 3. An overview of all studies focussing on formulating the user requirements of the PRO user.

Since the main work for setting up the user requirements for the PRO users was finalized in year one, NISV set up a study to further differentiate the requirements between the different user groups.

2.2 User requirements quantification using concept mapping

In the concept mapping study we zoomed in on the requirements that users have when they engage into searching an audio-visual archive using advanced search technology. Typically, user requirement studies use qualitative methods, transaction log analysis or investigate specific parts of a system such as browsing interfaces for a digital library consisting of videos. Although qualitative user studies provide valuable insights into the diversity of requirements specific to users, content features or system parts, it is usually difficult to translate the results directly into guidelines that help development and implementation. Therefore, we deploy a quantitative approach that allows us to categorise user requirements according to different user groups and to prioritise the implementation of system features for each group. We anticipate here on the assumption that each group may require its own specific implementation of the system.

In order to structure the needs of different groups of users and allow a quantitative comparison of groups, we used the so-called “concept mapping” method that combines a structured data collection approach with various types of data analyses such as multidimensional scaling (MDS) and hierarchical cluster analysis (HCA).

Concept mapping consists of two phases: first the idea generation phase, followed by the sorting and rating of the ideas. In the idea generation phase, participants are asked to provide their individual ideas – also referred to as “statements” – about a particular topic. In our study those statements represent requirements. In the sorting and rating phase, participants are provided with the statements generated by all of the participants. The task is then to order the statements, e.g., on the basis of importance as perceived by the individual participant of the study. In addition, participants are instructed to group statements into categories and provide for each category a meaningful label, i.e., a textual description of the category. The criteria for categorising statements are left to the participant.

When different groups of participants are selected to take part in the study – e.g. based on gender or profession – appreciation of statements and correlations between groups of statements can be compared across these groups. For our study we slightly change the standard procedure of the concept mapping method. Instead of asking participants to generate ideas on audio-visual search, we use a list of 71 “ideas” collected in previous requirements studies described in D1.3. The reason for following this approach is that we estimate that by leaving the generation of statements to the participants, we run the risk of ending up with a sparse list of statements due to the unfamiliarity of participants with audio-visual search. By introducing the main concepts of audio-visual search and showing participants mock-ups and prototype systems, this unfamiliarity issue could be solved during earlier studies, but such an approach is logistically not feasible for the concept mapping study. We translated the 71 requirements into comprehensive statements. As it is important that the statements are self-explanatory and unambiguous for individuals that are not acquainted with audio-visual search technology, we convert the technically oriented formulation of requirements into a form that is understandable for non-experts.

We differentiate into the three user groups we defined earlier: broadcast professionals, academic researchers and journalists, and home users. In total 47 representatives from each of the three user groups took part in the concept mapping study. For the broadcast professionals group, we invited 15 individuals, 14 scholars from the humanities and 3 journalists represent the “academic researchers and journalists” group and a total of 15 home users matching a pre-defined profile – familiarity with computer work (using applications such as Facebook and YouTube) but without any background knowledge on audio-visual search technology – participated.

We used a web-interface to present the statements in random order and told the participants that the statements were generated by asking potential users the following trigger question: what would you like from a system when you are searching for videos? We then asked the participants to categorise the statements according to perceived similarity, providing them with the following instructions: first read through the complete list of statements; then categorise the statements by either creating a new category for a statement, or moving a statement to an already created category; make sure that every statement is put somewhere; finally, label each category with a description that represents the category as good as possible.

Participants were free to sort the statements into as many groups as they liked although they were informed that in most cases using 10-20 groups should work out well. After sorting the statements, we asked the participants to rate each of the statements according to desirability on a scale between 1 and 5 where 1 means undesirable and 5 means very desirable.

2.2.1 Results

Using the category labels created by participants in combination with an analysis of the keywords that are present within the statements, we identify ten categories of user requirements, listed in the left column of Figure 1. In Figure 2 the ten categories are visualised with labels for the individual categories. The number of layers (e.g., one layer for the category “Search recommendation” and three for “Search accuracy”) give a visual indication of the desirability of the statements in the particular categories where more layers represents higher desirability.

Cluster	Average Rating
User-defined search functions	4.49
Help functions	4.30
Advanced search options	4.13
Search accuracy	3.99
User personal search history	3.95
Browser friendliness	3.74
Save search history	3.73
Feedback, share and social media	3.60
Search recommendation	3.31
Technical features	3.13

Figure 1. Categories of requirements

Cluster Legend

Layer	Desirability Value
1	3.13 to 3.40
2	3.40 to 3.68
3	3.68 to 3.95
4	3.95 to 4.22
5	4.22 to 4.49

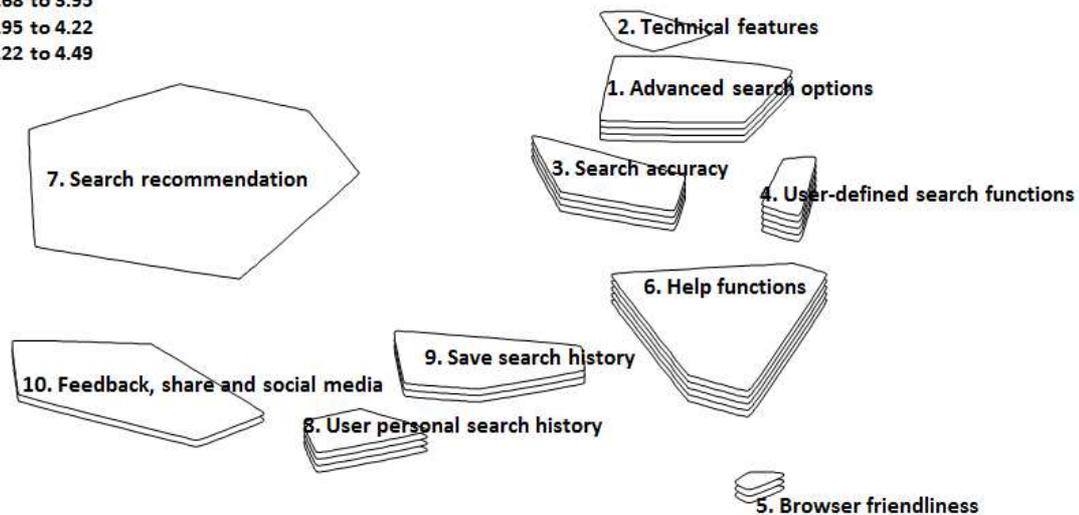


Figure 2. Visualisation of categories

The average rating for each of the categories is provided in the right column of Figure 1. The category “user-defined search functions” has only four statements but each statement is rated high so that it achieves the highest overall rating. This suggests that this category of requirements is very important for system development. When we look at the statements connected to this category, it is interesting to note that from a technical point of view these requirements relate to different aspects of search: ordering of results, application of filters, and the use of Boolean operators during search. This suggests that during system development the implementation of these requirements should not be addressed in isolation.

The high ranking of the category “help functions” also stands out. When looking at the individual statements of this category however, we see that the category label may be misleading. With “help functions” one may expect system functionalities such as represented by the statement: “the system

should include a help manual that explains how to use the system.” However, the requirements in this category rather point to a smooth, clear and transparent functioning of the system: results that load quickly, being able to view and navigate through the videos, transparent about filters that are active, alternatives for spelling mistakes, consistent results for a query, a clear and user-friendly interface, and of course also guidance for using the system via manuals.

In the light of the discussion about the re-evaluation of annotation strategies and access models in audio-visual archives, the high ranking of requirements related to “advanced search functionalities” is interesting. The statements in this category indicate that users are eager to make use of complex search strategies for searching, are interested in alternative access-points to the collections such as persons (who is speaking, who appears) and events, and are willing to deploy alternative types of annotations such as speech transcripts. However, according to the category labelled with “technical features,” users seem to have less interest in searching on the basis of annotations that are often associated with technical metadata such as shot types, camera movement and black and white versus colour.

To compare the ranking of requirement categories across the identified user groups we compute the correlation of requirements categories between groups. Figure 3 shows for the academic researchers and the broadcast professionals the average desirability of requirement categories. Although the correlation between the two groups is relatively high ($r = 0.83$) it is clear that some categories are ranked rather differently, such as the category “user personal search history” that is highly desired by the academics group and less by the broadcast professionals. In contrast and as expected, broadcast professionals are more interested than academics in searching the more technical features of videos.

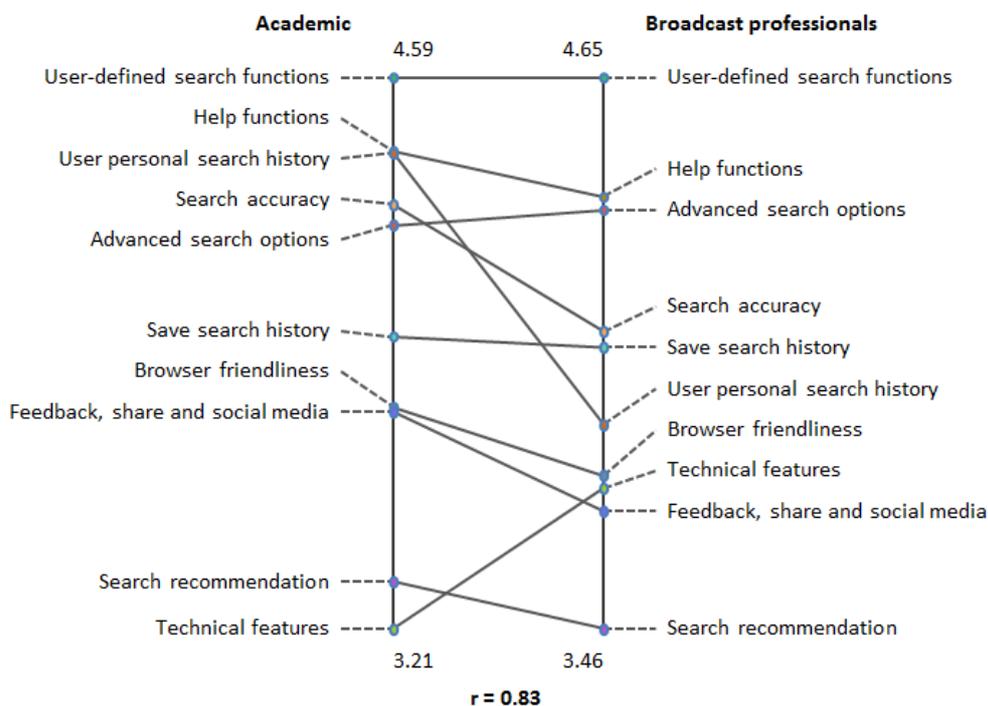


Figure 3. Average desirability of requirements categories (Academic vs. Broadcast Professionals)

Similarly, Figure 4 illustrates how broadcast professionals compare with home users with respect to the ranking of requirement categories. The correlation between these two groups is again relatively high ($r = 0.78$). The most notable differences between the groups are the substantially higher rating of browser friendliness (e.g., working on various brands and on mobile devices) and personal search history (e.g., saving search histories) by home users, and again the higher preference for searching technical information with the broadcast professionals.

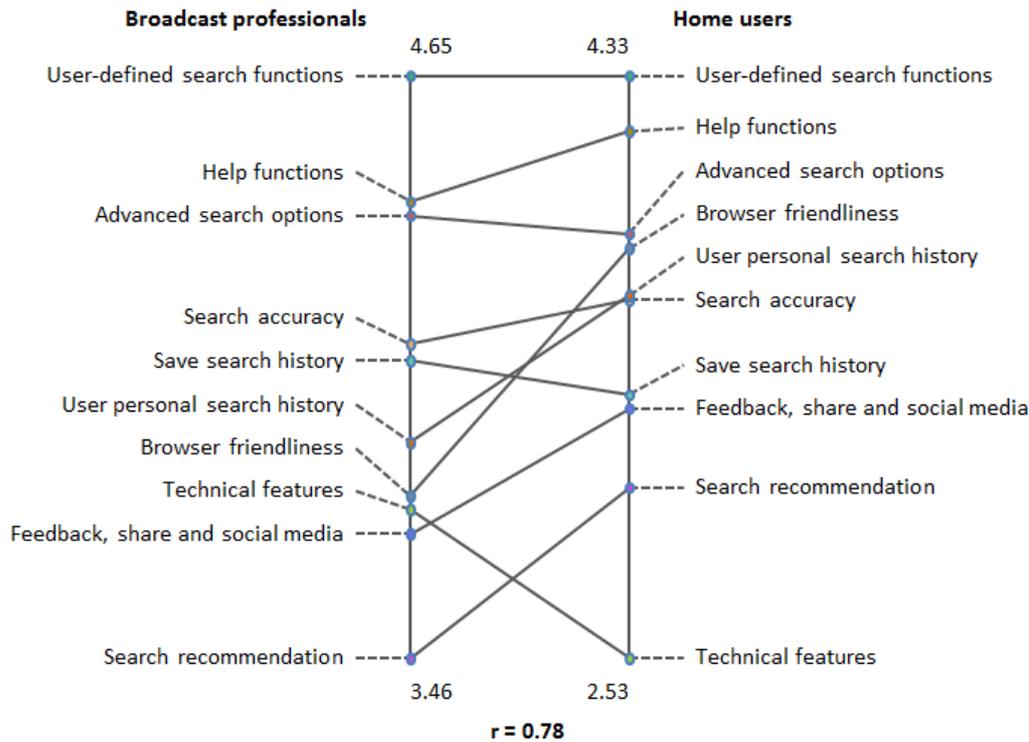


Figure 4. Average desirability of requirements categories (Broadcast Professionals vs. Home Users)

2.3 Conclusion for AXES PRO: reuse

The results of the concept mapping study show that several user requirements between the different types of users are similar. However, we also found differences underlying our approach of differentiating the three systems. Broadcast professional are more interested in searching and technical information relating to their aim of using systems like AXES PRO: professional users want to **reuse** audiovisual materials and therefore search and need to know the technical information.

The results show the academic researchers mainly want to browse and keep track of their search results by using a 'personal search history' underlying the AXES RESEARCH system should focus on investigate and research (more in chapter 2). Furthermore the home users differentiate also on personal search history as well as on browser friendliness indicating a preferred use of AXES HOME on different platforms (more in chapter 3)

3 REQUIREMENTS RESEARCH USERS

3.1 Overview requirements studies research users

In Year 1 and 2 of the project, several studies have been undertaken to formulate the user requirements of the RESEARCH users in which a total number of 615 users were involved. See the table below with an overview of the activities and the deliverables in which the results are described.

	Requirements Studies	No. users involved	Reporter in Deliverables
Academic researchers, teachers & students	• Inventory existing requirements	-	D1.2-Paragraph 2.2.1
	• Interviews	5	D1.2-Paragraph 2.2.3.1
	• Group interview	8	D1.2-Paragraph 2.2.5
	• Survey	342	D1.3-Paragraph 3.1 & D1.6-Paragraph 3.2
	• Eye tracking study	24	D1.6-Paragraph 3.5
Journalists	• Inventory existing requirements	-	D1.2-Paragraph 2.1.1
	• Group Interview	5	D1.2-Paragraph 2.1.3.1
	• Survey	231	D1.3-Paragraph 3.2 & D1.6-Paragraph 3.3
		615	

Table 4. An overview of all studies focussing on formulating the user requirements of the Research user.

When formulating the user requirements of the research users we followed a mixed-methods approach. (Group) Interviews were organised to gain qualitative insights that were further researched upon in quantitative surveys. As a preparation for the set-up of the surveys, three master students at the Erasmus University wrote their master theses about the online search behaviour of 1) academic researchers¹, 2) academic students² and 3) journalists.³ The outcomes of these qualitative research projects were taken into account while setting up the surveys.

The goal of these surveys is to get a more complete overview on 1) how Academics and Journalists use contemporary search engines and databases, 2) how they come to decide to use a certain search engine or database and 3) what they are experienced with. Moreover, in the home user survey (see chapter 3) we developed the Profile Matrix to 'position' the participants in whether they were experienced or inexperienced and whether they searched goal-directed or non-goal-directed.⁴ By repeating the questions for the Profile Matrix, we were able to compare between Home users, Academics and Journalists to get a better understanding of the differentiation needed between the RESEARCH and HOME systems.

The survey was organised online, using the tool of research bureau MWM2, which we had already used for the home user survey. While for the home users the participants were approached by MWM2, for the Academics and Journalists we did this ourselves. The results of the surveys were exported to SPSS databases to be analysed.

¹ Groot, R. de (2012) *Hoe vinden ze in audiovisuele archieven – Het zoekgedrag van studenten en docenten in kaart gebracht*. Masterthesis Erasmus University Rotterdam

² Embden, F. van (2011) *Zoeken naar een speld in de hooiberg – gebruik van de Universiteitsbibliotheek en het internet voor het vinden van informatie*. Masterthesis Erasmus University Rotterdam <http://thesis.eur.nl/theses/index/637190706/>

³ Nieman, B.(2012) *Kuifje in Cyberspace – Zoekgedrag op internet bij bureauredacteuren van een Nederlandse landelijke krant*. Masterthesis Erasmus University Rotterdam <http://thesis.eur.nl/theses/index/786746147/>

⁴ Kemman, M., Kleppe, M., Beunders, H. (2012) Who are the users of a Video search system? Classifying a Heterogeneous group with a profile Matrix. *WIAMIS 2012: The 13th International Workshop on Image Analysis for Multimedia Interactive Services*, 23 – 25 May 2012, Dublin, Ireland. <http://repub.eur.nl/res/pub/32602/>

3.2 Survey Academics

3.2.1 Participants

The survey amongst Academics was sent to 1.038 academics in The Netherlands and Belgium of which we had aggregated email addresses. These email addresses were gathered by using the contact list of the ESHCC⁵ (Erasmus School of History, Culture and Communication) and FW⁶ (Faculty of Philosophy), faculties of the Erasmus University, and email addresses of members of different faculties throughout the country, found by analysing the institutions websites.

With the MWM2 application we were able to personalize each email, so that each academic we emailed was addressed personally. The application would keep track of who had participated in the survey, so that we could send out a reminder mail to those who had not done so yet. In addition a public survey was opened which we spread across Twitter, blogs and other information channels which was at the same time a suitable way of disseminating the AXES project in general (see Appendix C for an overview).

A total of 342 academics filled in the survey, including information specialists. When only analysing the potential user group of the AXES-system, by leaving out the information specialists and students, we have a response of N = 288 (response-rate 24.6%).

3.2.2 Survey

The survey was distributed in English, the questions can be found in Appendix D. The survey consisted of a total of 60 questions including intermediate pages, which can be divided into 7 sections:

1. Demographics and background (1-10)
2. General usage of digital data and databases (11-22, 30-34, 36-37)
3. Usage of online video (23-29, 35, 38-40)
4. Experience in usage of online video (41-45)
5. Self-efficacy regarding usage of online video (46-47)
6. Goal-directedness regarding searching for online video (48-55)
7. Final questions (56-60)

When a participant indicated in question 11 that they never use online video, no further questions regarding usage of online video would be asked and these respondents would continue from question 37 to question 56 ("Final questions").

3.2.3 Results

The results of this survey have been described in a paper⁷ and the data have been made available online.⁸ In this report we give an overview of the findings in 3.4.

3.3 Survey Journalists

3.3.1 Participants

As the response on the personally addressed survey amongst Academics was so high, we did the same for Journalists. In the Netherlands, a total of 2.002 journalists were emailed, 133 from the Post-Doctoral Journalistic Education of Erasmus University Rotterdam⁹, 1.869 from the Dutch Press List¹⁰,

⁵ <http://www.eshcc.eur.nl/>

⁶ <http://www.eur.nl/fw/>

⁷ Kemman, M., Kleppe, M., & Scagliola, S. (2013). Just Google It - Digital Research Practices of Humanities Scholars. [arXiv:1309.2434v1](https://arxiv.org/abs/1309.2434v1) [cs.DL]

⁸ Kemman, M., Kleppe, M., Scagliola, S. (2013) Just Google It - Digital Research Practices of Humanities Scholars (Dataset). Available at <http://www.persistent-identifier.nl/?identifier=urn:nbn:nl:ui:13-9x3b-pa>

⁹ http://www.eur.nl/erasmusacademie/onzeкурсussen/media_cultuur_communicatie/pdoj/

and 8.000 members of the NVJ, the Dutch union for Journalist. Furthermore the open survey was spread via Twitter, blog posts and other information channels, again serving at the same time as a dissemination tool for the project as a whole, see Appendix E below. For the personally addressed mails, one reminder was sent.

In Germany, the survey was spread internally at Deutsche Welle.

A total of 321 journalists participated in the survey. Of the respondents, 306 were invited personally by email (response rate 15.3%), while 15 journalists participated via the public survey. All respondents are used in the results below, so that N = 321.

3.3.2 Survey

The survey was spread both in English and in Dutch, the questions can be found in Appendix F. Learning from feedback on the Academics survey, we changed the order of questions, making the survey more linear. The survey contained a total of 74 questions including intermediate pages, which we can divide in the following 8 sections:

1. Demographics and background (1-10)
2. General usage of digital data and databases (11-29)
3. Usage of online video (30-39)
4. Experience in usage of online video (40-43)
5. Self-efficacy regarding usage of online video (44-45)
6. Goal-directedness regarding searching for online video (46-53)
7. Interest in AXES-technology (54-69)
8. Final questions (70-74)

The survey among journalists was very similar to the survey amongst academics, with rephrasing of questions to better suit the situation of journalists. The section “Interest in AXES-technology” was added to evaluate how journalists responded to a video explaining the AXES-technology.

When a participant indicated that they never use online video in question 11, no further questions regarding usage of online video would be asked and these respondents would continue from questions 29 to 54 (“Interest in AXES-technology”).

3.3.3 Results

The results of this survey for Dutch journalists have been described in a paper¹¹, the data have been made available online¹². In this report we give an overview of the findings in 3.4.

3.4 Results of surveys

To provide a better overview, we provide an overview of the two surveys together with the HOME user survey results from D1.2.

3.4.1 Demographics

Tables 5, 6, and 7 below provide the demographics and video consumption for the three user surveys. For the HOME users these results are representative over the entire population, this cannot be said for Academic and Journalist users, as no overall demographics exist.

¹⁰ <http://www.deperslijst.com>

¹¹ Kemman, M., Kleppe, M., Nieman, B., & Beunders, H. (2013). *Dutch Journalism in the Digital Age*. *Icono 14*, 11(2), 163–181.

¹² Kemman, M., Kleppe, M., Nieman, B., Beunders, H. (2013) Dutch Journalism in the Digital Age (dataset). Available at <http://persistent-identifier.nl/?identifier=urn:nbn:nl:ui:13-o1q2-6c>

Age	Home	Academic	Journalist
18-24	12.3%	1.4%	1.9%
25-34	18.0%	34.7%	19.0%
35-44	19.8%	24.7%	19.9%
45-54	20.8%	18.8%	30.2%
55+	29.1%	20.5%	29.0%
N	971	288	321

Table 5. Age distribution of different user groups' respondents in percentages

Gender	Home	Academic	Journalist
Male	49.1%	57.3%	66.0%
Female	50.9%	42.7%	34.0%
N	1001	342	321

Table 6. Gender distribution of different user groups' respondents in percentages

What can be seen from table 5 is that the Academics in our survey are relatively young, with a high concentration between 25-34, which might be due to PhD-candidates with time to participate in surveys. The Journalists in our survey are somewhat older however, with a high concentration between 45-54. For both Research user groups we see a larger population of males. In D1.2 we found that age above 45 years was correlated to lower experience. For gender we found no such correlation.

Regarding video consumption, we asked separately for personal and professional usage.

Video consumption	Home	Academic		Journalist	
	Personal	Personal	Professional	Personal	Professional
Over 8 hours per week	8.1%	3.5%	1.0%	1.2%	1.2%
4-8 hours per week	10.3%	9.6%	3.1%	5.4%	5.3%
2-4 hours per week	22.9%*	16.7%	9.4%	11.5%	12.5%
1-2 hours per week		22.4%	19.4%	21.2%	25.9%
Less than 1 hour per week	46.5%	43.9%	46.2%	54.6%	36.1%
Never	12.2%	3.9%	20.8%	6.2%	19.0%
N	1000	228**	288	260**	321

Table 7. Video consumption of different user groups' respondents in percentages

*In the Home user survey 1-4 hours was a single answer category

**Personal usage for Academic and Journalist user surveys excluded those who never consumed video for professional reasons

From table 7 we find that small differences exist in video consumption frequency. Generally the Research user group has a larger group between 1-4 hours per week and only few respondents who watch more. In D1.2 we showed that more video consumption correlated with more experience with multimedia interfaces.

3.4.2 Usage of contemporary databases and search engines

To get a better picture of how scholars and journalists search online, we first investigated what they searched online. Participants could rate their usage of specific types of data on a 6-point Likert scale, in which "I don't know it" is rated lower than "never", ranging up to "very much". We assume that when the mean score is "regular" or higher it is part of the common research practice.

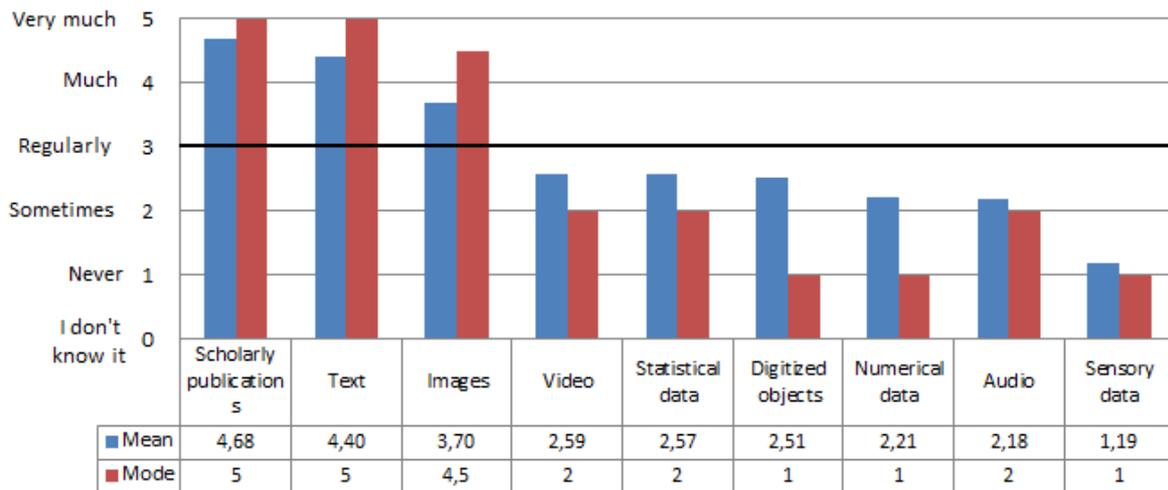


Figure 5. Academics: Mean and mode responses to “Which of the following digital data of sources do you use professionally (i.e. for research or lecturing purposes)?” ordered by mean score (N = 288)

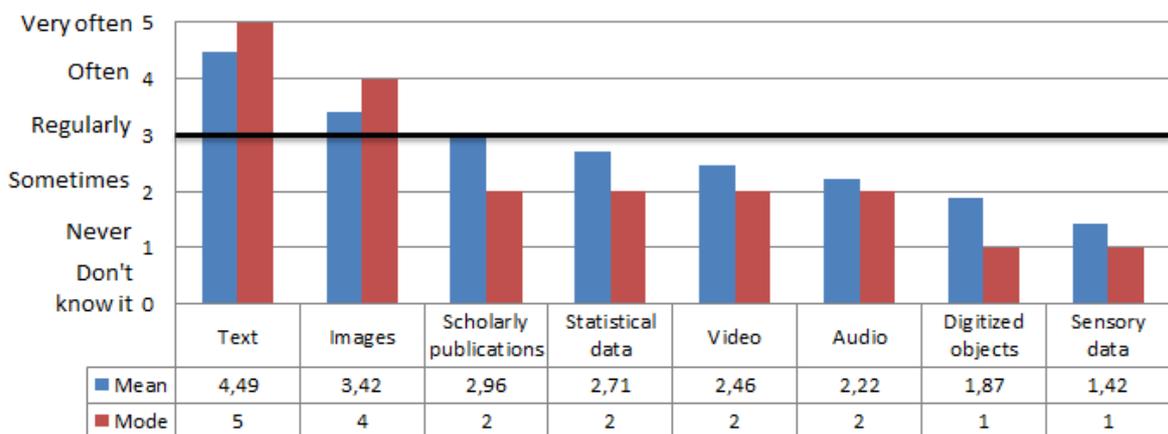


Figure 6. Journalists: Mean and mode responses to “Which of the following digital data or sources do you use professionally (i.e. for research or lecturing purposes)?” ordered by mean score (N=321)

What becomes clear from the two graphs in figures 5 and 6 is that text (regular and in scholarly publications) and still images are commonly used for research purposes. However, multimedia data such as video and audio is less commonly used.

To investigate where academics and journalists search these data, we provided a list of databases and search engines that participants could rate their usage of specific types of data on a 6-point Likert scale, in which “I don’t know it” is rated lower than “never”, ranging up to “very much”. We again assume that when the mean score is “regular” or higher it is part of the common research practice.

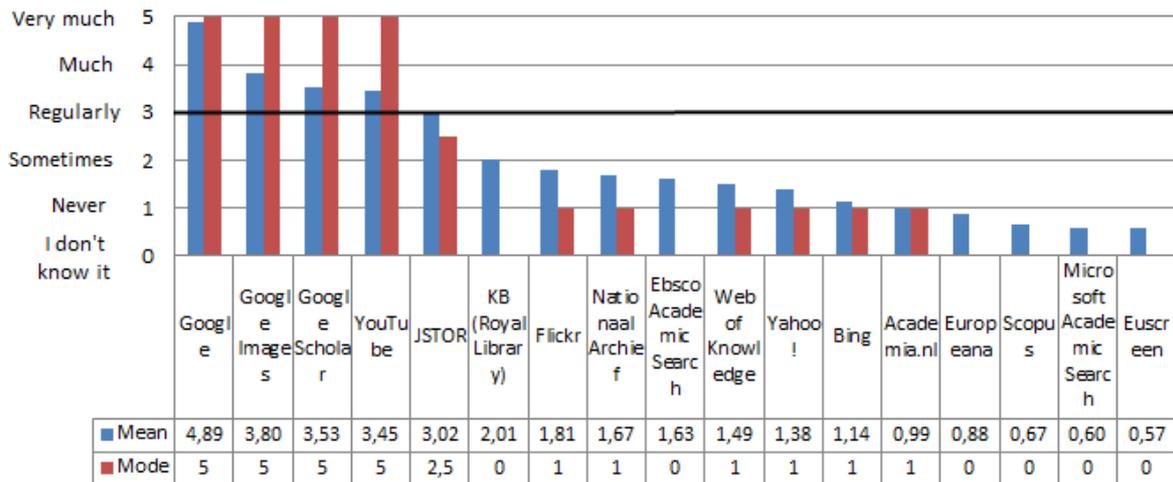


Figure 7. Academics: Mean and mode responses to a subset (17/24) of “Which of the following search engines, websites or databases do you use?” ordered by mean score (N = 288)

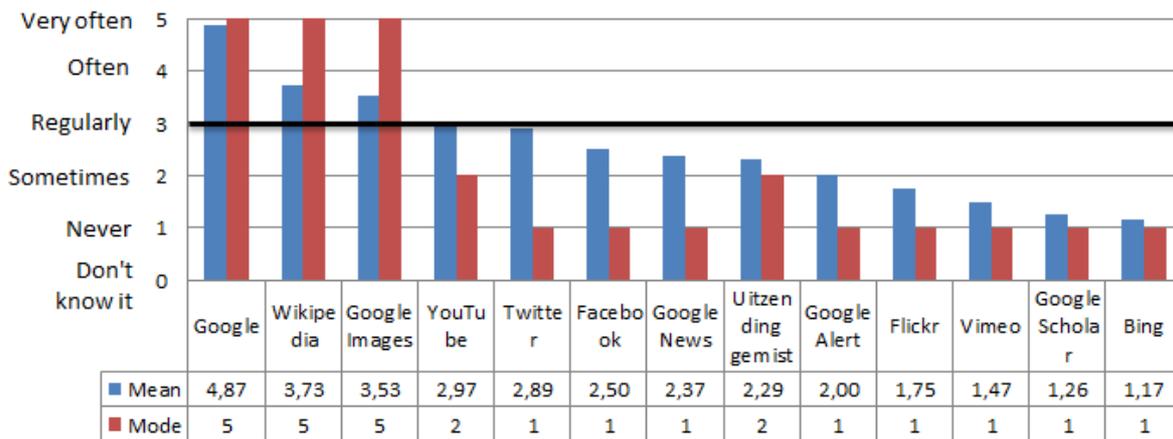


Figure 8. Journalists: Mean and mode responses to a subset (13/24) of “Which of the following search engines, websites or databases do you use?”, ordered by mean score (N = 321)

The list of databases and search engines was different between academics and journalists. We do see in figures 7 and 8 however that Google dominates search for text (Google), scholarly publications (Google Scholar) images (Google Images) and video (YouTube).

3.4.3 Decision to use

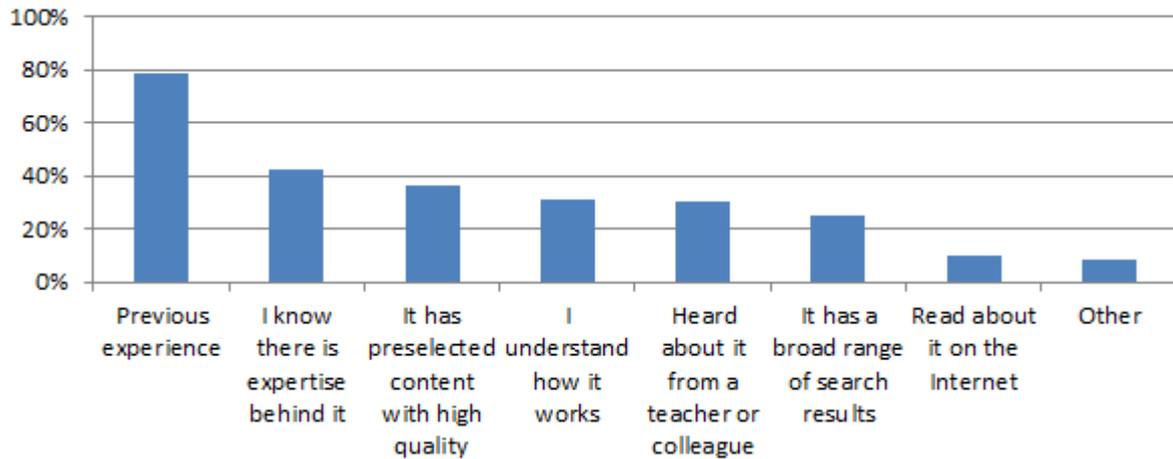


Figure 9. Academics: Responses to “When do you trust a search engine or database?” ordered by frequency (N = 288)

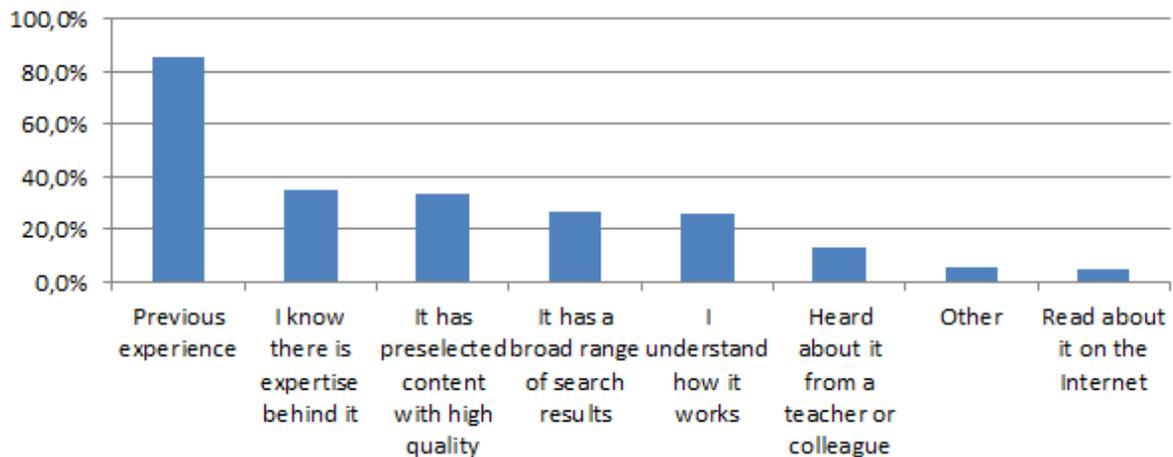


Figure 10. Journalists: Responses to “When do you trust a search engine or database?” ordered by frequency (N = 321)

For both the scholars as the journalists we see previous experience is the main reason to trust a database or search engine.

3.4.4 Experience

In D1.2 we investigated the experience with multimedia search systems of home users through the use of Profile Matrices.¹³ We compare user groups on two axes: 1) experience with multimedia search systems and 2) goal-directedness, how directed users search for multimedia material. See figure 11 for a comparison between home, academic and journalists. We randomly selected cases from each group to ensure the same group size, for each group N = 228, rendering the total N = 684.

¹³ Kemman, M., Kleppe, M., & Beunders, H. (2012). Who are the users of a video search system? Classifying a heterogeneous group with a profile matrix. In *2012 13th International Workshop on Image Analysis for Multimedia Interactive Services* (pp. 1–4). Dublin: IEEE.

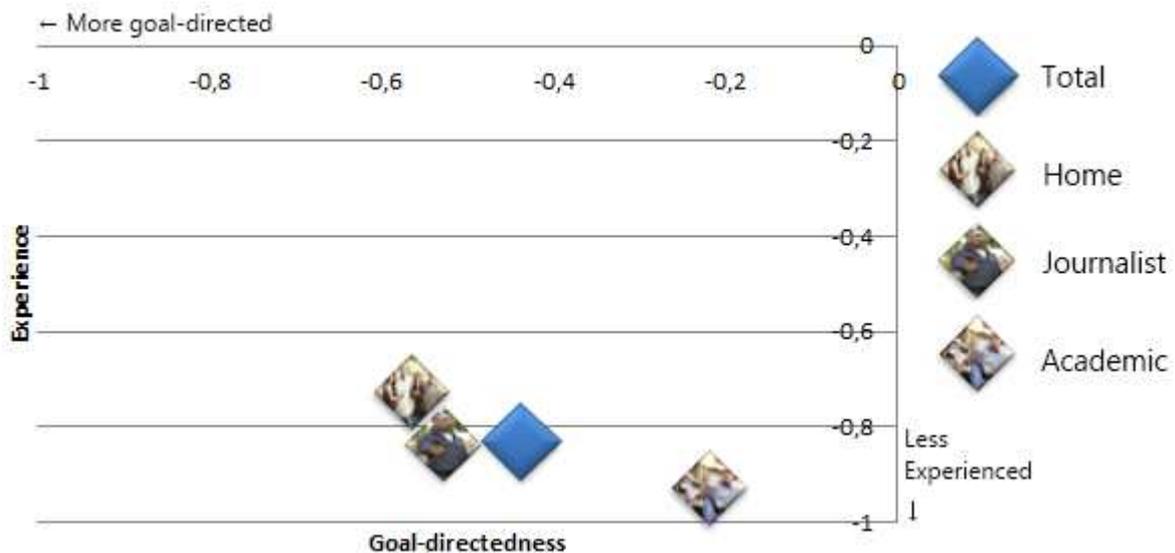


Figure 11 – Zoomed in Profile Matrix comparing home users with journalists and academics. Note that the complete scale run from -2 to 2. User groups are represented with pictures from their personas (N = 684).

We see that as with the home users, research users are fairly inexperienced and goal-directed. However, when comparing with an ANOVA we find that Academics are significantly less experienced than home users and Journalists, with $p < 0.001$. This might be due to the limited consumption of audio-visual material as shown above in table 7. Moreover, Academics are significantly less goal-directed (and more exploratory) than home users, with $p < 0.01$. This means that for research purposes, more exploratory search facilities might be required. This fits the keyword with which we characterized the academic user group in D1.2 (p. 14): investigate.

3.5 Search behaviour

3.5.1 Study design

In addition to these surveys, a user study was performed to gain more insight into the actual search behaviour of academics. In D1.2 and D1.3 several user requirements were defined related to the ability to refine search results using facets: user requirements D1.2-4, D1.2-6, D1.2-22 to 25, D1.2-44 to 47, D1.2-65, D1.2-66 and D1.3-18. In an eye tracking study we investigated how facets are used to refine search results, or gain an overview of the results found.

In the survey described above we found scholars use facets merely 'sometimes', to simplify the interface it could be an option to hide the facets until the user explicitly requires them. Whether this possibility works for scholars, and does not introduce a usability issue of "out of sight is out of mind", we did a between-subjects eye tracking study in which 24 historians performed several search tasks.

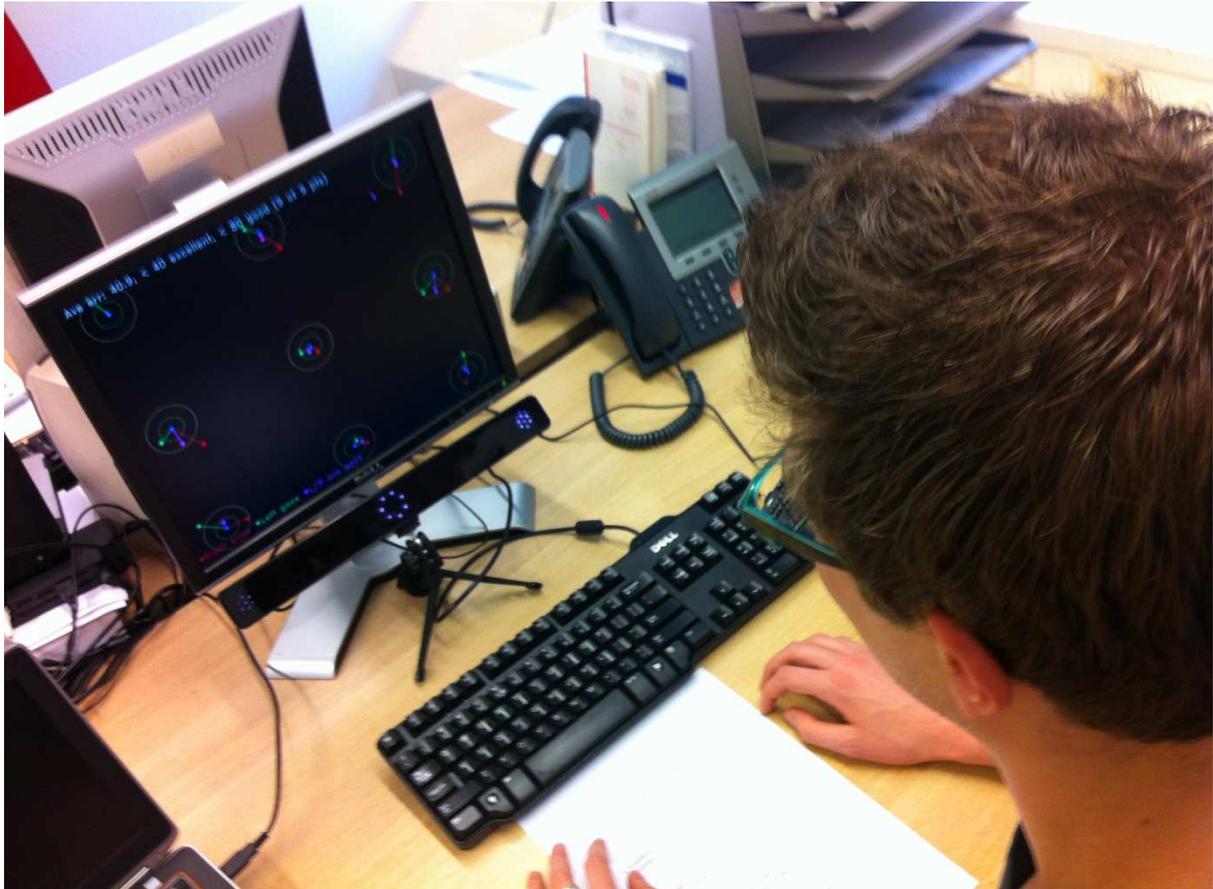


Photo 1. A participant starts with the eye tracking study

One group of participants received an interface with facets always visible, while the second group of participants received an interface with facets collapsed, but available when the participant needed them. See figure 12 for a comparison of the two designs.

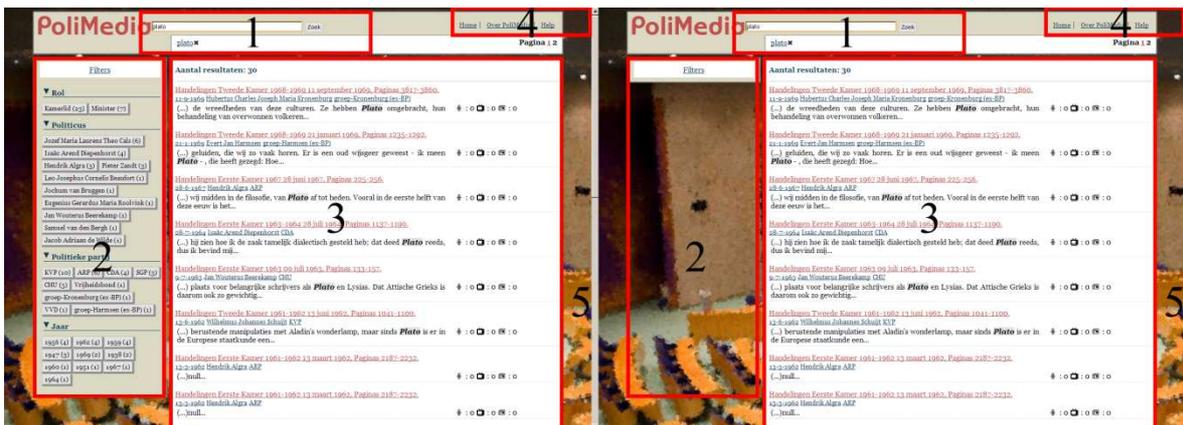


Figure 12. Screenshots of the visible facets version (left) and the collapsible facets version (right) with Areas of Interest drawn on top of the screenshots. 1) Search bar, 2) Facets, 3) Search results, 4) Page search

With the eye tracker we measured number of fixations (indicator of search efficiency) and viewing duration (indicator of distribution of attention). We did this for known-item as well as exploratory search tasks. Moreover, with a post-experiment questionnaire we measured user satisfaction.

3.5.2 Results

A more elaborate discussion of the study design and results has been published in a paper¹⁴, the data has also been published online¹⁵. We found participants used the facets heavily during their search tasks. Participants spent around 20% of number of fixations as well as viewing duration on the facets AOI during the known-item search tasks. During the exploratory search tasks, participants spent around 10% of number of fixations and viewing duration on the facets AOI. We compared the metrics with MANOVAs, for which we found no significant differences in number of fixations, viewing duration, nor for user satisfaction.

Collapsing the facets panel proved neither necessarily beneficial nor detrimental to the usability of the search interface. Whether we want to show them or keep them hidden by default is thus a design decision we are free to make.

3.6 Conclusion for AXES RESEARCH: research & investigate

Based on the interviews with scholars as described in D1.2 and the survey as described above, the list of user requirements in chapter 5 provides the main features with which AXES RESEARCH differentiates from PRO and HOME showing the RESEARCH system should focus on research and investigation set-up. Each user requirement is followed by the requirement ID.

- Completeness of results (Requirement 58)
- Tool for analysing videos (Requirement 74)
- Saving videos to (project-specific) folders (Requirement 75)
- Virtual cutter (Requirement 73)
- Related terms (Requirement 32)

¹⁴ Kemman, M., Kleppe, M., & Maarseveen, J. (2013). Eye Tracking the Use of a Collapsible Facets Panel in a Search Interface. In *Research and Advanced Technology for Digital Libraries* (pp. 405-408). Springer Berlin Heidelberg.

¹⁵ Kemman, M., Kleppe, M. & Maarseveen, J. (2013). *Eye tracking the Use of a Collapsible Facets Panel in a Search Interface (Dataset)*. Available at <http://www.persistent-identifier.nl/?identifier=urn:nbn:nl:ui:13-lvo4-9k>

4 REQUIREMENTS HOME USERS

4.1 Overview requirements studies AXES HOME

In the AXES project, the system for the home user is planned to be the final one implemented. As such, the partners in the project have been able to take advantage of the experiences gained through technical assessments, target user interaction and feedback when these systems were deployed. This information has been collated and made available within the project to help make decisions around the increase in usability and performance. In addition to this, the requirements for the home user were collected through a series of online surveys, interviews and inventories of existing requirement and statistics (see table 8).

	Requirements Studies	No. users involved	Reporter in Deliverables
Home User	• Inventory existing requirements	-	D1.2-Paragraph 3.1
	• Analysis Hardware, Software & Internet Usage	-	D1.2-Paragraph 3.1.2 & D1.6-Paragraph 4.2
	• Interviews	7	D1.2-Paragraph 3.2.1
	• Survey	970	D1.2-Paragraph 3.2.2
	• MediaEval workshops	60	D1.6-Paragraph 4.3
		1.037	

Table 8. An overview of all studies focussing on formulating the user requirements of the Research user.

In this chapter we address specifically the home user requirements and activities, which have taken place since the original requirements report, D1.2. This includes the two MediaEval trials and surveys held in conjunction with AXES in 2013. Second, as the project has progressed over a number of years, it is important to assess through a checkpoint if anything has changed from our original findings. Typically there have been technical advancements in online audio-visual applications, faster bandwidth to the home, the expansion of “2nd screen” tablet devices, and the growth of online activity generally. Although these changes will vary enormously from country to country, it is important for AXES to ensure that its platform enters the market where its build and what it can offer is in line with user expectations. We report on these changes especially in relation to the tablet as it is emerging as a popular consumer device for accessing audio-visual media.

4.2 Advances in consumer devices

As the project has progressed, the consumer market has matured with products offering the capability of interacting with audio-visual media. This is particularly evident in tablets, which are often referred to as “second screens” as their portability means they are used in conjunction with other activities such as watching TV. In the UK, for example, their improved performance, Wi-Fi capability, and affordability have seen them become a common sight in the home, in cafés, and on the metro. They have moved in some senses from a high-end luxury or business item to something that is in the hands of many every day.

4.2.1 Initial AXES requirements and tablets

In D1.2 we reported on the current usage and predictive growth of tablet devices. It pointed to a report by Gartner¹⁶, which compared both the shares of tablet sales and tablet OS. It expected the total sales of tablets to grow. In its report Gartner expects the numbers of iPad sales to triple between 2012 and 2015.

¹⁶ <http://www.gartner.com/it/page.jsp?id=1626414>

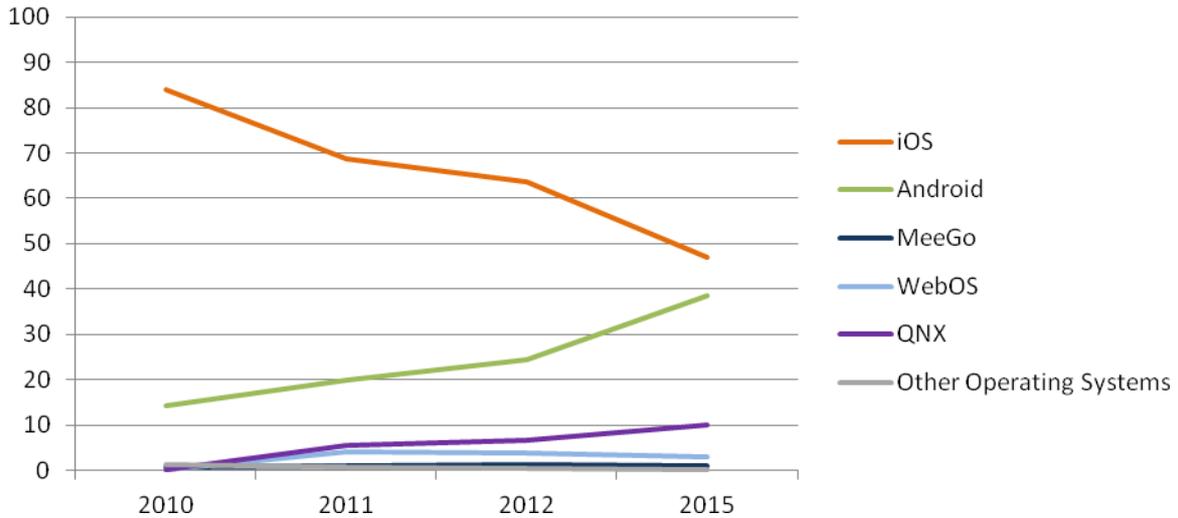


Figure 13. (Expected) market share in percentages

Further research in D1.2 specifically addressed iPad usage and its use for accessing audio-visual media, something which is of direct interest to AXES. A survey by Sanoma¹⁷ on the use of iPad tablets filled in by 3673 iPad users in Belgium, Germany, Finland, Hungary the Netherlands and Russia; found that over 95% of the respondents used the iPad daily, with 94% using the iPad multiple times a day. This is in sharp contrast with a research performed in the UK¹⁸, where only 42% of respondents answered they used their iPad daily. Two statistics of the Sanoma research are mainly of interest; whether people prefer the iPad over their desktop or laptop, and whether people watch videos on their iPads (figure 14 & 15).

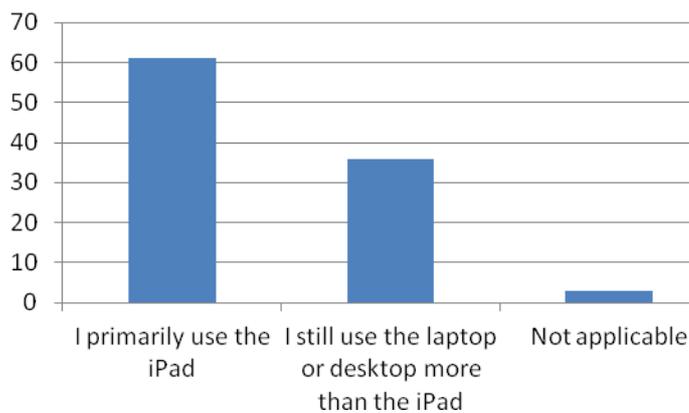


Figure 14. "Has the iPad become your primary computer at home (or do you use the iPad less than your laptop or desktop computer)?"

¹⁷ SanomaMedia (2011b), *Results international iPad study*
<http://www.sanoma.com/content/download/6607/233226/version/1/file/Results+Sanoma+Media+International+iPad+study+2011.pdf>

¹⁸ Parnell, B. Apple's iPad not so shiny once you get it home The Register 10-11-2011
http://www.theregister.co.uk/2011/11/10/brits_not_bothered_to_use_ipad/

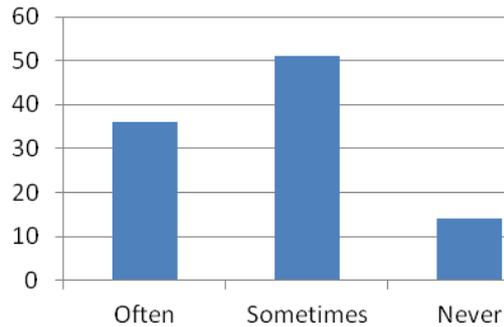


Figure 15. Watching TV or videos (e.g. YouTube) on the iPad

As can be seen from the graph iPad owners prefer to use their iPad instead of their laptop or desktop in general use. We can also determine that video consumption on the iPad is common; although mobile devices such as the iPad tablet do not appear to be a large portion of online usage, they are an interesting device for video usage. In the conclusion section of this deliverable we report on these findings as producing a requirement for AXES to accommodate tablet devices.

4.2.2 Current trends in tablet usage

Since the Initial Requirements Report in December 2011 the rapid growth of the tablet did indeed take place. We can draw on the detailed monthly stats reporting of the iPlayer: the BBC's online catch-up service for radio and TV. Monthly BBC statistics for the iPlayer have been collected over a number of years and this includes the choice of devices consumers are using.

The BBC's historical and current figures are useful for comparative purposes to AXES's Initial Requirements Report in Dec 2011. Below is a chart of the iPlayer usage data (Dec 2011 through to Dec 2012). It illustrates the choice of consumer device type for playing BBC content from the iPlayer.

From this slide below we can clearly see (in pink) that the percentage of requests through tablet devices was 5% in December 2011 and this more than doubled to 13% by December 2012 in line with the expected growth AXES reported on.

Requests for programmes by device type – TV and radio (includes Virgin Media Cable)

5

For the first time ever, fewer than half of all iPlayer requests came from PCs (47%). In fact, most devices and platforms delivered an increase in the volume of requests in December compared with November – particularly mobile & tablet devices which saw a +13% increase.

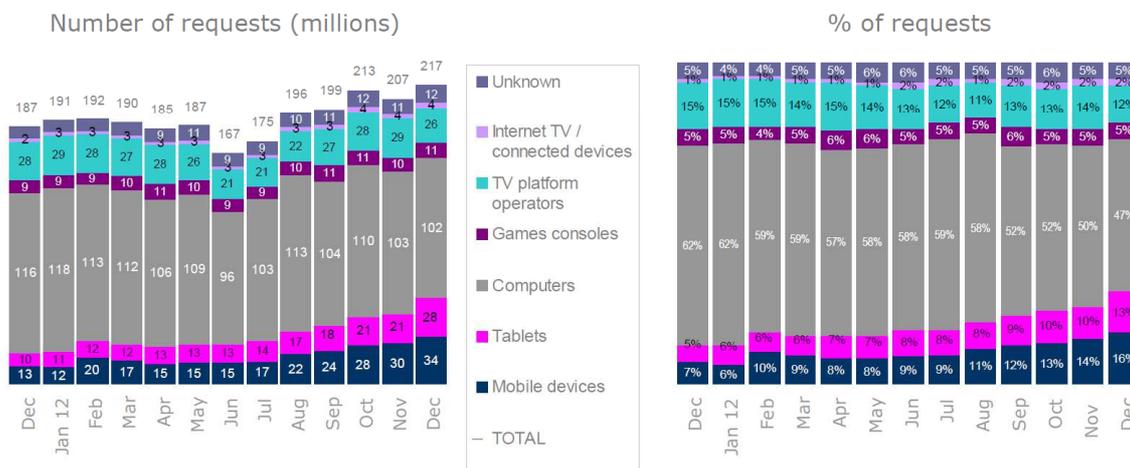


Figure 16. Request for programmes by device type. Source: <http://downloads.bbc.co.uk/mediacentre/iplayer/iplayer-performance-dec12.pdf>

Similar insights were provided in two newspapers reports (UK) in March and April 2013 providing us with an insight into consumer preference for tablets for accessing audio-visual content provided by the BBC. In March 2013 The Guardian newspaper reported on the doubling of viewing content via tablets in just 2 months.¹⁹ In April 2013 the Telegraph Newspaper (UK) wrote about tablets overtaking smartphones for using the iPlayer.²⁰

All these studies show that since D1.2 the market has matured in consumer devices and we see that the tablet is now firmly established in the market. Data from the BBC has shown that it has overtaken mobiles as the choice for accessing audio-visual content from the iPlayer. It is tablet devices that are likely to be used by large numbers of our target users, and AXES needs to accommodate this in technical planning and user interface design.

4.3 Additional requirements studies

4.3.1 MediaEval workshops and home users

Some of the AXES partners are also involved in the MediaEval evaluations²¹, which are a series of benchmarking initiative dedicated to evaluating new algorithms for multimedia access and retrieval. It emphasizes the 'multi' in multimedia and focuses on human and social aspects of multimedia tasks. AXES participated in two trials in April and September 2013 with MediaEval as it was a good opportunity to gather early feedback from home users on the goals of AXES and developing tools. Information collected and knowledge gained is also highly relevant to work going on in both WP6, Link Management and Structured Search, and WP7 Experiencing Digital Libraries.

¹⁹ <http://www.theguardian.com/media/2013/mar/04/bbc-iplayer-tablet-viewing>

²⁰ <http://www.telegraph.co.uk/technology/news/10005427/Tablets-overtake-smartphones-on-BBC-iPlayer.html>

²¹ <http://www.multimediaeval.org/mediaeval2013/>

A group of thirty members of the public were recruited, who were profiled to get a mix of age, skills, and experiences of using technology and accessing multimedia content. In 2-hour sessions, small groups were presented with an early version of the AXES system. The goal of these particular trials was to receive feedback on the AXES search technology, gather requirements on linking within audio-visual content and the overall functionality.

Over 300 hours of BBC video material was made available and the AXES system provided search options based on metadata, spoken words, visual categories, general similarity, and facial similarity. As the participants were unfamiliar with most of these technologies, they were explained in a 30-minute introduction to the system. In addition, the participants at these sessions helped the AXES project to discover public users' requirements on audio-visual hyperlinking, a novel technology. Each session ended with a short survey and a group interview to elicit feedback on the search technology and get information on how users perceived the difficulty of the tasks. The trials have provided AXES with a lot of interesting data.

From the April session we have found that:

- From the interview sessions held after the exercises it has been possible to determine that public users enjoyed searching a portion of the BBC archive.
- They liked the feature of dropping right into a requested segment of the content without having to watch whole videos.
- As we expected based on earlier user studies, users were not fond of all the different search options in the interface
- Users prefer a single 'google-type' search box.
- Users are enthusiastic about future possibilities of being able to follow links between videos.

In addition the participants at these sessions helped the AXES project to discover public users' requirements on audio-visual hyperlinking, a novel technology. Each session ended with a short survey and a group interview to elicit feedback on the search technology and get information on how users perceived the difficulty of the tasks.

4.3.2 2nd MediaEval workshop

In mid-September 2013 the 2nd part of the MediaEval user trials took place at the BBC's Research & Development headquarters. In total, 30 participants were recruited and 17 of them were returning from the first event and thirteen were new. In two-hour sessions users were asked to carry out a number of tasks including an online survey.

The objective of the 2-day event was to get users to validate proposed links between video clips which have been automatically generated by algorithms, two of which have been developed by AXES partners. The data collected allows AXES to evaluate the accuracy of algorithms that automatically find links from a video clip. By putting the evaluation in a benchmark framework (MediaEval), it becomes possible to compare different algorithms/approaches, and we can make an assessment of the current AXES system.



Photo 2. Roeland Ordelmans of NISV & UTwente give instructions to the participants of the MediaEval workshops

After the experiments, the respondents filled in an online survey that was created to find out about tablet usage and the types of content watched and in what context. Was it used in a shared experience, as with families or friends watching together? These questions were posed to gain more insights in the growing presence of tablets as reported in 4.2. Although with 25 participants these findings are not conclusive, they provide an indication of how AXES HOME users might use multimedia.

Of the 25 participants, 14 owned tablets for use in their leisure time, while 11 did not. Of the people who did have tablets, all used their tablets to watch audio-visual media, of which 10 did so over two hours per week. The tablet was used more often to watch audio-visual media than the pc. The most important use case was entertainment, confirming our characterization in D1.2 (p14).

Home users are willing to register for an account for added functionality. Out of 25, 18 were willing to register. Functionalities that offer additional value to home users are personalization (tailoring search results to individual interests), bookmarking, and saving a history of searches.

4.4 Conclusion for AXES HOME: entertain & personalize

Based on all the requirements studies aiming at the home users, we conclude that the consortium will need to decide on the most suitable platform on which AXES HOME will be built. Given the growth of the use of tablets and answers in the interviews and surveys a tablet application should be considered.

Furthermore, the list of requirements below provide the main features with which AXES HOME differentiates from PRO and RESEARCH showing the HOME system should focus on entertain. Furthermore, we also found the home users are a very diverse group, showing the need for personalisation. Each user requirement is followed by the requirement ID.

- Usable in different browser (requirement 91) and on tablets (requirement 93)
- Personal user settings can be saved (requirement 95)
- Show other programs in which similar fragments appear (requirement 104)
- Share results with others (requirement 114)

4.5 AXES HOME interaction scenario

In D1.3, we included interaction scenarios for the pro and research users. This paragraph includes the first version of an interaction scenario for the home user. This scenario will be discussed in the consortium and will further be refined.

In D1.2, we described how we created Personas for each user group, based on both a literature review as well as the preliminary requirements. Personas are a 'fictitious, specific and concrete representation of target users'.²² By creating these Personas, we aimed to make the envisioned AXES user more concrete for both internal use as well as dissemination activities. The descriptions have been discussed in several consortium meetings and are visualized by photos. Since the nature of Personas is descriptive and gave a sense of the users, the next step was to set-up an interaction scenario describing how the user could ideally interact with the AXES systems. Whereas Personas describe the envisioned user and their personal background, interaction scenarios describe the way a user interacts with a system.²³ For AXES we defined a story-like scenario based on the list of requirements as included in chapter 5 of this deliverable. The scenario should help the technical partners to discover the formulated requirements in D1.2 by staging a hypothetical work situation.

System	AXES HOME
Related Personas	Tom, 46, Father, York (see D1.2-paragraph 3.2.3.2.1
Related User Requirements ID	1, 23, 35, 36, 93, 99, 100, 106, 109, 112, 113, 114, 117
Lead partner	BBC

Tom is a fan of the series Eastenders. Every now and then he would like to re-watch a specific scene of one actor. So he grabs his tablet (requirement 93), goes to the AXES HOME system and logs in with his credentials so he gets his personalised entry page. When opening the system, it already shows recent fragments of Eastenders since the system knows of previous searches Tom performed on Eastenders. The search bar is central in the screen (requirement 1 & 106) so Tom types in the name of the actor and a description of the scene. Initially he makes a typo but the system offers an

²² Cooper, Alan. (1999). *The Inmates are running the Asylum*, Macmillan, quoted in Xin Wang, *Personas in User Interface Design* <http://pages.cpsc.ucalgary.ca/~saul/wiki/uploads/CPSC681/topic-wan-personas.pdf>

²³ Carroll, John M. (ed) (2000) *Making Use: Scenario-based Design of Human-Computer Interactions*. MIT Press; Carroll, John M. (1999) *Five Reasons for Scenario-Based Design Proceedings of the 32nd Hawaii International Conference on System Sciences*, page 2 <http://testingeducation.org/BBST/testdesign/CarrollScenarios.pdf>; Alexander, Ian F. and Maiden, Neil (2004). *Scenarios, Stories, Use Cases*. Wiley; Carroll, John M. (ed) (1995) *Scenario-Based Design: Envisioning Work and Technology in System Development*. Wiley

alternative spelling (requirement 112) and then shows a list with scenes. He does not yet find the scene he is looking for, so uses the advanced search functionality (requirement 100). The scenes are visualised by thumbnails (requirement 109) and show information on the duration of a video (requirement 35) but also visualises why this scene was found (requirement 36). Since the system shows too many results, Tom can refine his search by using the easily understandable filters (requirement 23) that are shown persistently during the search process (requirement 117). AXES HOME automatically saves Tom's search trail (requirement 113) so he can reuse it when returning on a later moment. When the fragment is found, it streams with seek capability (requirement 99) and the system allows Tom to share his results with his Facebook friends or by email (requirement 114).

5 CONCLUSION: FINAL REQUIREMENTS LIST

In this chapter we provide the final requirements list. This list is based on all the requirements studies and the first version of this list in D1.2. Each requirement has a unique number and it is marked for which user group it is identified. This does not mean these requirements are not incorporated within the other systems. We also give the requirements separate colours. Green requirements are considered to be feasible within the scope of the project. Orange requirements should be discussed within the consortium concerning the development of AXES HOME.

No.	User requirement	PRO	RESEARCH	HOME
1	Search bar should be central and prominent*			√
2	Advanced search feature should be easy to find near the search bar*			√
3	Precision and recall should be good			√
4	Filtering should be trustworthy and repeatable	√	√	
5	Provide multiple project functionalities within My Collections	√		
6	Provide possibility to filter any type of metadata element	√	√	
7	Provide premix editing function	√	√	
8	Provide save search functionality of multiple search steps	√		
9	Store search results overview with detailed information about the items	√		
10	Allow search with more than one word	√	√	
11	Allow searching for sounds and speech	√		
12	Allow searching for visual features	√		
13	Combine different information channels	√		
14	Have different options for searching	√		
15	Provide searchers with an overview of popular searches or even personalised views, created on basis of earlier searches	√		
16	Provide speaker identification (face recognition)	√	√	
17	Provide suggestions for search terms and search guidance	√	√	
18	Show related media	√		
19	Specification of fragments should be made effortlessly	√		
20	Use another video as input for new queries / Provide search for shot similarities	√	√	
21	Use relations between terms	√		
22	Allow multiple filters to be combined	√	√	
23	Filters should be easily understandable as refinements of search results	√		√
24	Combine textual and filtering search strategies	√		
25	Provide filtering combinations with multiple relevant items	√		
26	Provide hierarchical search	√		
27	Provide image-based search	√	√	
28	Search on any type of information, both descriptive and technical	√	√	
29	Allow searching on date & time, location, event	√	√	
30	Create a familiar interface people can relate to	√	√	
31	Allow searching on source reliability & rights restrictions	√	√	
32	Thesaurus or synonyms/related terms	√	√	
33	Content should be findable through common search engines			√
34	Search accuracy: hits should be valid and not overwhelming			√
35	Result list should show the information, such as duration of a video, about a result*			√
36	Result list should show why an asset is retrieved		√	√
37	Make clip browsing and ordering process available online	√		
38	Click on a key frame to initiate video from that point onwards	√		
39	Instant playout / browse within a given video	√		
40	Colour indication of relevant items in search results	√		
41	Show available metadata	√	√	√

No.	User requirement	PRO	RESEARCH	HOME
42	Visual interface for search on Geographical coordinates	√		
43	Observe usability guidelines	√		
44	Filter automatically on interior/outdoor shots	√		
45	Filter on aspect ratio	√		
46	Filter on colour and B&W images	√		
47	Filter on reuse availability / Rights status	√	√	
48	Provide descriptions on the shot level with time code	√		
49	Provide option to search for a specific time of day	√		
50	Provide reliable date information	√		
51	Provide technical carrier information: what formats and what quality are available for use	√		
52	Provide technical descriptions of the kind of shot (zoom, pan, ...)	√		
53	Thesaurus terms should be visible and searchable	√	√	
54	Clear marcation of entities, themes and events	√		
55	Descriptions should contain visual aspects of the content	√		
56	Descriptions should contain time-codes to enable quick browsing	√		
57	Export function for metadata	√	√	
58	Metadata should be 'complete'	√		
59	See and access items in their broader context	√		
60	Word-level searching of the video's speech transcripts within key frame series	√		
61	Give more general background information about a clip which is not included in the metadata		√	
62	Include relevant suggested results	√	√	
63	Show subtitles		√	
64	Provide person/speaker identification (voice and face recognition)	√		
65	Visualize the filter steps		√	
66	Let users filter during the entire search process		√	
67	Include a view counter to show how often a video has been viewed		√	
68	Include a counter to show how often a clip has been saved to a collection		√	
69	Suitable for people who are inexperienced, yet goal-directed			√
70	Timeline is an interesting feature for browsing			√
71	Create a sitemap			√
72	Easy and quick to use			√
73	Include a virtual cutter to allow users to select relevant segments	√	√	
74	Include a tool to allow users to analyse the videos		√	
75	Include a tool to save videos in separate folders		√	
76	Allow videos to be shared both online (linking/embedding) as well as offline (downloadable)		√	
77	Find fragments of clips		√	
78	Create an archive dataset and a temporal dataset of videos to work on		√	
79	Create an API to other libraries		√	
80	System should offer options for lower resolution and a higher resolution content of at least 720p			√
81	Document how AV materials have been found e.g. by search trails		√	
82	Show where and by whom was this video used as well		√	
83	Offer an alerting service to users who want to stay informed on the publication of new relevant videos		√	
84	Provide clear access to the methods used to rank search results	√		
85	Provide clear explanation for the use of categories	√		
86	Provide clear search instructions	√		
87	Speed	√	√	
88	Stability, reliability	√	√	
89	YouTube is the most popular video website and should be used as an example			√

No.	User requirement	PRO	RESEARCH	HOME
90	System should work consistently between browsers			√
91	System should work a variety of browsers			√
92	System should offer fallback mechanism for older browsers			√
93	Tablets should be supported. At least for the next 3 years iOS is the most important tablet platform.			√
94	If tablet, a decision must be made about a native app or web app in HTML5			√
95	Personalization: Save user settings*			√
96	Common terminology: Use of plain language and not jargon.			√
97	Enable the use of pre-and post-selection based on filters and concepts		√	
98	Enable Boolean search techniques		√	
99	Streaming with seek capability, akin to YouTube, is preferred over streaming without seek capability, to enable playback features such as rewind and fast forward*			√
100	Users should be able to perform advanced searches (for example, using programme title and date)		√	√
101	The results have to be displayed quickly, and result pages should load quickly when I click on their links			√
102	Users should be able to see the cost of purchasing any archive material from within the search result list			√
103	The system should be able to show the most popular episodes/fragments from a television series			√
104	The system should, for any given video fragment, be able to show any other programs in which that fragment appears			√
105	Word order should have no influence on my search results			√
106	The search bar should always be visible, so that I can initiate a new search at any point			√
107	Users should be able to get recommendations from people who watched the same video about the other videos they watched (similar to "Customers Who Bought This Item Also Bought...")			√
108	The system should display a clear message if no results have been found			√
109	Users should be able to see the thumbnails of relevant parts of the video on the search result page*			√
110	It should be easy to change the search settings (e.g., order by date), without leaving the results page*			√
111	Users should be able to search for videos from a particular genre (for example news, entertainment or comedy)*			√
112	The system should offer alternative spellings if I have mistyped my query			√
113	Users should be able to save their search keywords and search results in order to return at a later point of time if necessary			√
114	Users should be able to share search results with others by using a link (URL)*			√
115	Users should be able to search for videos that have a given mood (for example, dramatic, exciting, calm etc.)			√
116	Users should be able to give feedback on how well the system is performing*			√
117	It should always be clear which filters are in place			√

* Also incorporated in AXES RESEARCH

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