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User Experience Evaluation of the Radio and Television Media Management System

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The focus of this study was the National Audiovisual Institute's (known as National Audiovisual Archive until the end of 2013) development of the user experience of the Radio and Television archive's Media Management System for end users; researcher and students. The main user groups and their specific needs were described. The goal was to improve the user experience of the software based on the needs of the academic research of the radio and TV. The material of the study was a usability test conducted in spring 2013. Focus of the tests was in user experience of the software.

The questions of this research are: How to evaluate the needs of the academic research? How to implement such needs as usability improvements into the Media Management System? What kind of information is needed, in what form and how?

The theoretical basis of the study is concerned the assessment of the different usability testing methodologies and definition of user experience in the digital library software context. Digital libraries were seen to have similar goals and user cases as the radio and television program stream database. Studies of user experience in the context of digital library software formed an important background for this study.

The results showed that complex search features were not preferred by the users and users tended to prefer browsing instead of advanced search, so the features such as making notes should be promoted and developed more. For example, the participants were eager to use the My Desktop - interface, which enables saving notes and searches. They learned it fast, so the need for such a tool seems obvious, but it seems that the metaphor for the function is not correct. Researchers need efficient tools for storing and organizing the collected information for later use in academic research, and browsing the database should be promoted instead of advanced search features. This is in line with findings of the user experience research made in the field of digital libraries.

Keywords	user experience, usability, digital libraries, software, radio, television, archive, database, interface

Opinnäytetyössä kehitettiin radio- ja televisio-ohjelmatietokannan käyttäjäkokemusta loppukäyttäjiä ajatellen. Työssä kuvattiin pääkäyttäjäryhmiä ja heidän erityistarpeitansa. Tarkoituksena oli parantaa ohjelmiston käyttäjäkokemusta akateemisen tutkimuksen tarpeisiin. Tutkimuksen aineistona olivat keväällä 2013 tätä tarkoitusta varten tehdyt käytettävyystestit.

Tutkimuskysymyksiä oli kolme: Miten arvioida akateemisen tutkimuksen tarpeita? Miten toteuttaa tällaisten tarpeiden pohjalta käytettävyyden parannuksia radio- ja televisio-ohjelmatietokantaan? Millaista tietoa tarvitaan, missä muodossa ja miten?

Tutkimuksen teoreettisena pohjana ovat erilaiset käyttökokemuksen testausmenetelmät ja käyttökokemuksen määritelmät digitaalisten kirjastojen kontekstissa. Digitaaliset kirjastojen katsotaan olevan samanlaisia käyttötapauksissa ja tarkoituksessaan radio- ja televisio-ohjelmatietokannan kanssa. Digitaalisten kirjasto-ohjelmistojen käyttökokemustutkimukset muodostivat tärkeän taustan tähän tutkimukseen.

Tutkimuksen tulokset osoittivat, että monimutkaisten hakutoimintojen sijaan käyttäjät suosivat laajojen hakujen tekemistä ja hakutulosten selailua. Käyttäjän hakutottumuksia vahvistavia toimintoja, kuten muistiinpanojen tekemistä, olisi edistettävä ja kehitettävä edelleen. Esimerkiksi radio- ja televisio-ohjelmatietokannan käytettävyystestiin osallistujat olivat innokkaita käyttämään Oma työpöytä -toimintoa, joka mahdollistaa muistiinpanojen ja hakujen tallentamisen. He oppivat sen nopeasti, joten tällaisen työkalun tarve tuntuu itsestään selvältä.

Tutkijat tarvitsevat tehokkaita työkaluja tiedon varastointiin ja järjestämiseen myöhempää käyttöä varten akateemisessa tutkimuksessa, ja näitä ominaisuuksia olisi edistettävä monimutkaisten hakutoimintojen sijaan. Tämä on sopusoinnussa digitaalisten kirjastojen käyttökokemustutkimusten havaintojen kanssa.

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1 Introduction

The Radio and Television Archive (RTVA) was founded as part of the National Audiovisual Archive (KAVA) in 2008 (name changed into National Audiovisual Institute aka KAVI) at the beginning of 2014, when it merged with the Finnish Centre for Media Education and Audiovisual Media). Then the new legislation on the preservation of cultural materials came into force. It is main task is to preserve the Finnish radio and television culture for later generations. The RTVA records the program stream of the primary radio and television channels in its entirety. Samples are also recorded from approximately 100 other channels. The RTVA also deposits program types defined by law as original physical items or files. RTVA collections are mainly used by researchers and students.

Creating a digital archive for the captured program stream of the Finnish radio and television channels is one of the central services provided by the RTVA. The main goal was to build a vast system for control and browsing of the captured broadcast stream and program stream related metadata such as Electronic Program Guide (EPG) and Finnpanel's viewing rating data. Digita Oy is responsible for the capturing and transcoding services, W3 Group (known as W-Create Oy at the beginning of the project) is responsible for the Media Management System and IT Center for Science Ltd (CSC) is responsible for preserving and streaming services. The CSC is also the technical integrator of the project. Besides KAVI, viewing and listening stations of the Media Management System are located in the Finnish legal deposit copy libraries (Savolainen, 2011).

The focus of this study is KAVI's development of the user experience of the Radio and Television Media Management System for end users: researcher and students. Cataloguers are also an important user group, and usability will be developed also to improve the cataloguing work, but the cataloguers are not included in this research. I will describe the main user groups and their specific needs. The plan is to improve the user experience of the Media Management System based on the needs of the academic researchers of the radio and TV. The software was developed during 2012 for making it more suitable for cataloguers, but now the main focus is the principal users and main

target is to get the software released on the Internet in the middle of 2014. The audio-visual material will be excluded from the Internet release.

During the development process of the Media Management System, usability tests of the prototype of the Media Management System were conducted in summer 2009. Four test subjects participated in tests: they were all researchers. Although the number of the participants was relatively small, the findings of the usability tests were useful and the tests produced many ideas for improvements of the existing functionalities of the Media Management System and produced even new user-friendly features which were built into the final version of the Media Management System. It strengthened the feeling that the selected way for implementing the Media Management System was a good and functional one.

With some considerably big delays of the original timetable, the Media Management System was accepted for use in autumn 2011 (Savolainen 2011). The second usability test research was conducted during spring 2013. As the first usability tests were based on very structured tasks, now the focus was more centred towards the actual needs of the research and the user experience of the software. The questions of this research are:

1) How to evaluate the needs of academic research?
2) How to implement such needs as usability improvements into the Media Management System?
3) What kind of information is needed, in what form and how?

The theoretical basis of the study will be concerned about the assessment of the usability testing methodology and the definition of user experience in the digital library software context. The definitions and methodology are discussed in chapter 2. In addition, the software development for digital library purposes in general will be discussed in chapter 3. Chapter 4 will introduce the selected methodology, the content of the test and the test subjects. Chapter 5 will describe how the testing proceeded and chapters 6 and 7 will concentrate on the analysis of the test results. Chapter 8 will present the conclusions of the research.

2 Usability testing definitions and methodology

In this chapter, the concepts of usability and user experience will be defined and also some methods for involving users in the development process will be reviewed. The evolution of the user-centric design is the key issue of this chapter. Making the distinction between the usability and user experience is essential for this research, because the aim is to recognize the actual needs of the potential user of the software and make them contribute and increasingly take part into the requirement elicitation and validation of the development of the Radio and Television Archive's Media Management System.

2.1 Usability

Because the main focus of this work is usability research, it is necessary to define what kind of meanings the concept "usability" holds. In this work, usability refers to user's ability to use the product as desired. To achieve this goal, one can assume that there have to be some kind of considerations and expectations about the possible users of the product. In this section 2.1 the different aspects of usability will be explained.

Donald A. Norman (2002) explores the user's needs, interests and focuses on the usability of the product design in his work *The Design of Everyday Things* (2002). The book was first published in 1986 under title *The Psychology of Everyday Things* (Norman 2002, xi-x). Norman defines the concept User-Centric Design, and the basic ideas of the book are still valid. Norman summarizes his design principles as follows:

- Make it easy to determine what actions are possible at any moment (make use of constraints).
- Make things visible, including the conceptual model of the system, the alternative actions, and the results of actions.
- Make it easy to evaluate the current state of the system.
- Follow natural mappings between intentions and the required actions; between actions and the resulting effect; and between the information that is visible and the interpretation of the system state (Norman 2002, 188)

Norman (2002) gives many examples where the designer has neglected the usability of the product. One of his main arguments is that the designer should make sure that the user is able to make use of the product as intended and with a minimum effort to learn how to use it (2002, 189). Norman suggested that the following seven simple principles of design are essential for facilitating the designer's task:

1. Use both knowledge in the world and knowledge in the head.
2. Simplify the structure of tasks.
3. Make things visible.
4. Get the mappings right.
5. Exploit the power of constraints.
6. Design for error.
7. When all else fails, standardize.
(Norman, 1988, p.188-189).

Norman's work was an important step towards involving actual users in the development process. Their involvement lead to more effective, efficient and safer products and contributed to the acceptance and success of products (Preece, Rogers, & Sharp, 2002).

Jakob Nielsen adapted the same basic concepts to produce heuristics for usability engineering. In Nielsen's book *Usability Engineering* (1993), usability was presented as only a part of the larger entity, which concerns the system acceptability as a whole. Usability is part of the usefulness of the product; the meaning is the system able to achieve some desired goals. Figure 1 below illustrates the idea:
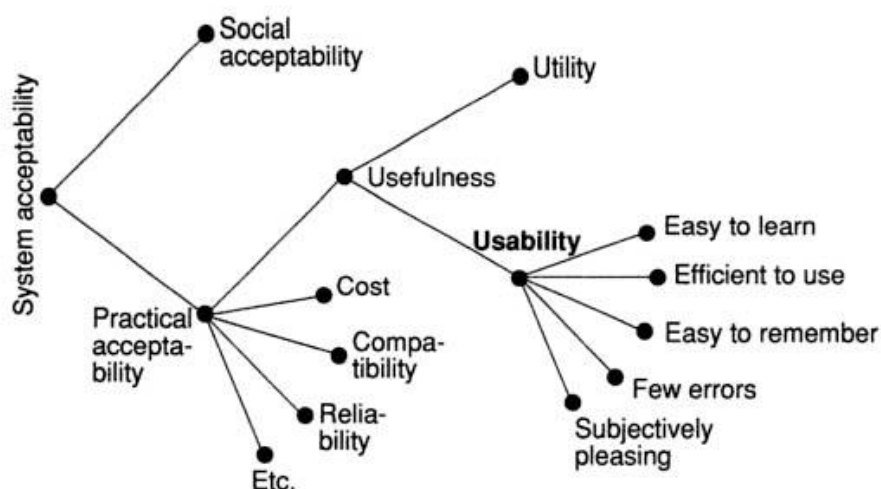
Figure 1. A model of the attributes of system acceptably. Copied from Nielsen, 1993

In the model shown in figure 1, system acceptability is broken into social acceptability and practical acceptability. Social acceptability means that the system can hold morally questionable features, such as race profiling or comparable socially awkward features. Practical acceptability is split into various categories, including traditional categories such as cost, support, reliability, compatibility with existing systems, as well as the category of usefulness. Usefulness is the issue of whether the system can be used to

achieve some desired goal. It can again be split into the two categories of utility and usability, where utility is the question of whether the functionality of the system in principle can do what user wants it to do. Usability is the question of how well users can use that functionality (Nielsen 1993, 24-25). Nielsen also states that usability is more than one-dimensional property of the user interface and defines usability of the system with five components as seen in figure 1: *learnability*, *efficiency*, *memorability*, *errors* and *satisfaction* (Nielsen 1993, 26):

> *Learnability:* The system should be easy to learn so that the user can rapidly start getting some work done with the system.
>
> *Efficiency:* The system should be efficient to use, so that once the user has learned the system, a high level of productivity is possible.
>
> *Memorability*: The system should be easy to remember, so that the casual user is able to return to the system after some period of not having used it, without having to learn everything all over again.
>
> *Errors*: The system should have a low error rate, so that users make few errors during the use of the system, and so that if they do make errors they can easily recover from them. Further, catastrophic errors must not occur.
>
> *Satisfaction*: The system should be pleasant to use, so that users are subjectively satisfied when using it; they like it. (Nielsen 1993, 26)

Because usability can sometimes be difficult to explain objectively, it is practical to use definitions which are based on generally accepted standards. Usability has been defined in the ISO 9241-11 –standard, as follows:

> Usability: 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 (SFS-EN ISO 9241-11).

The standard describes the necessity and ways to measure usability. Identifying the goals and decomposing effectiveness, efficiency and satisfaction are important factors in usability measurement. Also the environment is taken into account in the standard: everything related to usability of the product is seen as measurable. Figure 2 below, copied from the standard, illustrates the concept:
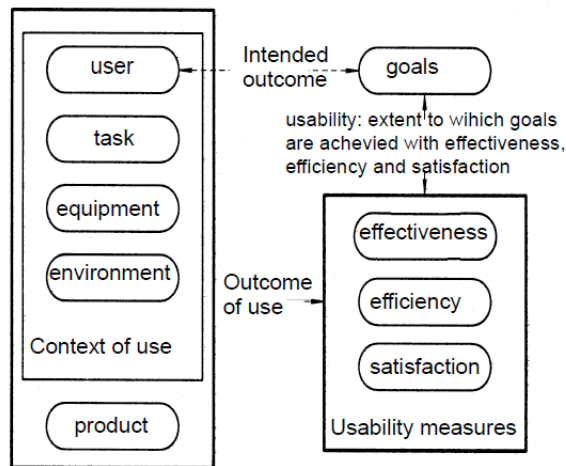
Figure 2. Usability framework, copied from SFS-EN ISO 9241-11.

In designing the usability research figure 2 gives ideas of what components of the product need to be tested, if the user has problems achieving the wanted outcome of use.

There are similarities in Nielsen's view and the ISO standard, and the purpose of the definition is similar: to give usability measurable attributes and a systematically approachable point of view, in other words, to give engineers something to work with.

Thus it is safe to say that usability is about satisfying the needs of the user and getting the job done. Redish and Dumas (1999) have put this in a very sensible way:

> Usability means that the people who use the product can do so quickly and easily to accomplish their own tasks. This definition rests on four points:
> 1. Usability means focusing on users;
> 2. people use products to be productive;
> 3. users are busy people trying to accomplish tasks; and
> 4. users decide when a product is easy to use. (Redish and Dumas 1999)

Goodman, Kuniavsky and Moed (2012) have a more business-oriented focus in usability. They purpose, that a usable product is something that is functional, efficient and desirable to its target audience. *Functionality* is about product usefulness, to be able to perform a task that one is expected to do. *Efficiency* is to get the task done fast and with smallest number of errors. *Desirability* is about the product's "look and feel", pleasure in using the product. In short, usability is ultimately good design. (Goodman, Kuniavsky and Moed 2012, 22-23). This definition is like a polished version of Nielsen's definition.

Steve Krug (2005) has given a very clear and practical view of constructing the usability of a website: everything should be self-explanatory on the site and the time put into on learning the interface of the site should be minimal. (Krug 2005, 10-16). Krug's book is a good example of how usability principles can be adapted in practice, even though one is not aware of all the official definitions and standards of usability.

In this research the focus will be more on user experience than usability. After defining the user experience, the suitable way to analyze the test results will be defined. However, it is challenging to set apart usability and user experience. The different views of user experience are discussed in section 2.2.

2.2   User experience

The main question of this research is whether the product satisfies the needs of the target group and how the product should be developed to fit the needs more accurately. This problem is related to the usability of the product, but it is also related to the concept of user experience. User experience is much more subjective concept than usability.

Tulls and Albert (2008) have explained the difference between usability and user experience as follows:

> Usability is usually considered the ability of the user to use the thing to carry out a task successfully, whereas user experience takes a broader view, looking at the individual's entire interaction with the thing, as well as the thoughts, feelings, and perceptions that result from that interaction. (Tullis and Albert 2008, 4)

Thus user experience is a way to take the concept of user-centric design even further. It is not enough to make products that we can use successfully; the interaction with the product must be also emotionally and intellectually involving and pleasant. Standardized ways exist for defining the concept as well as for the term usability (see section 2.1). The standard ISO 9241-210 defines user experience as follows:

> User experience: person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service. (SFS-EN ISO 9241-210).

However there are also three notes to the definition, which are needed to emphasize the subjectivity of the concept:

> NOTE 1: User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use.

> NOTE 2: User experience is a consequence of brand image, presentation, functionality, system performance, interactive behaviour and assistive capabilities of the interactive system, the user's internal and physical state resulting from prior experiences, attitudes, skills and personality, and the context of use (SFS-EN ISO 9241-210).

The context of use, mentioned in note 2, is often said to include the physical and social environment, but the tool sets that are/will be used with/alongside the developed tool should be emphasised also. This kind of tool set is called ecology of tools. It is known that tools change practices, thus knowing the existing tools used and the related practices aids the design and also the validation of the designed tool (Spinuzzi 2004 and Spinuzzi and Zachry 2000).

> NOTE 3: Usability, when interpreted from the perspective of the users' personal goals, can include the kind of perceptual and emotional aspects typically associated with user experience. Usability criteria can be used to assess aspects of user experience. (SFS-EN ISO 9241-210)

Therefore, because user experience is bound to the *user's subjective attributes*, the *system itself* and in the *context of use*, there is no definitive way to say what the "right" or "accurate" user experience would be. Basically it is always dependent on all the three changing factors. Hassenzahl's and Tractinsky's (2006) definition of user experience is in line with this:

> UX is a consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.), the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organisational/social setting, meaningfulness of the activity, voluntariness of use, etc.) (Hassenzahl and travinsky 2006, 95)

When comparing the ISO standard definitions of the usability and user experience, there are some overlapping and these concepts are in fact hard to separate from each other definitely.

The concept of user experience is derived from the user-centric approach, attempting to involve users in the development of the product and trying to get more information about the user's preferences. Nielsen Norman Group defines user experience in their website as follows:

"User experience" encompasses all aspects of the end-user's interaction with the company, its services, and its products. (http://www.nngroup.com/,2013)

User experience is seen as the fulfilment of the needs of the customer or user. The product should be desirable and give pleasure. Given this perspective, user experience is more than just compiling the task given and committing the compulsory features. The product and its ability to function like user wants or expect it to work is also a footing foundation of the company's credibility, including and combining engineering, marketing, graphical and industrial design, and interface design. Norman Nielsen Group also wants to distinguish the user experience from the user interface (UI). The product needs to be more than a likable object; it also needs the substance meaningful to the user. User experience is distinguished from usability as a wider concept. If usability covers the systems learnability, efficiency, pleasantness, and so forth, user experience needs to fulfil a wider and deeper range of user needs.

Law, Roto, Hassenzahl, Vermeeren, and Kort (2009, 719-728) have tried to define user experience by a survey, with user experience professionals as respondents in their article. The main aim of the survey was to promote active discussions on the nature of user experience in which a heterogeneous group of people from the UX (User eXperience) community would be involved. The questionnaire used in the survey had three sections with a set of questions: UX Statements, UX Definitions, and Your Background. In the UX Statements section, the respondents were asked to indicate their level of agreement with a set of 23 statements, which were collected and formulated by the authors in an attempt to address a wide variety of issues related to UX. In the UX Definitions section, respondents were asked to express their opinions on one or more of a set of five definitions and pick their preferred definition. The survey took place in February to May 2008 and there were 275 respondents.

In the analysis of the survey statement part, it was found that the respondents understood user experience as dynamic, context-dependent, and subjective, and an important aspect was the potential benefits, which users may derive from a product. However, subjectivity of the user experience was not seen meaningful, because the predic-

tion of and design for experience would become futile. In the definition part, the diversity was much wider. The selected definitions were as follows:

D1   All aspects of the end-user's interaction with the company. Its services and its products. The first requirement for an exemplary user experience is to meet the exact needs of the customer without fuss or bother. Next comes simplicity and elegance that produce products that are a joy to own, a joy to use. True user experience goes far beyond giving customers what they say they want, or providing checklist features.

D2   A consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.) the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organisational/social setting, meaningfulness of the activity, voluntariness of use, etc.)

D3   The entire set of affects that is elicited by the interaction between a user and a product including the degree to which all our senses are gratified (aesthetic experience) the meanings we attach to the product (experience of meaning) and the feelings and emotions that are elicited (emotional experience).

D4   The value derived from interaction(s) [or anticipated interaction(s)] with a product or service and the supporting cast in the context of use (e.g. time, location, and user disposition).

D5   The quality of experience a person has when interacting with a specific design. This can range from a specific artefact such as a cup toy or website up to larger integrated experiences such as a museum or an airport. (Law, Roto, Hassenzahl, Vermeeren, and Kort, 2009, 723)

The answers were divided as presented in table 1:

Table 1.   Division of the selected definitions for user experience.

Definition ID	D1	D2	D3	D4	D5
Number of respondents	46	65	44	19	36
Percentage proportion	22%	31%	21%	9%	17%

The authors noticed that two background variables "primary role" and "country of resi-dence" played a somewhat significant role in influencing the respondents' definition choice. The respondents from industry preferred D1/D2 whereas those from academia preferred D2/D3. The respondents from Finland and the UK favoured D2, and the re-spondents from the UK and the Netherlands least favoured D4. The survey findings suggested that some socio-cultural factors seemed relevant, given the significant role played by the country of origin of the respondent. This survey is an interesting attempt to clarify the concept of user experience, and shows that there is no shared exact defi-nition of user experience.

Garnett (2011) has created a very useful diagram (figure 3), which tries to visualize the elements of user experience. In this diagram, Garnett has isolated different levels and meanings of the different levels as a mental model (Garrett 2011, 19-31):
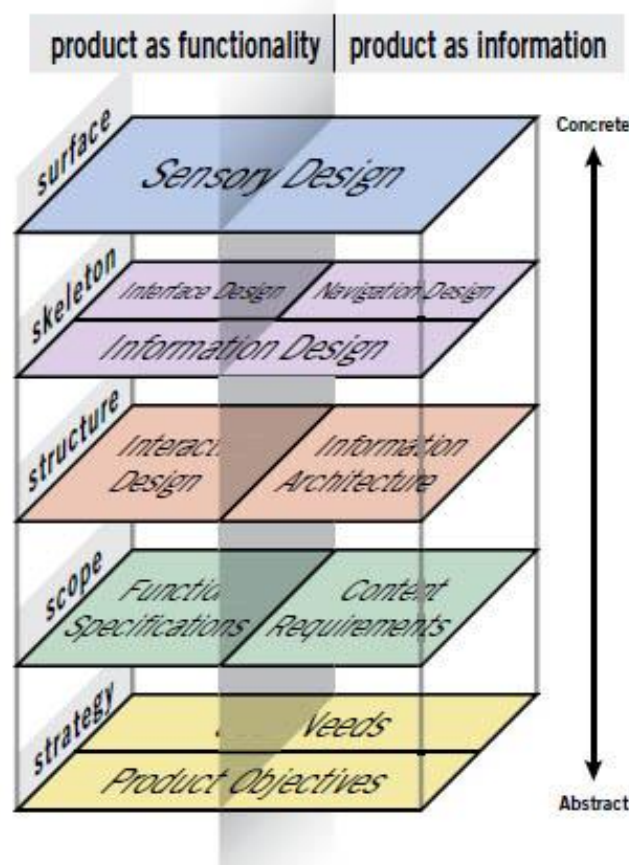
Figure 3. Elements of user experience. Copied from Garrett 2011, 29.

The diagram in figure 3 works from bottom up: the lower planes works as a founding structure for the following upper planes. As one can see pictured at the right side of the

diagram, the issues get more concrete when advancing the planes upwards. On the lowest plane, it is not relevant to think about the final shape of the site, product, or service at all. The only relevant issue is how the site will fit into the selected strategy. That means that in this plane the product is very abstract: it has no form, only an idea. On the highest plane, the most concrete details of the appearance (colours, fonts etc.) of the product are relevant. Only the form is important. All the other choices concerning the strategy of the site, scope of the site and structure of the site has been done.

> Plane by plane, the decisions we have to make become a little more specific and involve finer levels of detail. (Garnett, 2011)

A short revision of the different planes is provided below:

Strategy Plane describes the strategy of the site, which means the visions of the site owners and the needs of the site users. For example, the strategy might be to promote and give the needed information about the upcoming event for different user groups (participants, media, performers)

Scope Plane describes the way in which the various features and functions of the site fit together. For example, in this level it will be decided how much information is needed to give to each user group about the upcoming event, is there press material, map of the venue or directions available.

Structure Plane defines how the users move one page to another. The categories and information structure are described here. In the event example, the information structure for different user groups (participants, media, performers) is decided on this level.

Skeleton Plane describes the placement of buttons, controls, photos, and blocks of text. The skeleton is designed to optimize the arrangement of these elements for maximum effect and efficiency. The basic layout of the site is decided here.

Surface Plane is a series of web pages, made up of images and text. Some of these features are functional, some of them just illustrations. This is where the graphic designer does the most detailed work and decides for example the colours, shapes and fonts. (Garrett 2011).

Furthermore, Garrett (2011) divides these planes in two: *product as functionality* and *product as information.* This is based on splitting the audience into two: those who are focused on the developers´ point of view, design problems and the technical side of the web and those who are more concerned with information distribution and retrieval and put weight on the traditional worlds of publishing, media, and information science (Garrett 2011). Of course these groups are not totally separated from each other, but Garrett provides insight into different approaches where developer can find a common ground with content providers and consumers.

It seems that the complexity of the product will add need for a more detailed study of the user preferences and user experience, whereas simple products can be successfully designed by using the usability standards and very light user experience research.

The Radio and Television Media Management System has been developed since 2008. A preliminary usability test was conducted in the year 2009. It was very complex (it has over 5,3 million broadcast with extensive metadata in late 2013) and it had very specific user groups. A user experience approach was essential for this product. Selections of proper methods are needed. In the next section 2.3, different methods for testing the user experience of the product will be examined.

2.3   Methods involving the user

Because of the more or less subjective nature of the concept user experience, it is necessary to apply specific methods to get information about a user's needs and for involving the user in the development process. The first usability tests were conducted in usability laboratories that were staffed by people who were experts in user-interface design and testing, and this is still the practice in large companies. These laboratories are equipped with an area that allows the designers to observe the testers unnoticed (Rubin 2008). However, due to the cost of running such laboratories and the distributed nature of many systems it is increasingly common to use mobile or remote usability testing kits that are a fraction of the cost (Mueller, Tamir, Komogortsev, Feldman 2009).

One popular approach is called usability inspection, which refers to a set of methods that are all based on having expert evaluators inspect a user interface of a product without involving actual users. These methods include heuristic evaluation, heuristic

estimation, cognitive walkthrough, pluralistic walkthrough, feature inspection, consistency inspection, standards inspection and formal usability (Useit.com, 2013). There is no need to look at them in more detail as they are not relevant in this study, because the focus of the test will be in non-expert users.

There are many ways to do usability tests with non-expert users. Basic structure of user-centred research is: getting hold of some representative users, asking the users to perform representative tasks with the design and observe what the users do (Useit.com, 2013). Important part of the test is to get the right participants to the test. There are different approaches to do tests, and the techniques can be categorized in many ways. Usability test methods will be reviewed according to Goodman, Kuniavsky and Moed (2012). This forms a basis in categorizing different techniques. This is not meant to be read as a complete list of different usability test methods, but they are just different approaches to get information about product usability from users.

Focus groups

Focus groups are structured, moderated group discussions. The participants are carefully selected people, who represent the target audience of the product. The aim of the focus group interview is to get to know the audiences' preferences and priorities. Focus groups are good in the early phase of the development for getting ideas, prioritizing features and to get a good understanding of the true needs of the target audience of the product. Focus groups are a good way to get general information about people who will be more likely to use the product and their attitudes. On the other hand, focus groups are not useful when one wishes to get information about the experience of the actual act of using the product. (Goodman, Kuniavsky, Moed 2012, 141-145)

Focus group interviews need to be carefully moderated. The topics must be prepared carefully and the preferred target audience needs to be clear in the recruiting phase. The moderator needs to be skilled. He or she should encourage participation without letting any person dominate the discussion. The biggest problems of the focus group interviews are misleading or inaccurate results. The people in groups tend to avoid conflict, and people do not always say what they really think if they think that it will cause some kind of problem in the group consensus. The discussion guide itself can also lead the participants just to follow the moderator and thus give the results that do not represent the actual thinking of the focus group.

Object-Based Techniques

Object-Based Techniques simply mean that there are supplementary objects in the interview, such as photos or cards. These can help the researcher to understand how people think and categorize their world more than just in words (Goodman, Kuniavsky, Moed 2012, 179-185).

Field visits

Sometimes it is necessary to understand the physical environment of using the product. Field visits are needed, if it is necessary to get more detailed information about understanding both how and why people do what they do. Observing the actual context of work and particularly what other tools are used will show the real use experiences, and test participants do not have to describe everything. False assumptions can be corrected and issues which are difficult to put words can be noted in field visits (Goodman, Kuniavsky, Moed 2012, 212-216).

Diary studies

Diary studies are used when there is need to follow a very lengthy time period. The test participants report in a diary about their use experiences and own observations. Diary studies can take even months. The participants of diary studies can be distributed geographically almost anywhere. The studies can be very individually carried out and are very flexible. The studies can be done with a notebook, audio recordings, video recordings and online applications. Diary study is also a non-intrusive test method. (Goodman, Kuniavsky, Moed 2012, 243-257).

Surveys

Surveys are needed when it is necessary to get some quantitative information about certain characteristics of the product. Surveys are conducted when the product has a user base. Sometimes it is necessary to get more information about the profiles of the users, user satisfaction and what the users consider valuable. Surveys can contain usually demographical questions, detailed background questions and actual research

questions. There can be feedback possibility also (Goodman, Kuniavsky, Moed 2012, 328-341).

Usability tests

All those previously mentioned techniques are in a way usability tests. In this section, usability test are defined as structured interviews focused on the specific features in a product's interface. The focus in the interviews series are on the tasks performed by the interface's test participant. Researchers analyse recordings and notes from the interview for everything that the test participant says and does. After a number of these tests, researchers compare the observations, collect the repeating and common issues into a list of functionality and presentation problems.

Usability tests examine how people perform specific tasks. For that reason, usability tests are not a good way to study the entire user experience of the product. Usability testing is most effective in the early to middle stages of development, before features are locked. Usability test should be done in iterative cycles. They should not be done so late that it is impossible to implement extensive changes if serious problems are found.

There are four main types of usability testing according to Goodman, Kuniavsky, Moed (2012):

> *Exploratory*, to test preliminary concepts and evaluate their promise
> *Assessment*, to test features during implementation
> *Comparison,* to assess one design against another
> *Validation,* to certify that features meet certain standards and benchmarks late in the development process (Goodman, Kuniavsky, Moed 2012, 274)

Recruiting the test participants is one of the most essential parts of usability tests. Tasks are also very important to be well prepared. Good tasks should be reasonable, described in terms of the end goals, specific enough, in a realistic sequence and not too time-consuming.

The test site should resemble the typical place where the product is used. Video recording is also recommendable, and separate audio recording. When doing usability tests with the computer, screen activity is also essential to record. The interview itself should be conducted, so that user feel comfortable enough and the useful responses

are elicit, so that the interview is not drastically interrupted. A non-directed and formally open interviewing style is recommended. It is good also to have observers present with the interviewer (Goodman, Kuniavsky, Moed 2012, 273 - 314).

3   Role of the user experience in a digital library development

This chapter will summarize what user experience means in scholarly use and there are any special characteristics when concerning scholars as a user group. The studies of the development of digital libraries will be used, although the Radio and Television Metadata Management System (MMS) is more of an audiovisual archive and program metadata database. When concerning the concept of the context of use, the ISO 9241-210 states as follows:

> ...the characteristics of the users, tasks and organizational, technical and physical environment define the context in which the system is used (ISO 9241-210).

The standard categorically defines the users and other stakeholder groups, the characteristics of the users or groups of users, the goals and tasks of the users and the environment(s) of the system. There are very few similar systems, and because the main audience of the system is scholars and students, I think there exist enough similar conformity in the Radio and Television Metadata Management System and digital libraries in general what comes to user experience studies. Also, for example Chowdhury (2010) has concluded after reviewing selected literature and reports of research projects focusing particularly on digital preservation, as follows:

> ...the problems and issues, beyond those that are technological, remain the same for the printed as well as digital world, and also for the digital libraries and digital preservation world, and they always centre-around the users and context. (Chowdhury 2010, 207).

The complexities of identifying and representing the complicated and changing nature of users and the context of the digital cultural material software systems are discussed in the following sections.

3.1 Usability in cultural heritage database projects

When considering usability testing in cultural heritage projects, there are certain characteristics that have to be considered. The main purpose of these projects is to make all kinds of cultural content accessible to users. Database and the content provided can be fully accessible to every user like the Europeana (http://www.europeana.eu/), or there can be some kind of method to get revenue from niche markets such as INAmediapro (http://www.inamediapro.com/en/). However the importance of user experience is well acknowledged in these projects. If nothing else matters, the funding and future of these projects are more or less linked to user numbers.

Nicholas (2010) has written about information seeking behaviour and usage of scholars in the virtual environment in general. Nicholas works in CIBER Research, which is an independent research group and is specialized in making sense of how very large numbers of people behave and consume in the digital environment. To this end they map, monitor and evaluate digital information systems (http://ciber-research.eu/CIBER_Research_Ltd.html). Nicholas uses data from CIBER deep log studies conducted over a period of seven years including studies of users of ScienceDirect, Oxford Scholarship Online and OhioLINK. This research analyzes how people actually behave on the Web, not how they think they behave. Based on this material Nicholas has proposed that library and publisher services and systems may well be built on false premises and a wrong paradigm.

Scholars have never gained so much access to information as there is now available. It seems evident that scholarly users opt for simplicity and convenience over advanced searching. In fact, Google searching seems to be among scholars. They do not stay too long on one site, which indicates that users are just viewing and navigating through information instead of really reading it. There is of course diversity in usage. Nicholas has found following examples of diversity (Nicholas 2010):

- Subject studied: Life Scientist are absolutely insatiable when it comes to scholary information and typically account for nearly half of all e-journal use – admittedly they are a large community with a very large scholary resource.

- Scholars from research-intensive universities behave very differently to those from teaching orientated universities. Thus research intensive universities use per capita is highest, their users spend much less time on

visit, and they forsake most of the online facilities and make most use of gateway sites. like PubMed.

- Searching: Germans are the most "successful" searchers and most active information seekers if we take into account the number of pages viewed in a session.

- Age: older users are more likely to come back (they are less promiscuous), and view abstracts. Young people use Google more and spend more time online viewing (Nicholas 2010)

So the scholar user as an information seeker can be described as frenetic, pragmatic, bouncing, navigating, checking and viewing. Nicholas also notes that it can be the case that a virtual environment just makes evident the characteristics which have been always present in the physical information environment; perhaps scholars and people in general have always been bouncers and looked for information with the same principles. When concerning this insight, the developments of the complex information services are designed in a false belief of user preferences (Nicholas 2010, 23-31).

3.2   Digital libraries and user experience

Problem of possible wrong design model of the digital libraries has been acknowledged in recent usability studies and user experience investigations of digital libraries. For example, Dobreva (2011) notes that although there are major reference models in designing digital libraries which incorporate the concept of users, users are not directly taken into account in decisions about aspects of digitization that impact users. She also enlists six myths of user studies in digital library development:

'We know our users' – development people are convinced that they know enough about their users already and do not need to bother with any further study. This can be true in traditional offline services, it is not true in online resources.

'If we build it they will come' – a philosophy that can be observed in projects in the digital domain where the major effort is directed towards digitization and/or online services, but without making sure that there will be an interest in the resource.

'Users use similar devices and have similar abilities' –neglecting to ensure that all users should have access to content and services, regardless of any special information needs or disabilities and independently of the technology used and of the context in which they act.

'The Digital McDonald's' – this is apparent when the developers of a resource believe that several standard options will meet the expectations and needs of any user – akin to choosing from the options on a unified menu.

'User studies is the same as evaluation' – in fact, user studies and evaluation are different activities, and while evaluation can (and often does) involve users, users can be involved before a product is designed and during development.

'Quality means innovation' is another common attitude when the effort of a project is primarily targeted to introducing the newest gadgets and technologies without really understanding how to support users better. (Dobreva et al., 2011, 1-19).

It seems that although usability evaluation has been taken into account in digital library strategies, the actual involvement of the actual users is too rarely used or overlooked as self-explanatory.

Teruggi (2010) presents the user research of the Europeana web service, cultural portal for accessing European content. First it was needed to express the requirements in Europeana:

> **Functional requirements**: a multilingual portal to access European cultural content from 4 domains: Libraries, Archives, Audiovisual Collections and Museums;
> **Non-functional requirements:** the portal should be capable of containing up to 10 million objects, permit multiple accesses, not contain the content but metadata, previews and representations permitting access to content in their original environments, respect publishing and author rights;
> **Design objectives:** should be user friendly and permit different categories of users to make the best out of it. It should contain a certain number of user-oriented functionalities. (Teruggi 2010, 35)

Also potential user groups of the Europeana portal were identified based on existing local experiences online content and modelled from the description of what the portal would be (Teruggi 2010):

> **General user:** people that visit the Europeana portal just for curiosity or seeking sporadically for a specific information or content;
> **School child, Student:** permits to conceive online courses or to prepare presentations and exercises; it is one of the great potentials for Europeana, it makes access to cultural content easy;
> **Academic student, Teacher:** looking for certified information, and the possibility of exporting information of courses or research works;
> **Expert researcher:** explores all the possible sources, annotates and uses them thoroughly, wants access to the largest possible amount of content;
> **Content holders:** they know what they have and how to access it; they need to check their online access (Teruggi 2010, 36)

The team working on the Europeana project used several different approaches to gain information about user satisfaction: on-line surveys, feedback inbox, login analysis, focus group surveys, user testing panel and expert analysis. The results will be analysed as a whole to get most use of the gathered information. Teruggi (2010) mentions that measuring user satisfaction is a permanent objective for Europeana, because it is a continuously evolving project and new content is introduced on regular basis. The goal is to follow user tendencies and adapt the environment to new expectation. (Teruggi 2010, 23-40.) A good example for keeping these goals is another CIBER report "CIBER for Europeana: Culture on the go" (November 2011), where potential usage of different mobile devices is carefully investigated. Europeana is a very good example of proper implementation of the user-centric design.

Kautonen (2013) had studied digital library research reports for her presentation in Liber Conference in Munich in 2013. In the Finna-project, there exists a clear strategy for user involvement (Kautonen 2013). She had a good general disposition on emerging themes in user studies in digital libraries:

- Constantly changing user needs
- Useful information about non-users
- Local viewpoints
- User involvement in design
- Evaluation methods and criteria
- New viewpoints (Kautonen, 2013)

In the digital library context, it is noted that the massive amount of diverse data combined with different potential user needs requires user-centric orientation in digital library development. This means investment in user experience in development (for example, Ji 2009). Digital libraries provide filtered access to high quality, richly described, expert evaluated content, and library systems are known to be frustrating to users when comparing to more popular information seeking systems. These preferences and information seeking strategies should not be the sole basis of design principles, because users often do not know in detail how these search engines work. Simple web-search engines can be a basis for development, but web-search engines should not be just copied (Hall and Khoo 2012). User studies in the domain of digital libraries requires following the advancements of technologies. User experiences create technological expectations, and these expectations are constantly changing with the rapid technological change. This can actually mean that digital libraries should be constantly redesigned to meet new expectations. (Dobreva and Felicitati 2011.) Developers must follow

the change of users' habits and study motivations for using the service. For example, a user study conducted in the context of the TELplus project showed the power of influence of previous user habits: they wanted the interface to be in their mother tongue and get the content of the articles immediately, as in Google search. Also the familiarity of the interface will affect the usage, and it was also noted that users not familiar with the content of the digital library will probably use the service with different strategies. Taking these into account could improve services in surprisingly ways. So following the users' habits, the appeal of the interface, and motivations for using the service were seen essential, and studying complementary usage logs was suggested as the next phase of studying user experience (Agosti et al. 2010, 233-234.)

However, available resources in development can be very constraining factor in development, especially in non-profit and publically funded projects. A good example for designing simple architectures for digital libraries that make use of file-store repositories is presented by Lighton Phiri and his colleagues in "Bonolo: A General Digital Library System for File-based Collections" (2012). Evaluation of the curator and end user interfaces by means of a user experience study showed that a digital library system can be built in simple file-store architecture without having too much negative effect on the user experience (Phiri et al., 2012, 9-11). So it is essential to know and study the library users and their needs to get the right balance of design features. However, even if there are the required resources available in a digital library development, it does not guarantee success. There is a good article by Sastri and his colleagues: "User Interface Design Challenges for Digital Libraries" (2011). In the article it is noted that in fact considerable resources have been used in building the digital libraries, but research has shown that digital libraries are underutilized, due to their poor user interfaces and information overload. User satisfaction is seen as a key to quality in digital library services, because they are intrinsically interactive systems, providing access to a full range of information and services on the local and global network (Sastri et al., 2011, 7). I see this somewhat similar to the Radio and Television Metadata Management System: metadata that is saved into the database is not limited in any ways. Everything that comes from the program data providers is saved as such (after checking the validity of the broadcast time). Sastri et al. (2011) state as follows:

> Designing the effective user interface system for digital library needs to understand the larger context that determines the users' information, needs and purposes for using the DL, that is, the context of the users' work; the individual user's specific work and tasks. (Sastri et al. 2011, 7)

So the characteristics of the data in digital libraries cannot be only guideline in development, and by using only data models in development the changing nature of the user preferences can be easily overlooked. The following user activities in digital library environment in Indian University system was recognized:

> **Information Discovery**: This is the primary activity of all groups of digital library users. Users discover the information in a way of searching and browsing the digital library according to their need.
> **Information Access:** After successful discovery of information by using either searching or browsing, user access the information either for reading or for printing.
> **Information personalization:** User wants some set of personalization features while accessing the digital libraries. Search results storing and filtering, bookmarking the information are some of the goals.
> **Information Creation:** Users can create new information and deposit into the digital library.
> **Information Review/Comment:** Existing information can be reviewed by the user and he comments the information.
> **Information Sharing**: User shares the discovered search results, information with other likely interested people in order to enrich the rich the knowledge. (Sastri et al. 2011, 10)

Research has also shown that in present use, only expert users exist only in the faculties of Science and Engineering/Technology (which are probably experts in any information retrieval in a digital environment). Other user groups neglect the use of digital libraries due to either lack of content or the hindrances in using of an infancy user interface of the digital library system. (Sastri et al. 2011, 10)

Dobreva, McCulloch, Birrell, Ünal and Feliciati (2010) studied user habits of the so-called "Digital Natives" (young people born in time when digital services are ubiquitous). They studied a relatively small number of participants and combined self-evaluation methods with their actual information seeking behaviour. There were similar results as in a CIBER research study based on log analysis discussed earlier in section 3.1. The profile of digital natives in the context of specialised electronic library usage was described as follows:

> 1. Preference for general search engines. Digital natives prefer to use general search engines such as Google and Wikipedia rather than specialised resources.
>
> 2. High search confidence is not necessarily backed up with skills. Young users are confident in their skills for online searching, but in carrying out tasks which hinted at using advanced searches within a digital library which supports them, not one participant amongst the young users taking part in the study ran an advanced search. This could suggest that young users need to

undertake more practical tasks, enabling them to practice their online searching skills.

3. Users in different countries perceive digital libraries in different ways. Some users are more critical than others. This is definitely an area where more research is needed. The differences in the education in information technologies in the participating countries does not seem to correlate with the different perceptions. Variance could be attributed to individual differences, rather than to geographical diversity, but further investigation is required.
   (Dobreva, McCulloch, Birrell, Ünal & Feliciati 2010, 41-42)

Focus of the user studies should be ease of use and intuitiveness of the digital library, identification of "future" user needs as technology and user preferences change and also the styles of the use of the service, expectations and trustworthiness are essential in library services, and similarities and differences between groups from different countries are also essential (Dobreva, McCulloch, Birrell, Ünal and Feliciati 2010, 42).

For gaining a better access to content, there can be a special portal tool for searching information in digital libraries. These kinds of search software or portals search multiple databases and aggregate the results to user. In the article "Usability Test Results for a Discovery Tool in an Academic Library", Fagan, Mandernach, Nelson, Paulo and Saunders studied the use discovery tool in EBSCO Discovery Service (http://www.ebscohost.com/discovery). Discovery tools such as web software were defined as tools which search journal-article and library-catalog metadata in a unified index and present search results in a single interface (Fagan, Mandernach, Nelson, Paulo and Saunders 2012, 83). The results showed that there was inconsistency in the use of some interface features: some were heavily used, other features were not used. This leads to a conclusion that conducting usability tests should be continued for finding usability issues and also to understand user behaviour and satisfaction (Fagan, Mandernach, Nelson, Paulo and Saunders 2012, 104-105). This research also shows the conflict between the actual needs of the digital library users and development guidelines, which often comes from librarians and curators of digital collections.

3.3   Measuring the usability of digital library systems

There has been some discussion about how the measuring of the usability in the digital library environment should be defined specifically. Buchanan and Salako (2009) presents their methodology for measurement usability for digital library systems. The key challenge is to identify what to measure and how, compounded by concerns regarding

common understanding of usability measures. The ISO standard 9216-1 works as starting point, and as general features *effectiveness, efficiency, aesthetic appearance, terminology, navigation,* and *learnability* are recognized as the key attributes of system usability and *relevance, reliability,* and *currency* as the key attributes of system useful-ness. Buchanan and Salako (2009) noted that usability evaluations might lead to sys-tems which could prove to be effectively designed systems with a flawless, but func-tionally useless user interface (Buchanan and Salako 2009, 638). In a digital library system, usefulness is a very important factor. What is a library where the user cannot find the information needed with reasonable effort, without having to spend hours of work just on learning the interface and getting to know the right ways for information retrieval?

Joo and Lee (2011) propose a measure instrument of usability based on widely ac-cepted usability frameworks, which can be applied to academic digital library evalua-tion. The title of their article is "Measuring the usability of academic digital libraries: Instrument development and validation" (2011). It was executed as a survey, and it was constructed from the ISO 9241-11 standard suggested efficiency, effectiveness, and satisfaction, while learnability was added based on Nielson's usability model. Figure 4 below illustrates the measurement instrument:

Dimension	Item code	Item indicator
Efficiency	EFY1	This digital library is well designed to find what I want
	EFY2	I can complete a resource-finding task quickly using this digital library
	EFY3	This digital library is easy to use to perform my search tasks
	EFY4	This digital library guarantees prompt responses in searching academic resources with stability
Effectiveness	EFT1	I can usually complete a search task using this digital library
	EFT2	I am successful in general in finding academic resources using this digital library
	EFT3	Overall, this digital library is useful in helping me find information
Satisfaction	SAT1	I am satisfied with this digital library overall
	SAT2	It is a pleasure to use this digital library to find what I want
	SAT3	I am comfortable and feel fulfilled while using this digital library
Learnability	LER1	It was easy to learn to use this digital library
	LER2	The terminologies used on this digital library were easily understandable
	LER3	This digital library provides appropriate help functions and information
	LER4	I was able to access easily what I wanted the first time I began to use this digital library

Figure 4. Measurement dimension and items, copied from Joo and Lee 2011, 529.

There were 230 test participants and descriptive statistics, including the mean, standard deviation, skewness, and kurtosis, were examined and the construct validity and reliability of the identified evaluation instrument was checked with a structural equation modelling software. The instrument was found reliable as a practical tool, but it was noted that inspection and formal usability tests will serve as the main methods in examining digital libraries, but a measurable user survey can complement these two predominant methods (Joo and Lee 2011, 528-532.)

One of the biggest obstacles for creating measurement tools for usability testing is the lack of standard definition of the basic concepts such as usability, usefulness and user experience (see also section 2.3). Heradio, Fernández-Amorós, Cabrerizo and Herrera-Viedma (2012) have examined the state of the art of the quality evaluation of digital libraries based on users' perceptions by conducting a structured literature review covering 41 primary studies. There are plenty of definitions for usability and usefulness and it is hard to contrast the experimental results obtained by different authors. The authors have visualized the problem in figure 5 below:
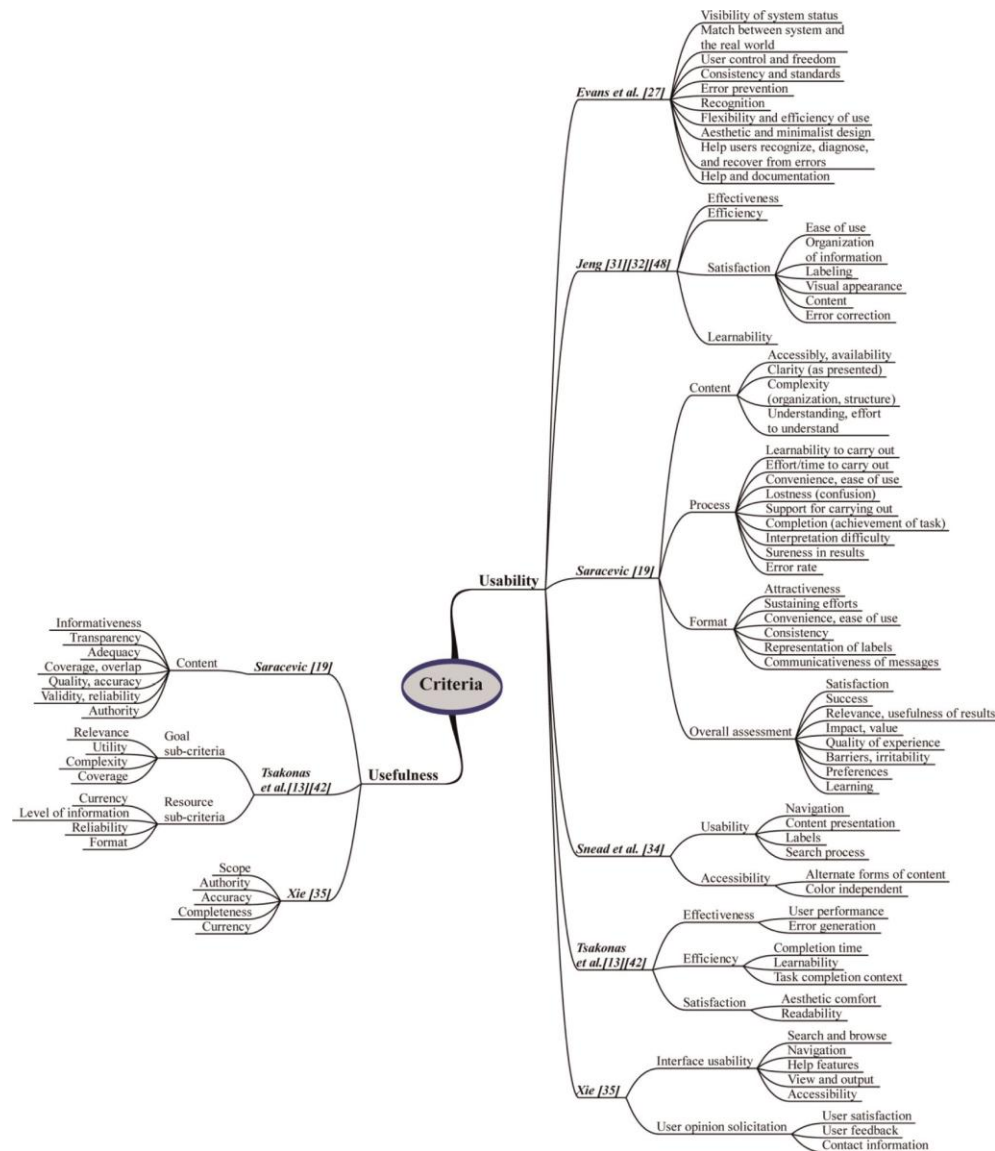
Figure 5. Criteria for user-centred evaluation of digital libraries. Copied from Heradio, Fernández-Amorós, Cabrerizo and Herrera-Viedma 2012, 6.

Heradio, Fernández-Amorós, Cabrerizo and Herrera-Viedma (2012) also suggested the use of a survey built on the set of selected criteria and a scale for the questions, Likert scales or ordinal fuzzy linguistic modelling to represent the user's perceptions, have also been suggested (Heradio, Fernández-Amorós, Cabrerizo Herrera-Viedma 2012, 10-13.)

In the present study, the evaluation and measurement of the findings of the usability tests will be based on qualitative assessment. The issue-based metric as proposed by Tulls and Albert (Tulls and Albert 2008) will be used.

3.4   Main aspects of the digital library user experience evaluation

When evaluating the various user studies of digital libraries, it seems evident that scholarly use of databases is more related to simple searching and browsing than making complex advanced searches. This notion will be reflected in this study. There also exist presumptions that the staff working in cultural institutions have great influence on the usability development of the digital library software instead of the actual users. This problem has been acknowledged in recent usability studies and user experience investigations of the digital libraries. There exists reference models in designing digital libraries which incorporate the concept of users, but users are not always directly taken into account in decisions about aspects of software that impact on users. In this study, the focus will be on the researcher users although the staff are also one important user group. More effort has to be put into involving researchers in development.

It is important to be aware of the emerging technological trends and changing user preferences. These can change quite frequently, so it is necessary to acknowledge the constant need for user experience evaluation in any product development. Also it is good to be aware of the different possibilities of using measurement tools in user experience studies. With these references, the results of the user experience research can be presented more effectively to the stakeholders, for example.

3.5   Selected methodology

The focus of the research is on the user experience of the product. For this research, the most suitable method is the usability tests as described in section 2.3. Usability tests give room for insights of the user and the user experience of the Radio and Television Archive's Metadata Management System can be studied with this method. The major issues of the user experience of the Media Management System are discovered best with the right participants. It is said that five participants will be enough for finding out 80% of the issues of the software (see for example Tullis and Albert 2008, 118).

The theoretical and comparative frame of the study will be the user experience research focused on the digital library environment. Radio and Television Archive's Media Management System and digital libraries share enough analogical user groups, needs and issues. the focus will be on the notions of the user expectations and preferences, and on analysing the test results based the interviews and comments about user interface and usefulness. These will give the backbone for the user experience

analysis. The repeating issues can be counted and they will work as the measurable factor of the study. The measurement methods, which were discussed in more detail in the section 3.3 are not included in the tests, but such measurements as self-evaluation of the users and using a measure instrument of usability based on widely accepted usability frameworks could have been included into the test procedure to provide more user-generated evaluation, prioritisations and evaluation of the problems found during tests. This would have helped to see which of these problems were severe and important to tackle from the user perspective, since often the issues that are felt important to correct are different for users than for designers and developers.

The analysis will gather the found issues and organize them by the severity rating based on the frequency and severity level given by the researcher. These results will be reflected to the context of the user experience of the digital libraries as described in section 3.2. Also the notions about the found trends from various user experience studies concerning digital libraries will be implemented when analysing the results.

4 Preparations for the user experience study

In this chapter, the process of making the usability test paper, selection of the participants, the actual usability test and evaluation of the gathered information will be described. The usability test of the Radio and Television Media Management System is about the user experience of the product, so weight will be put on open discussion. Formulating the research paper was a challenge. Initial aim was to find the central issues which are bad for user experience. However, later it was noted that it would have been helpful to put more measurable elements to the tests. The practical methods used in documentation (equipment, preparations etc.) will also be described in this chapter.

4.1 Users of the radio and television media management system

The Radio and Television Archive (RTVA) records the program stream of the primary radio and television channels in its entirety. Samples are also recorded from approximately 100 other channels. Digital recording was started at the beginning of 2009. The recording is executed in accordance with the annual recording plan prepared by the National Audiovisual Institute (KAVI) and approved by the Ministry of Education and Culture. The recorded stream can be accessed by the Media Management System.

The material can be used for research and study purposes in nine different organizations altogether in six localities. The viewing and listening access is governed by the Act on Legal Deposit and Preservation of Cultural Materials, and the Copyright Act. The original materials are the copyright of their respective authors, and therefore may not be digitally copied or forwarded.

Customers can access the recorded program stream at RTVA viewing stations. Background information is offered in the form of program metadata collected from variety of sources.

Radio and Televisio Archive's Media Management System
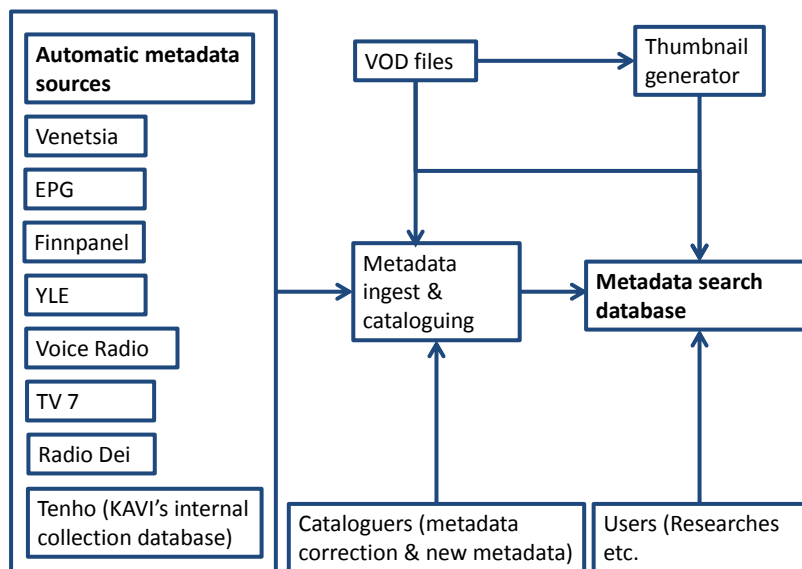
Figure 6. Basic structure of the Media Management System

Figure 6 describes the basic structure of the Media Management System. Most of the metadata is imported automatically. Ingested metadata is accessible to researchers in one day delay, and VOD -files are linked to the program metadata with the channel, date and time of the broadcast.

Profiles of the users of the software are categorized as follows*: system supervisors, "super" metadata managers, metadata administrators, user administrators, researcher users, researcher users on the internet* (relevant when published on the web) and *anonymous users of the libraries.*

System supervisors are responsible for monitoring the system, maintenance, technical support for metadata administrators as well as metadata administration. They have metadata editing rights and rights to create, delete and edit all user accounts. *Super metadata managers* can create, delete and edit metadata administrators and researcher users. They can edit metadata with the same rights as the metadata administrators. *Metadata administrators* monitor the automatically imported metadata from various sources, edit it when necessary and add more metadata. They also monitor the quality of the recorded program stream by listening to or viewing random samples of the recordings. They have no rights for user management. Otherwise they have the same rights as researcher users. *User administrators* can create, delete and edit researcher users. They do not edit the metadata, These are usually the staff of the libraries who also provide assistance for researcher users. They can use the My desktop feature. *Researcher users* can do searches and browse the database freely and use the My desktop feature. All the metadata is available for researchers in the viewing stations. *Researchers on the internet* can do searches and browse the database freely and use the My desktop –feature, but they cannot access video, thumbnails or audio. *Anonymous users in libraries* can do searches and browse the database freely, but they cannot use the My Desktop feature.

4.2   Description of the researcher users

This research is focused on the research users who are regarded as the primary user group of the software. Research users are profiled similarly as in the Europeana study presented in section 3.2: students who need material for courses or to prepare presentations and exercises; teachers who are looking for certified information, and the possibility of exporting information of courses or research work and expert researchers who explore all the possible sources, annotate and use them thoroughly and want access to the largest possible amount of content. No specific discipline is defined.

A researcher user has some kind of academic background, and his/her research interest is related to television and/or radio programs. The user can be a freshman student or an already experienced professional researcher. The main interest of the researcher is searching, browsing and viewing the archived radio and television programs. When viewing the programs, the researcher needs to take notes about the program. Often researcher want to use their own laptops for taking notes, and this is also necessary if the researchers want to take notes with them, because there is no possibility to access

notes created inside the system outside the viewing stations. This will be possible after the Internet release, but the access to the VOD files will be blocked in the Internet use. The My Desktop tool, which is meant to be the main tool for taking notes, makes it possible to share notes with other users through shared folders inside the tool. However creating notes is blocked in those viewing stations where there is also access to digital collections of the University of Helsinki. Some libraries have an extra viewing station for Radio and Television Metadata Management System only, but in general taking notes with a laptop is recommended.

4.3 Selecting the tasks for the test

In this section, subjective qualitative methods of self-reflection will be described. It must be mentioned that some requirements for improvements for the Media Management System had been proposed earlier in the beginning of 2013. These requirements were gathered from the employees of the RTVA staff. It soon became clear that it is hard to maintain the integrity of the usability test of the software by the people who have been so deeply involved in the development that it affected the structure of the test tasks. Some of the questions were suggestive and some of the tasks were hard to understand, if one had no prior experience of the software. It was necessary to reformulate the questions with someone who was not yet so involved in the software. Fortunately, the questions were evaluated by a colleague who did not know the system but was interested in it. With this feedback, it was possible to process the questions to some extent by giving clearer and more understandable goals for the tasks, and by highlighting the fact that that it was not the correct answer that we were looking for but the process of using the system itself and the user experience of the system.

The job-specific questions in the task questionnaire were designed to gather the following types of information:

- How clear and understandable are the functions of the system?
- How well system meet any expectations?
- How would the user like the system to be improved?

The test was divided into six parts. These parts examined certain areas of functionality of the software. The first part was about advanced search, the second part was about browsing the electronic program guide (EPG), the third was about simple program

search and a program info view, the fourth was about functionalities in the My Desktop, the fifth was about browsing the channels and the sixth was about the playback of the programs. The focus of the test was on the most likely used functions of the research-student users. Selection of the "most-likely functions" was arbitrarily made by me. the questionnaire is presented in Appendix 1.

The second part of the usability test was a theme interview, where the questions were open-ended, contrary to the task-based interview. This section was meant more for researchers. Unfortunately, the theme interview was not conducted properly. Only one participant attended also the theme interview. Thus, the theme interview was left out from this research.

4.4   Preparations

Before the tests, it was necessary to select the right equipment and software. The aim was to get as much documentation as possible. A video camera was needed for capturing the test session. Screen capture software was also needed for capturing all the activities of the participants. A separate audio recorder was also important, because the microphone on the camera was very poor. Finally, facility for the actual test was needed

The first three interviews were captured with a Panasonic MiniDV camera, and the last two were captured with a Nokia smartphone (E7). It was much easier to exploit the video captured from the smart phone, because transferring MiniDV tapes to computer was unnecessarily laborious. Using the smartphone was also convenient, because it was not necessary to set up a separate video recording device. Joby Gorillapod was used as tripod. This setup worked quite well, but there was one setback. During the last interview, somebody called to the phone that was capturing the video, which interrupted the interview and some of the video was lost. So if smartphones are going to be used in any kind of documentation, it would be good to make sure no calls will reach the phone by removing the SIM card or using some other technique such as the airplane mode to block incoming calls.

A proper screen capture software was needed. Open source alternatives such as CamStudio (http://camstudio.org/ were tested, but these were too unstable for recording more than 10-20 minutes. Software had to be able to record at least two hours

of screen activity. On the commercial side there is highly acclaimed usability testing software Morae from Techsmith, but it was too high-end. However other software from Techsmith, called Snagit 11, seemed suitable: simple, stable and not too expensive screen capture software. After some testing, Snagit was accepted for the usability test screen capture solution.

The environment for the test also had to be prepared. Creating the test user for Windows 7 operating system was needed, because my personal work computer was used in the tests. The physical environment for the test was the multifunction room in my workplace.

After the tests, the collected audiovisual documentation was edited as one video. The video which recorded the testing progress of the test was put side-by-side and synchronized with the screen capture video. The audio recorded with a separate recorder was also syncronized with the videos. (see the screen capture of the final result in figure 6). The Adobe Premiere Pro CS6 software was used for editing purposes. The resulting videos were deleted after they were studied and transcribed.
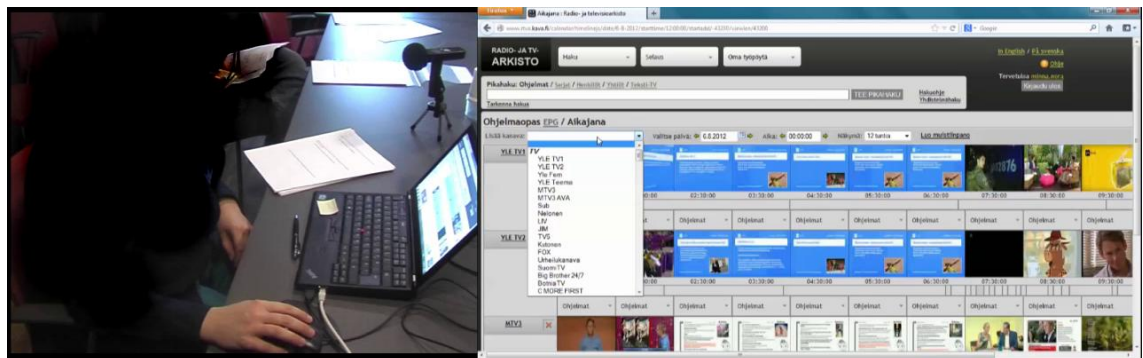

Figure 7. Screen capture of the split-screen video research (participant blurred)

The technical preparations for the Radio and Television database user experience research are summarized below:

- Video camera for recording the testing process
- Screen capture software for capturing the action on screen
- A proper audio recorder

- Creating the test user to the Windows 7 operating system
- Facilities for the test
- Editing computer and software for compiling the audiovisual material together

4.5   Participants

The participants of the usability test were recruited in various ways. Recruitment began in the autumn of 2012, because the original plan was to conduct interviews in autumn 2012. The recruitment advert was on display in the KAVI library. The study participants were promised a fee of 50 euros an hour. Work pressure pushed the interviews into spring 2013. The advert about participating in the usability test in the library was not very helpful; only one participant was recruited with the advert. Two participants were recruited by a colleague, and one of the participants came by a recommendation from another participant. Common to all the participants was the interest in radio and television research (mostly in television research). Before the test, each participant was asked to fill in a form of background information and a personal skills evaluation form (Appendix 2). Also the consent form for video documentation was required to be signed before the test (Appendix 3).

The test participants were four women and one man. The respondents' backgrounds were quite different; the age range was from 29 to 54 and all had different educational backgrounds (see table 2).

Table 2.   Background of the participants.

Participant	Age	Gender	Education background
A	30	Female	Academic Degree
B	48	Female	Academic Degree
C	36	Male	Academic Degree
D	54	Female	Further education
E	29	Female	Academic Degree

On the basis of the background information of the self-assessment form all considered themselves good users of the computer and information seekers on the Internet, with an average score of more than 4 (on a scale of 1 to 5). The next strongest areas were skills related to searching the archives and television cultural knowledge, both scored equal to 3. The median score of the question concerning the knowledge of the archiving profession was 2, and the median score of the radio-related issues, as well as television technology issue were less than 2. This gives the profile of a group of participants who were accustomed to the computer and Internet and who were also familiar with television culture, but do not know the culture of the radio and the radio or television broadcasting technology. The male participant was different from the profile, because he was the only one who gave a score for the radio culture and the radio and television broadcasting technology questions 3 or 4. His responses were interesting to follow in relation to the other participant responses in the test. The others were from more humanistic disciplines, while the male student studied engineering sciences.
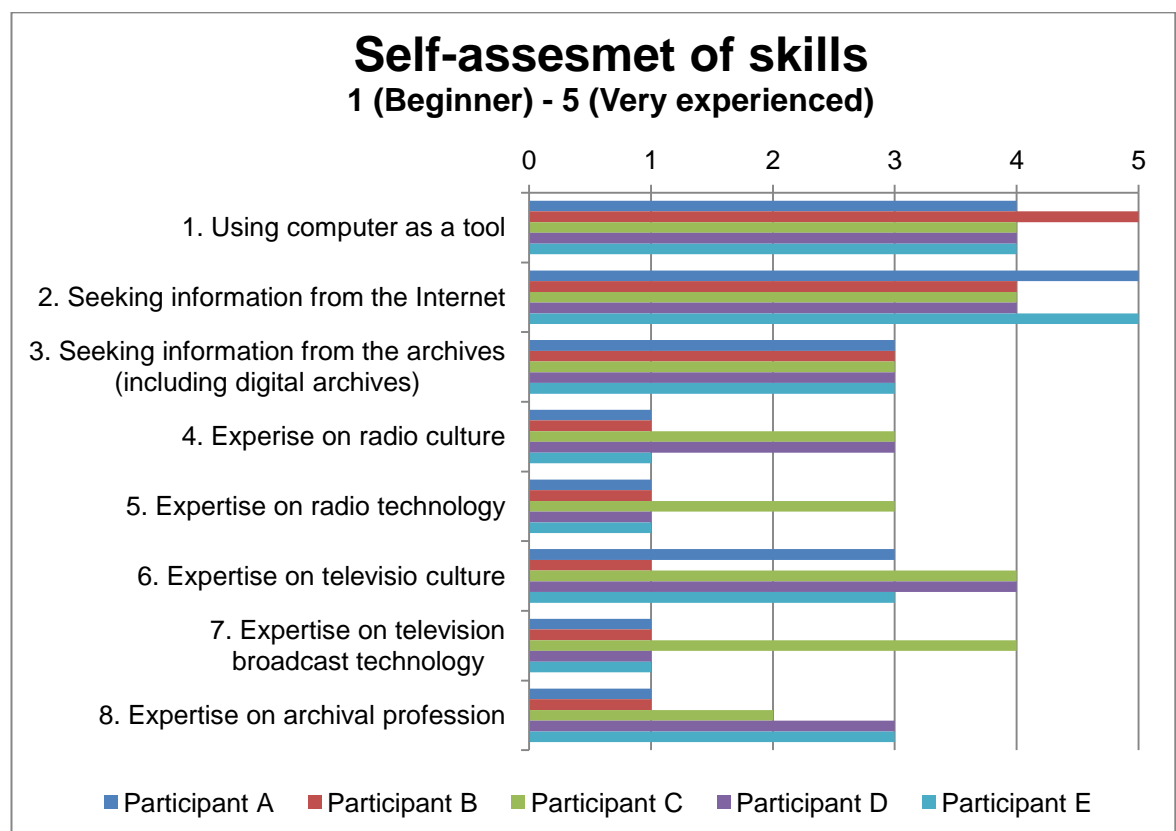
Figure 8. Self-assessment of skills of the participants.

This study showed, that it is important to gather and analyze the background data of the participants, because this can give new perspectives for analyzing the test results.

5   Analysis of the test

The test was conducted in rather informal style. Activity of the free exchange of views took place during the test with me and the participants. Specific questions during the test were asked and the participants were free to comment on the system and to give suggestions for system connection. All the conversations was recorded for further analysis.

In figure 8 the test persons are referred to by letters A, B, C, D, and E. Same letters are used in the analysis of the test. Letter (or letters) in brackets refers to a particular person (or persons, if more than one).

5.1   Task 1 (Advanced search)

The system's first task which focused on the advanced search gave all participants the most difficulties. Forming the search query with drop-down menu fields would take time, and the use of logical operators felt uncomfortable even though all the participants had much previous experience of other similar services. There is an example of the interface of the advanced search in figure 8. No one completely accomplished the tasks related to advanced search.

Figure 9. Screen capture of the RTVA-software's advanced search page.

Following list is compiled from the answers and comments of the respondents during the task. Many comments were gathered, partly because this was the first and the most difficult of the tasks.

Assembled comments:

- The purpose of the search string field above the drop-down fields was unclear. The tests indicated that the search query was easily written directly to the search string field, though the aim was to form the query through drop down fields.
  - No separate search string field should be visible to a user in advanced search (A, B, C)
  - The search string field could be moved to the bottom, so it would not be so easily confused with a quick search (B)
  - Writing directly to the search string field should be prevented, if the purpose is to use only the drop-down menus (C)
- Creating the time span of the query (i.e. limiting the dates to 1.1.2010 - 1.2.2010) with the drop-down menu fields *broadcasted before* / *broadcasted after* proved to be difficult to pin down. Almost every participant needed guidance from the test supervisor.
  - There should be separate fields apart from the drop-down menus for the time span query (*broadcasted before* / *broadcasted after*) (A, C, D),
  - Different broadcasted fields gets easily mixed up in the drop-down menu (C, D) (see figure 9 below).
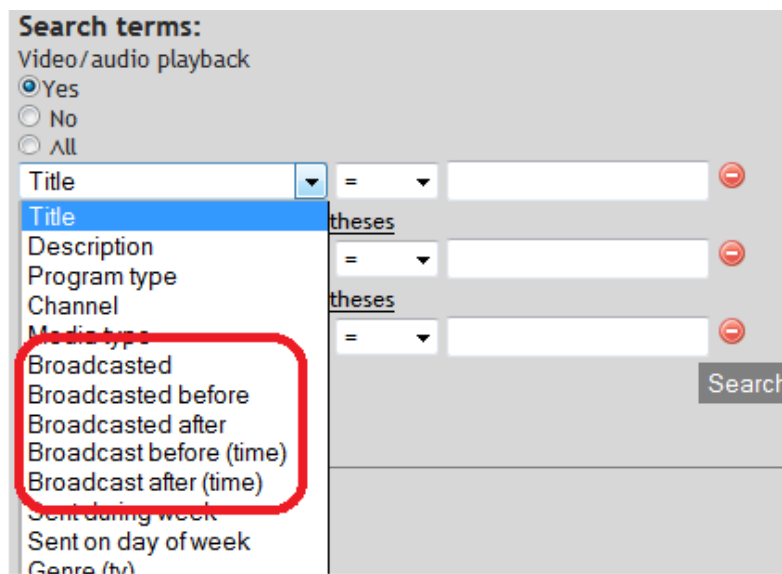

Figure 10.   Screen capture of the RTVA-software's drop-down menu.

- Once submitted, one should be able to edit the search afterwards. One is able to filter the results further through the *Refine search* menu, but in the tests almost everyone hoped to go back to the original search query for fixing the parameters, rather than refining the search more. One can see the search query in the search field, and one can edit it, but it was proved to be too difficult to grasp for most users. If one wants to make some changes to the search query, the entire query has to be built from scratch.
    - o Users should be able to fix the recently made query in the Advanced search, but now the search fields are cleared automatically when a search is done. (A, B, D)
- When a user wants to go back to the search results after looking more closely at one separate program from the results, it is unclear how it can be done. The browser's "back button" works in the desired way and searches are also stored at the right side of the user interface, but almost all the participants wanted separate "go back to search results" link. (A, B, E).
- One participant wished that there were separate links to the previous screen and also to the bottom of the page (E).
- Instructions of the Advanced search functions should in general be more clearly present in the interface. Very few people looked in any way at the written instructions although this was specifically mentioned to the participant. (A)
    - o Usage of the Help page should be clearer. It is unclear now, for example, how to exit the Help page (D).
- A link to advanced search should be in general better displayed at the front page of the system, for example with a larger font (C, E)
- Usage of the drop-down menu in the advanced search was unclear. The default was the program Title field (see figure 8) and there was no indication or reference that there were more fields in the drop-down list. Field selection of the drop-down list was also confusing; the system did not tell one that the field was now selected (except that it is visible). Further guidance for field use was seen necessary, or it should be implemented more clearly.
    - o The user needs to get more information about the usage of the drop-down list (D).
    - o Differences between the fields are not clear enough. There should be more explanation when to use different fields, like the description field, the genre field and type of TV-program field (E)

     o   There could be more fields, such as the year of production and the pro-
duction country (E).

5.2   Task 2 (EPG)

Another task was related to the EPG view (see figure 10) and timeline view (see figure 11). The assignment was somewhat confusing for the participants. The tasks were written so that specific week to be explored was mentioned. The purpose of the task was to explore the week programs for one day at a time, but the task was written so that it could be easily misunderstood, so that all the days of the week should be explored simultaneously in one view. This had to be explained to each participant. However, I decided not to change the written form of the assignment after two tests, when I realized the problem. Altering the written form of the task for the rest of the participants would have put the test results in a different position, and comparing them would have been more difficult. In general, the EPG view was preferred and the timeline view was difficult to understand. Adding and deleting channels in the EPG view seemed a little awkward. However the participants succeeded in carrying out their tasks and the idea of the views was clear.
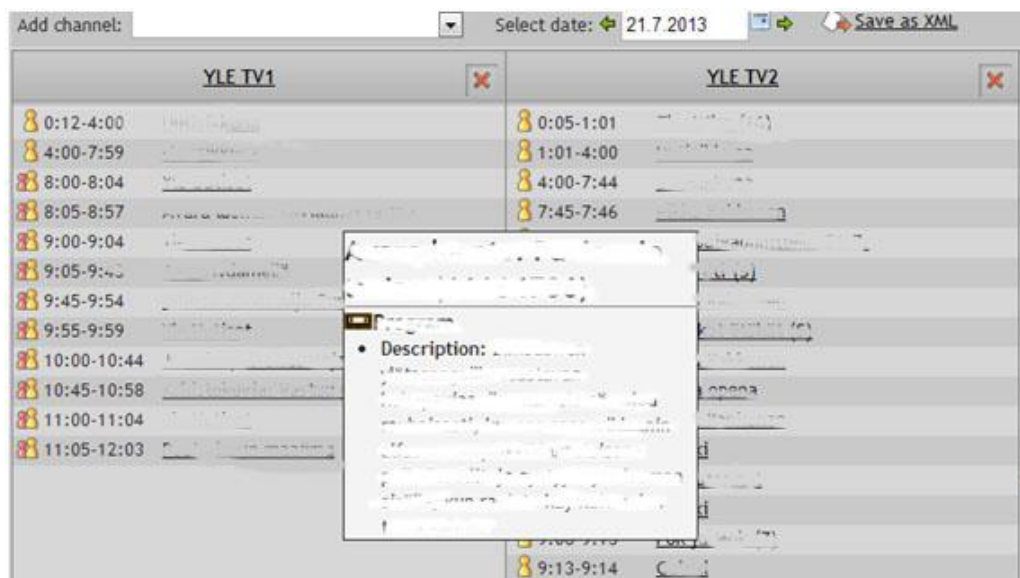
Figure 11.   Screen capture of the EPG view

An example of the floating layer containing the program information hovering above the timeline is seen in figure 11. It is related to the timeline above, not below, although it is

situated more closely to the timeline below. Understandably, a user can get confused in interpreting the view.

Figure 12.   Screen capture of the Timeline view.

Following list is compiled from the answers and comments of the respondents during the task. There were not so many comments.

Assembled comments:
- Instructions of the EPG view should be more visible. (A)
- Purpose of the Timeline view remains unclear (A)
- The floating layer consisting of program information in the timeline was disturbing for some of the participants. Layer covers part of the timeline and it is hard to figure out where it did belong, to the upper timeline or to the lower timeline.
  - There should be clearer reference about the program information layer and the channel it belongs to (B).
  - There should be a direct link to VOD file in the floating layer. (E)
  - The floating layer should be over the timeline rather than below. (E)
- The floating layer in the EPG, which includes the Finnpanel rating data of the program, was slow to appear. (B)
- There should be limits in the calendar of the timeline view and the EPG view, so that the user could not set the dates too far to the past or to the future. (C)
- Adding channels to the EPG view felt a little awkward:
  - When channels are being added to the EPG view, it would be more understandable for the user that the added channels would always fall on the left side, rather than the default order of the channels now, because

the user does not necessarily understand that there is a fixed order of the channels in the EPG view. (C)

- o The system does not explicitly tell that the user has successfully added a new channel to the EPG view. Sometimes this can be left unnoted, especially if there are several channels already in the view. (C)

- There should be more visual ways to adjust the timeline view's time frame, such as there are in the non-linear video editing software like Adobe Premiere. This means that timelines should be able to arrange by dragging them with mouse (C)

- It is not clear enough that the views can be switched in the interface header links (Electronic Program Guide EPG / Timeline, see figure 13 below). (D)

Program Guide EPG / Timeline

Figure 13.   Switch between EPG view and the Timeline view

- The EPG view is such a familiar way of expressing information about the daily programme of the channels that there should be a direct link to the EPG view from the home page. (E)

5.3   Task 3 (Single program view)

This task was considerably easier than the previous task for the participants, probably because finding a single program resembles a basic book or article search in the library database software, and every participant seemed to have at least some experience of it. All the participants performed the task well. Participants mostly paid attention to the way in which the information was displayed in the single program view. See an example of the singe program view in figure 13.
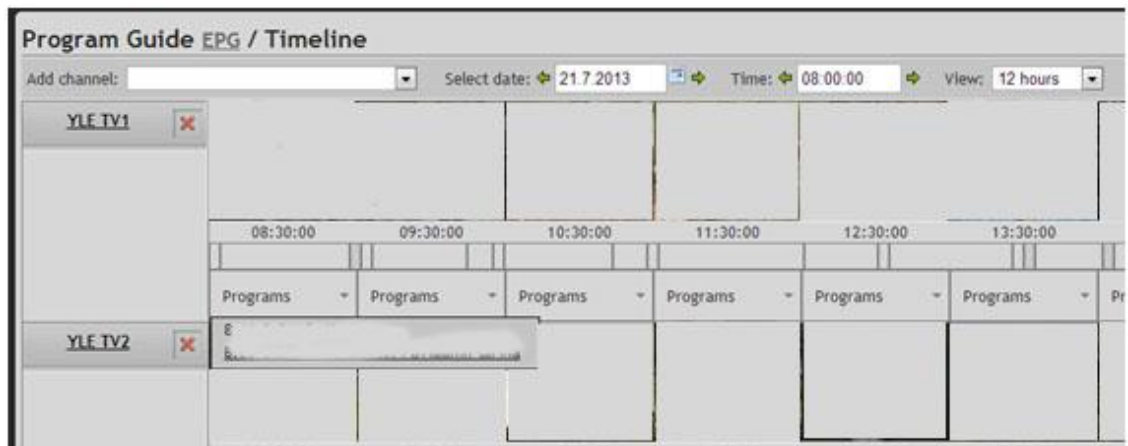
Figure 14.   Single program view.

Following list is compiled from the answers and comments of the respondents during the task. This task presented no serious problems, so there were not so many comments.

Assembled comments:

- There was no specific movie-search in the system, but it can be circumvented by using the genre of choice. (A)
    - There was a wish that there would be a more obvious difference between movies and other programs. (E)
- The difference between program information fields and data sources is unclear. (A)
    - There should be a floating layer for example on mouse-over (like in the EPG view) which would tell the source of the information. (A)
    - Source information could also be in a parenthesis after the field name (A)
- All the different names of the program should be in the same field in a row, as they are in keywords. (A)
    - Additional names could be hidden by default (C, D)

5.4   Task 4 (My desktop)

Use of the My Desktop function of the software was easy to comprehend by the participants. The location of the function is in the upper level navigation (see figure 14).
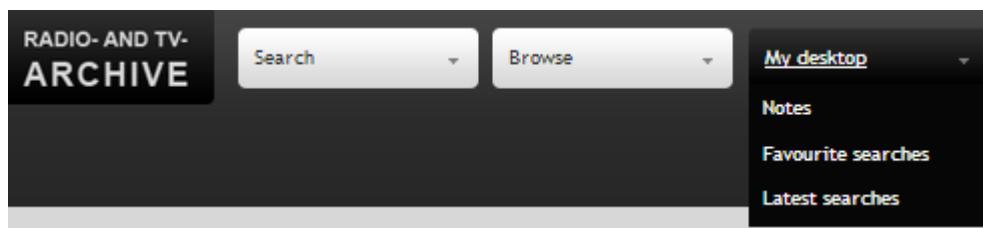
Figure 15.   Location of the link to the software's My Desktop.

Creating notes and folders to the My Desktop seemed obvious to all. The My Desktop view was generally very well received by the participants (see a general view of the My Desktop in figure 15). Suggestions were mostly related to the terminology used in the desktop: the very term "Desktop" was confused with the Windows operating system's desktop. Also, the fact that the notes that had been saved into software's Desktop, cannot be saved anywhere outside the system was confusing. A possibility to create a note concerning a certain video or audio clip was considered important.

Figure 16.   My Desktop view

Following list is compiled from the answers and comments of the respondents during the task. This task presented no serious problems, so there were not so many comments.

Assembled comments:

- Search from the notes of the Desktop will not be applied to folders made in the desktop (A)
- Titling of the Desktop view was not clear
  - My Desktop drop-down menu links "My Desktop" and "Notes" - links lead to the same main view (the other is useless) (A, E)
  - The main page's title "Notes" will not change when navigating to "Favourite searches" and "Recent searches" links. The relation between links and page titles remains unclear (A).
  - Options for the term "My Desktop": My Account or My searches.
- It would be good if one could sort notes by dragging with a mouse (B).
- The user does not necessarily notice that the saved notes will go into the folder named "default" by default. (B, E),
- The function for saving search results into My Desktop was difficult to find (B)
  - "Save the search to your desktop" - link could be at the top of the links seen at the right side of the interface or highlighted more in some other way (bigger font, etc.), (B, C, E)
  - There was inconsistency between the elements highlighted in the search results page, now the search query in bold distracts from the "Save the search to your desktop" –link. (B)
  - In the EPG view, the link is named differently (Create a note), the same term for the same function should be used consistently ("Save the search to your desktop" or "Create a note") (B, C, E)
  - The function which creates a note from the EPG view is not clear. There is uncertainty in what the note actually refers to (D).
- It would be good to be able to save notes outside the Desktop, otherwise the usage of the desktop function is not particularly useful, and the user will prefer taking notes with his/her own portable machine. (B, C, E),
  - Notes should be saved as an editable text file (E).
- The term My desktop was mixed with the computer's desktop (E)
- Account management and My Desktop should be combined (E).
- When making a note about search results or the EPG view, it would be better if the view would not jump into My Desktop view, but would remain in the place where the note was made (E).

5.5   Task 5 (Channel listing)

This task was effortless for the participants. Most participants mentioned a need for a more visual look. For example the use of the channel logos in the channel list was mentioned repeatedly (see figure 15). The single channel view was also considered a bit messy (see figure 16).

Figure 17.   Screen capture of the channel listing

The user can switch the channel listing view into television channels, radio channels and all channels, as seen in the upper right-hand corner in figure 17.

Figure 17 shows that the view presents redundant information in separate fields in a similar way as in the single program view.

Figure 18.   Single channel view.

Following list is compiled from the answers and comments of the respondents during the task. This task was also easy, so there were not so many comments.

Assembled comments:

- There was unclarity of the sources of fields in the single channel view, as was in the single program view (A).
  - Source of the data could appear in a layer when one puts one's mouse cursor over the name of the field (A).
- Fields with the same name could be hidden by default, and they can open by clicking the name of the field (A)
- Expressing the various comments and information about errors in the files could be clearer and neater (A).
- Channel logos were hoped to be in use in the software (B, E).
- Selection of the TV and radio channels could be emphasized more (C).
- There should be a "return browsing the channels" -link or equivalent in the single channel view (D).

5.6   Task 6 (Playing the VOD files)

The task concerning the use of the radio and television program VOD files with the VLC client (see example of the VOD playback in figure 18) brought information about

the user's needs from the client functionality and interface. The very basic functionality, playback of the video and audio files, was there. On the other hand a very basic play-back control features were not as steady as hoped for (rewind, stop playing, monitoring the passage of time) and disfunctionality of the features caused frustration in users. Listening to a radio program was particularly difficult because of the lack of ability to follow the elapsed time from the timeline. There were no video thumbnails, so seeking from the audio file was very difficult. Also, understanding the playlist functionality was difficult. The program stream consisted of one hour files which were assembled linearly one after the other.
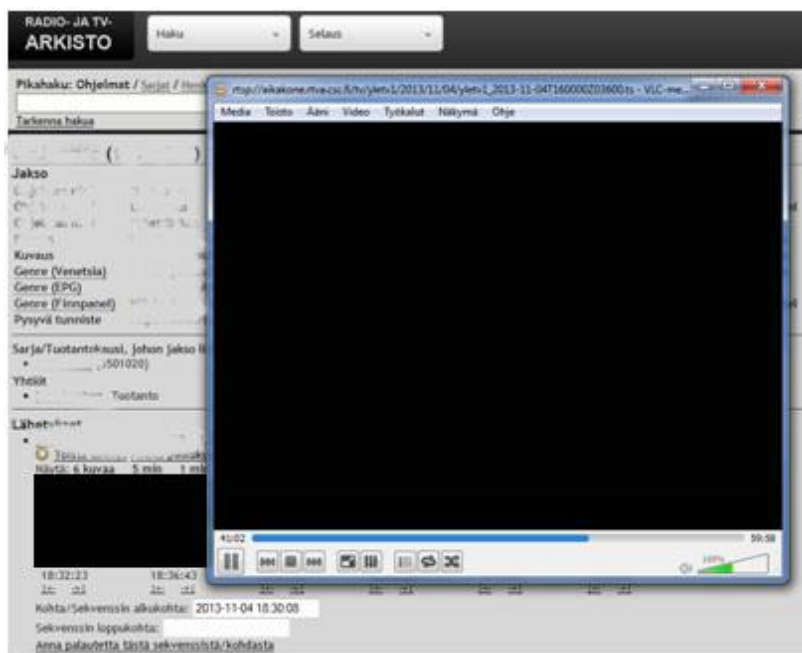
Figure 19.   Screen capture of the playback feature with VLC.

Following list is compiled from the answers and comments of the respondents during the task. This task presented problems, so there were more comments.

Assembled comments:

- Playback of the radio program was more difficult than the television program because there was no information about the position of the playback in the file. (A)
    - There is a need for the information about the position of the playback; now one cannot see the time moving at all during playback (A)

- o There is no way knowing when there is a quiet break in the program and when there is no sound on the file because of some kind of defect. (B)
- It would be better if the playback file could be limited only to the desired program instead of navigating through one hour files (A, E).
- The written instructions which describe the way of navigating the VOD files with keyboard shortcuts is easily ignored (B)
  - o The user can mistakenly use the chapter button for navigation; this will take the user to the next file and he/she will get lost in that way. It would be better if the chapter button was not displayed (C).
- Weaknesses in the player make it difficult or even impossible to make transcriptions of the programs (B).
- The playback client should be more stable in fast forwarding (C, E)
  - o The pause function and rewind functions are important for researchers in terms of observation, but now these do not work properly (a pause will always crash the player) (D)
  - o One should get past unnecessary parts of the file more easily (D).
- The time below the thumbnails can misguide the user, because one can mistakenly think that the time presented there is related to the duration of the file, not to the start time of the playback, which is the case (see figure 19) (C).

Figure 20.   Example of the thumbnails

- The play button (arrow button) could be more clearly on display, bigger (C).
- There should be a possibility to play the file anywhere the user wants to play it (C).

- There should be chapter marks in the file for more fluent fast forward, for example every minute (E).
- Subtitle selection should be clearer (E).

5.7 Evaluation of the found issues

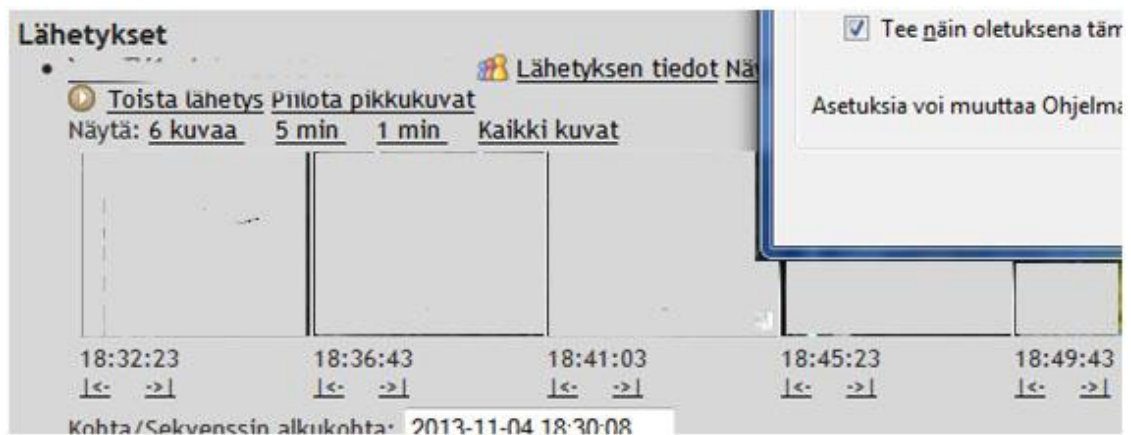In this section, the most relevant issues based on tests are listed. The evaluation criteria for making the recommendations have been:

1. Frequency of the issues
2. Evaluation of the severity of the issues by the development team.

Severity rating was adopted from Tulls and Albert (2008). They have suggested a simple three-level system which is adaptable in many different situations:

> *Low:* Any issue that annoys or frustrates participants but does not play a role in task failure. These are the types of issues that may lead someone off course, but he/she still recovers and completes the task. This issue may only reduce efficiency and/or satisfaction a small amount, if any.
>
> *Medium:* Any issue that contributes to but does not directly prevent task failure. Participants often develop workarounds to get to what they need. These issues have an impact on effectiveness and most likely efficiency and satisfaction.
>
> *High:* Any issue that directly leads to task failure. Basically, there is no way to encounter this issue and still complete the task. This type of issue has a significant impact on effectiveness, efficiency and satisfaction (Tulls and Albert 2008, p. 106)

A similarly defined three-level system will be used in this study and points are given accordingly: Low = 1, Medium = 2 and High = 3. This will be combined to frequency of issues reported by the participants. So the total scale of the severity of a certain issue will be with 5 participants 2 to 8. There is some debate about the usefulness of the severity rating made by the researcher, because there exist no real standards for it (Tulls and Albert 2008). A more useful way to evaluate severity would be asking the opinion of the severity of the issue from the users. It would also be more true to the nature of the user experience and getting the users involved in the development process.

It should be noted that recommendations concerning the development of the streaming features will depend on the streaming technology which presents specific technical

constraints which are not discussed in this study. However it is considered a high priority development target in our development team, so issues concerning the playback are put on top of the development regardless of the analysis. Tables 3, 4, 5, 6 and 7 present the found issues with severity ratings. Table 3 shows the issues found in task 1. The most severe issues found in Advanced search were related to creating the time span of the query and improvement on returning the previous page or query.

Table 3.   Issues found in task 1 (Advanced search).

Issues found in task 1 (Advanced search)	Number of participants	Severity level	Total
Search String field: No separate search string field should be visible to user in advanced search	3	1	4
Search String field: Search string field should be moved to the bottom	1	1	2
Search String field: Writing directly to the search string field should be prevented	1	1	2
Creating the time span of the query: Separate fields for time span –query (broadcasted before / broadcasted after)	3	2	5
Creating the time span of the query: Different broadcasted –fields gets easily mixed up in the drop-down –menu	2	2	4
User should be able to fix the recently made query in the Advanced search	3	2	5
Separate button or link for returning to search results after looking one of the results	3	1	4
Separate links to the previous screen and also to the bottom of the page	1	1	2
Usability of the Help page is not good; users cannot find exit from the Help page.	1	2	3
Instructions of the Advanced search functions should in general be more clearly present in the interface.	1	2	3
Link to advanced search should be in general better displayed at the front page of the system, for example with larger font	2	1	3
User needs to get more information about the usage of the drop-down list	1	2	3
There should be more explanation how to use different fields, like the description field, the genre field, type of TV-program field, etc.	1	2	3
There could be more fields, such as the year of production and the production country	1	1	2
Total number of issues: 14	**Mean value of total severity: 3,21**		

Table 4 shows issues found in task 2. The issues found in EPG and the timeline view were not regarded so severe as in other tasks. None of the issues were found by two different participants

Table 4.　　　Issues found in task 2 (EPG and Timeline views)

Issues found in Task 2 (EPG and Timeline views)	Number of participants	Severity level	Total
Instructions of the EPG view should be more visible.	1	1	2
Purpose of the Timeline view remains unclear.	1	1	2
Timeline: There should be clearer reference about the floating program information layer and the channel it belongs to.	1	2	3
Timeline: There should be direct link to VOD file in the floating program information layer.	1	1	2
Timeline: Floating layer should be over the timeline rather than below.	1	1	2
Floating layer in the EPG, which in holds the Finnpanel rating data of the program, was slow to appear.	1	1	2
There should be limits in the calendar of the timeline view and the EPG view, so that user could not set the dates too far to the past or to the future.	1	2	3
Adding channels to EPG: o When channels are being added to the EPG view, it would be clearer that the added channels would always fall on the left side.	1	1	2
Adding channels to EPG: System should explicitly tell that user has successfully added new channel to the EPG view.	1	1	2
There should be more visual ways to adjust the time-line view's time frame, such as there are in the non-linear video editing software like Adobe Premiere.	1	1	2
It is not clear enough, that the views can be switched in the interface header links	1	1	2
EPG view is so familiar way of expressing information about the daily programme of the channels, that there should be a direct link to the EPG view from the home page.	1	1	2
Total number of issues: 12	**Mean value of total severity: 2,17**		

Table 5 shows issues listed in task 3. There were least issues in the single program view related task. None of the issues were found by two different participants.

Table 5.   Issues found in Task 3 (Single program view)

Issues found in Task 3 (Single program view)	Number of participants	Severity level	Total
There is no specific movie-search in the system.	1	1	2
There should be more obvious difference between movies and other programs.	1	1	2
The difference between program information fields and data sources is unclear.	1	2	3
There should be floating layer for example on mouse-over (like in the EPG view) which would tell the source of the information.	1	1	2
Source information could be in a parenthesis after the field name	1	1	2
All the different names of the program should be in the same field in a row, as they are in keywords.	1	1	2
Additional names could be hidden by default .	1	2	3
Total number of issues: 7	**Mean value of total severity: 2,29**		

Also in task 4 there were no serious issues, as table 6 shows. The most severe issue found in the My Desktop related task was related to saving notes for the user. This is impossible at the viewing stations at the libraries, but will be possible when the system is released on the Internet. The terminology used in this functionality was confusing for the participants. This can be explained by the fact that the whole metaphor used here is false.

Table 6.   Issues found in Task 4 (My Desktop**)**

Issues found in Task 4 (My Desktop)	Number of participants	Severity level	Total
Search from the notes of the Desktop cannot be applied to folders made in desktop.	1	1	2
Titling of the Desktop-view: My Desktop drop-down menu links "My Desktop" and "Notes" - links leads to the same main view	2	2	4
Titling of the Desktop-view: The relation between the navigation links on the left side of the screen and page titles remains unclear.	1	2	3
Sorting notes by dragging with mouse	1	1	2
User does not necessarily notice that the saved notes will go to the folder named "default" by default.	2	1	3
Function for saving search results into My Desktop was difficult to find	1	1	2
"Save the search to your desktop" - link could be at the top of the links seen at the right side of the interface or highlighted more in some other way (bigger font, etc.)	3	2	5
Imbalance between the elements highlighted in the search results page, now the search query in bold distracts from the "Save the search to your desktop" –link	1	1	2
In the EPG view, the link is named differently (Create a note), the same term for the same function should be used consistently ("Save the search to your desktop" or "Create note").	3	2	5
Function, which creates note from the EPG view, is not clear. There is uncertainty in what does the note actually refers	1	1	2
It would be good to be able to save notes to the user, otherwise the usage of the desktop function is not particularly useful, and the user will prefer taking notes to own portable machine.	3	3	6
Notes could be saves as an editable text file.	1	2	3
The term My desktop gets mixed in computer's desktop	1	1	2
Account management and My Desktop should be combined	1	1	2
When making a note about search results or the EPG view, it would be better if the view does not jump to My Desktop -view, but would remain in the place where the note was made.	1	2	3
Total number of issues: 15	**Mean value of total severity: 3,07**		

The channel listing view related task was done quite fast, there was no great interest in the functionality. There were hopes for visual elements such as channel logos. Table 7 shows that also in this task there were no serious issues.

Table 7.   Issues found in Task 5 (Channel listing)

Issues found in Task 5 (Channel listing)	Number of participants	Severity level	Total
There is unclarity of the sources of fields in the single channel view, as was in the single program view	1	2	3
Source of the data could appear in a layer when you put your mouse cursor over the name of the field	1	1	2
Fields with the same name could be hidden by default, and they can open by clicking the name of the field	1	2	3
Expressing the various comments and information about errors in the files could be the clearer and neater	1	1	2
Channel logos are wished to be in use in the software	2	1	3
Selection of the TV and radio channels could be emphasized more	1	1	2
There should be "return browsing the channels" -link or equivalent in the single channel view.	1	2	3
Total number of issues: 7	**Mean value of total severity: 2,57**		

The final task concerning the playback of the VOD files was the most problematic area of the software. Even the most basic functions like pausing the playback and seeking within the file mostly fails. These issues are known to the team. Table 8 lists the found issues.

Table 8.   Issues found in Task 6 (Playing the VOD files)

Issues found in Task 6 (Playing the VOD files)	Number of participants	Severity level	Total
Playback of the radio program is more difficult than the television program be-cause there is no information about the position of the playback in the file.	1	3	4
There is need for the information about the position of the playback; now one cannot see the time moving at all during playback	1	3	4
There is no way knowing when there is a quiet break in the program and when there is no sound on the file because of some kind of defect.	1	3	4
It would be better if the playback file could be limited only to the desired program instead of navigating through one hour files	2	2	4
The written instructions which describes the way of navigating the VOD files with keyboard shortcuts is easily ignored	1	1	2
User can mistakenly use the chapter button for naviga-tion; this will take the user to the next file and gets lost in that way. It would be better if the chapter button is not displayed	1	3	4
Weaknesses in the player make it difficult or even im-possible to make transcrip-tions of the programs.	1	3	4
The playback client should be more stable in fast for-warding	2	3	5
The pause function and rewind functions are important for researchers in terms of observation, now these does not work properly (pause will crash the player always)	1	3	4
One should get past unnecessary parts of the file more easily	1	2	3
Time below the thumbnails can fool the user, because one can mistakenly think that the time presented there is related to duration of the file, not in the start time of the playback, which is the case	1	2	3
The play button (arrow button) could be more clearly on display, bigger	1	1	2
There should be possibility to play the file anywhere user wants to play it	1	2	3
There should be chapter marks in the file for more fluent fast forward, for exam-ple every minute	1	2	3
Subtitle selection should be more clearer	1	2	3
Total number of issues: 15	**Mean value of total severity: 3,47**		

The total number of found issues and the severity when comparing the tasks is presented in table 9:

Table 9. Total number of issues and mean values of the severity ratings

	Number of issues	Mean value of total severity
Task 1	14	3,21
Task 2	12	2,17
Task 3	7	2,29
Task 4	15	3,07
Task 5	7	2,57
Task 6	15	3,47
Total	**70**	**2,80**

According to these, the most frequent number and severe issues were found on tasks 1, 6 and 4 (advanced search, playing the VOD files and My Desktop feature). The mean value of the total severity of all the other tasks was below average and there was no single issue above severity level 3. If task 6 is excluded, the issues with total severity value are 4 or above are from the tasks concerning advanced search and My Desktop. This is shown in table 10:

Table 10.   Issues sorted by the severity after evaluation of the results.

	Number of participants	Severity level	Total
Advanced Search			
Creating the time span of the query: Separate fields for time span –query (broadcasted before / broad-casted after)	3	2	5
User should be able to fix the recently made query in the Advanced search	3	2	5
Search String field: No separate search string field should be visible to user in advanced search	3	1	4
Creating the time span of the query: Different broad-casted –fields gets easily mixed up in the drop-down –menu	2	2	4
Separate button or link for returning to search results after looking one of the results	3	1	4
My Desktop			
It would be good to be able to save notes to the user, otherwise the usage of the desktop function is not particularly useful, and the user will prefer taking notes to own portable machine.	3	3	6
"Save the search to your desktop" - link could be at the top of the links seen at the right side of the inter-face or highlighted more in some other way (bigger font, etc.)	3	2	5
In the EPG view, the link is named differently (Create a note), the same term for the same function should be used consistently ("Save the search to your desktop" or "Create note").	3	2	5
Titling of the Desktop-view: My Desktop drop-down menu links "My Desktop" and "Notes" - links leads to the same main view	2	2	4

5.8   Recommendations for further development based on evaluation

Based on the analysis of the test results and severity ratings, the following issues are recommended for further development. The issues concerning the playback are considered a high priority. Recommendations are divided into high priority development recommendations and medium level recommendations. Although the issues concerning the Advanced search got high points in severity ratings, they are put into the class of medium level development recommendations based on the research discussed in

chapter 3: users prefer browsing instead of advanced search, so features such as making notes are more important than complex search features.

High priority development recommendations include the following:

Playback of the VODs
These were seen as the most important issues concerning the VOD playback.

- For listening to the radio programs, it would be necessary to have more elements for navigation, such as a possibility to follow the elapsed time of the program or the visual monitoring of voice and music.
- Fast forward and pause functions should be better.
- On the whole the possibility to control the VOD file is poor and controlling the one hour length streaming files is considered difficult.

My desktop
These were seen as the most important issues concerning My Desktop function.

- The user should have more access to notes saved into My Desktop in some way (right now the user has no access to the notes because of the high-level security requirements)
- There are problems in finding the function which saves the search results into My Desktop. The link should be made visible more clearly.
- Relevant terminology should be aligned (Is it Save to your desktop or Create a note?).
- The titling of the My Desktop interface is not clear and needs re- structuring (eg, My desktop link and Notes link are basically the same function).
- Problems with the metaphor in general, revision of the meaning of the function should be made.

Medium level development recommendations include the following

Advanced search:
These were seen as the most important issues concerning Advanced search function.

- No separate search string field should be visible to the user in addition to the search fields and the operators, even if its purpose is to clarify the construction of one's search.
- Creating the time span of the query should be easier, for example giving separate fields for start and end time times in addition to the drop down fields.
- The filled fields in advanced search should not be emptied automatically after performing the search; the search string should be editable in the advanced search interface after the search.
- In general, there should be more visible guidance and instructions for formulating the search string.

EPG and timeline views

These were seen as the most important issues concerning EPG and timeline functions.

- The present layout of the program information at the timeline was considered difficult. It was proposed that the program information should hover on top of the thumbnails of the channel which program information refers to.
- There should be a link to EPG view on the front page, because it is such as familiar way of expressing information about daily programs.

Single program view:

These were seen as the most important issues concerning single program view.

- Presenting the information from various sources more logically
- Hiding the redundant, repeating fields with the same information
- Link to the previous screen

Channel view:

These were seen as the most important issues concerning channel view.

- Presenting the information from various sources more logically
- Channel logos into the list.

6   Analysis of the test results

In this research, there were three questions to be answered:

1) How to evaluate the needs of the academic research?
2) How to implement such needs as usability improvements to the MMS?
3) What kind of information is needed, in what form and how?

Firstly, it should be noted that the playback features were also considered important, although all the participants did not commented on that. The VLC client performed so poorly, that it seemed that the participants did not feel any need to say all the faults aloud because of frustration. This part of the test was somewhat in vain because the issues were known already, but it was useful to get more information about the known issues and possibly get new perspectives solving the issues.

The task and the comments made by the participants can be placed mostly in the areas of scope plane, structure plane and skeleton plane, when considering Garret's (2011) categorization of user experience discussed in section 2.2. One notion can be made: the issues which can be put into the skeleton plane (the placement of buttons and controls)   were assessed as more severe than issues in the "higher" planes, such as the structure plane (Categories and information structure) and the scope plane (the way in which the various features and functions of the site fit together). This is logical because if the problem is in the base architecture of the software, it will be more difficult for a user to solve the problem.

The question concerning the need of academic research is partly answered. The profile of the users of the Radio and Television Metadata Management System is somewhat similar to users of the digital libraries in general, as was noted in chapter 3. Based on recent findings of the user preferences of the digital libraries, it can be noted that in fact researchers do not in general need very sophisticated tools for information retrieval. They tend to use a simple keyword search and then just simply browse the results. It may be that a virtual environment just makes evident the characteristics which have always been present in the physical information environment. This brings up the idea that the developments of complex information services are designed in a false belief of the actual user preferences. Users prefer browsing instead of an advanced search, so the features such as making notes should be promoted and developed more.

This research correlates the hypothesis in a way: that none of the participants could use the advanced search successfully; they leaned on simpler means for information retrieval whenever possible. When forced to use the advanced search, issues were bound to emerge. The whole function was found important in principle by the users when talking about it, but the participants' actions showed other attitudes. On the substance side, the participants wanted to get more segmented program information, for example a possibility to search movie genres. All the participants were also eager to use the My Desktop interface, and comments on that were easy to revive. They learned it fast, so the need for such a tool seems obvious. Researchers need efficient tools for storing and organizing the collected information for later use. However it seems evident that the metaphor used in the interface is wrong. This notion is supported by the comments about terminology and the suggestions about connecting the functions of the My Desktop to My Account.

There were also some notions about the interaction logic of the interface. Features such as drag and drop were hoped for, and the terminology of the similar functions was not always consistent, for example the notion about the links Save to your desktop vs Create note in the My Desktop task. Similar functions should be coherently named and implemented, and this relates also to following the trends in technology and changing user preferences. This requires more research in the future.

The prioritized issues will be implemented as improvements during the year 2014. Some of the issues of the VLC player will be fixed by embedding the player to the browser and by utilizing the time-related information from the software responsible for the streaming services. All the functions, which are needed for operating the VLC, will be put into the web browser. Hopefully, this will be ready for testing in April 2014. Improvements related to other parts of the software will be implemented first to the Internet release of the product. Because of the merging of the Finnish Centre for Media Education and Audiovisual Media and National Audiovisual Archive into a single organization called National Audiovisual Institute in the beginning of 2014, there were some changes in the public appearance of the web services. Thus, now at the same time, it is possible to make changes to the public appearance of the Media Management System and also in the interface based on the results of the user experience study. Work has already been started, and hopefully the release will be made during the spring of 2014.

However this test did not reveal any more detailed knowledge about what information was needed (question 3). It showed how the information was searched for from the database and how the participants would like to get access to it. However, it was understood by the participants that the Radio and Television Database can be used in many different disciplines, not just in the field of communication research or television and radio studies. It penetrates into and can be used in all the disciplines of science. What researchers seem to need is more possibilities for browsing a large database.

After the test I realized that it would have been helpful to add some kind of self-reported metric instrument to the test. In section 3.3, I discussed possible metrics which could be applied to measuring the user experience of the digital library software. The metric for this research would have been more self-evaluation to the tasks. Users could have rated themselves how important the found issues were and how severely they felt the issue would affect user experience. I find that these kinds of metrics would be helpful in prioritizing the found issues. These measurements would have also given more information about what uses the users find in this kind of database and what they expect from it. It would also be more in the spirit of user experience, to get more involvement and preferences from the users into the development process.

The approach would also help in answering question 2: the implementation of the actual needs as improvements to the database. In this user experience study, the researcher's point of view and interpretation is too dominant in the analysis of the results. During the analysis, it became clear that I could have more information about the needs and preferences of the users, if I had added more metrics and self-assessment to the research. For further user experience of the Radio and Television database, the tests should be designed so that after the tasks there should be self-reported assessment of the task, based on whatever evaluation is needed. For example, the metrics presented in section 3.3 will apply to the Radio and Television Media Management System. Elements of efficiency, effectiveness, satisfaction and learnability can be researched in many ways. The evolving factors of technology and changing user preferences should be also taken into account also, as discussed in chapter 3.

7 Conclusion

The focus of this study was in recognizing the actual needs of researchers and in the user experience of the Radio and Television Metadata Management System. Defining

the concepts of usability and user experience was needed. The meaning of user experience can vary as shown in section 2.2. However the user experience of the product was examined here. Usability test methods for collecting information about user experience were selected. The tests were recorded in various ways: video, audio and screen activity. A non-directed and formally open interviewing style was used during the tests, and the participants could comment freely.

The profile and needs of the users of the Radio and Television Metadata Management System was considered similar to the users of the digital libraries in general. Comparative user experience researches from the area of digital library software development were examined. Generally speaking, it seemed that researchers needed tools for simple searches with a browsing functionality. Developments of the complex information seeking services are not used very often. These kinds of tools are used by librarians and other professional information workers, who are often also making requirements for digital library software. The importance of the involvement of users seems to be highlighted more in recent studies. The findings of this research support these hypotheses. The participants could not use the advanced search successfully, but they preferred simple searches. Development should be prioritized so that the functionalities which are valued highly and used most by the users would be the main aspects of software development. Also the popular technological trends in similar products should be noted and their possible positive contribution to user experience should be evaluated.

In my opinion, user experience of the Radio and Television database has to be an ongoing process. Conducting the usability tests is not the only way for collecting information. After the web release of the product, surveys can be made. This study also showed the importance of participants' self-reported assessment of the tests. If self-assessment is not included in the tests, there is too much possibility for interpretation of the results. Changing technology trends and user preferences should be also observed constantly.

In my opinion this project was very productive and informative. It was well received by the organization. The project successfully brought forth issues relevant to users and new perspectives for the product. These were seen fruitful for further development process. The results of the user experience evaluation will be examined by the staff of KAVI involved in the development of the Media Management System. What improve-

ments will be made will be evaluated. These will be implemented into the interface which will be released on the Internet. Some features were added to the current release because they were useful also to the staff. Further user studies will be conducted.

As I had very little previous experience of making user experience evaluations, I learned very widely about the history, theory and practice of usability and user experience. The concepts of usability and user experience and their difference became clear to me. User experience in the digital library perspective was very useful to learn and I will keep myself updated for further studies in this area. Gathering experiences and theory from similar projects is important.

This work gave me new perspectives about making requirements for software interfaces. It also gave me more professional knowledge and skills for future work. This research was professionally useful for me and the organization where I work. As I am writing this thesis, I feel that I could do further work in the area of user experience development in digital libraries.

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Questionnare

Tehtävä 1.

Mene yhdistelmähakuun ja tee seuraavanlainen haku:

- kuvaukseen hakuehto "vaalit"
- rajaa hakua ajanjaksolle 1.3.2011 – 30.4.2011
- rajaa hakua koskemaan joko kanavaa YLE TV1 tai MTV3.

Tarkastele hakutuloksia. Lajittele hakua eri tavoin ja selaile hakua eteen- ja taaksepäin. Katso myös haun tilastoja.

Miten selkeäksi koet hakutuloksen käsittelyn ja selailun?

a) Vastasiko hakutoiminto odotuksiasi (kyllä / ei + jos ei, perustele miksi?)

b) Millainen olisi onnistunut haku, vastaa yhdellä tai kahdella lauseella:

c) Miten hyödyntäisit hakutuloksista saatavia tilastoja?

Tehtävä 2.

Tutki LIVin ja JIMin vuoden 2012 ohjelmistoa viikolla 32 (6.8.-12.8.2012) käyttäen EPG-näkymää päivä kerrallaan.

a) Miten selkeäksi koet liikkumisen EPG-näkymässä?

Vaihda näkymiä aikajanan ja EPG:n välillä ja tutki muutamia ohjelmia lähempää. Lisää EPG-näkymään kanavat MTV3 ja Nelonen.

b) Miten selkeäksi koet liikkumisen EPG-näkymän ja aikajanan välillä?

c) Jos mietit eroja aikajanan ja EPG-näkymän välillä, niin kumpaa käyttäisit mieluummin ja miksi?

Tehtävä 3.

<u>Hae elokuva</u> "Kulkurin valssi".

    a) Millä tavalla löysit elokuvan?

    b) Jos sinulla oli vaikeuksia löytää elokuvaa, kerro mitä?

<u>Tutki elokuvan tietoja.</u>

    c) Miten selkeäksi koet ohjelman tietojen näkymän?

    d) Saatko selville, kuinka monta lähetystä elokuvalla on?

    e) Millainen olisi mielestäsi onnistunut ohjelmanäkymä, jossa on useita lähetyksiä?

Tehtävä 4.

Mene Oma työpöytä –osioon.

Luo aiheelle ”liikenneonnettomuudet” kansio. Tee kansioon yksi muistiinpano aiheeseen liittyen.

a) Onnistuiko kansion ja muistiinpanon tekeminen hyvin? (kyllä/ei, jos ei, niin miksi ei)

Hae aiheeseen liittyvää materiaalia tietokannasta ja tallenna hakuja luomaasi kansioon.

b) Miten selkeäksi koet hakujen tallentamismahdollisuuden?

Valitse yksi päivä EPG-näkymään, tee näkymästä muistiinpano ja tallenna luotuun kansioon.

c) Miten selkeäksi koet EPG-näkymän tallennusmahdollisuuden?

d) Miten kehittäisit Oma työpöytä – toimintoa, jotta se vastaisi omia käyttötarpeita?

Tehtävä 5.

Selaile kanavia (Selaus – kanavat) TV –ja radiopuolelta.

    a) Onko kanavalistaus ja yksittäisen kanavan näkymät selkeitä (kyllä / ei, **j**os ei miksi ei)?

    b) Miten itse parantaisit kanavien selausta, vastaa yhdellä tai kahdella lauseella:

Tehtävä 6.

Katso ja selaa ulkomaankielistä TV-ohjelmaa YLE TV2:ltä (esim. 13.6.2012 22:16-23:06 Mistä tulen: Roger, sovinto Ruandassa?). Kokeile siirtyä edestakaisin ohjelmassa asiakasohjeissa luvussa 5 (Tallenteiden toistaminen VLC-soittimella) olevien neuvojen mukaisesti.

    a) Pystytkö mielestäsi liikkumaan tallenteessa riittävän hyvin? (kyllä / ei, jos ei, miksi:)

Kuuntele radio-ohjelmaa (esim. Aristoteleen kantapää, YLE Radio 1, (29.8.2012 17.20-17.45). Kokeile siirtyä edestakaisin ohjelmassa asiakasohjeissa luvussa 5 (Tallenteiden toistaminen VLC-soittimella) olevien neuvojen mukaisesti.

    b) Pystytkö mielestäsi liikkumaan tallenteessa riittävän hyvin? (kyllä / ei, jos ei miksi:)

    c) Millainen olisi mielestäsi ideaali TV- ja radiotallenteiden toisto-ohjelma?

Background form

Tervetuloa käytettävyystestaukseen!

Käytettävyystestauksen tarkoituksena on kerätä käyttäjien kokemuksia ja mielipiteitä testattavan järjestelmän käytöstä. Testissä etsimme ongelmallisia ja vähemmän ongelmallisia osa-alueita järjestelmän toiminnasta ja ominaisuuksista, emme testiin osallistuvista henkilöistä!

Käytettävyystestaus koostuu taustatietojen keruusta, kyselylomakkeesta ja varsinaisesta vuorovaikutteisesta käytettävyystestauksesta RTVA-hallintajärjestelmän kanssa.

Vastaa alla oleviin kysymyksiin parhaan kykysi mukaan. Kaikki vastaukset käsitellään anonyymisti, eikä niitä näe kuin käytettävyystestausta suorittavat ja testituloksia analysoivat järjestelmän kehittäjät. Vastauksia käytetään RTVA:n hallintajärjestelmän käytettävyyden kehittämiseen ja sitä kautta myös käytettävyystestaukseen liittyvään opinnäytetyöhön. Kaikki muu kerättävän tiedon käyttö on kiellettyä ilman asianomaisten lupaa.

Koehenkilön tunniste:___ (testin valvoja antaa)

Tietoja sinusta:

Ikä: _____

Sukupuoli: ___

Koulutustausta: peruskoulu / lukio / AMK-tutkinto / korkeakoulu-tutkinto / jatko-tutkinto

Koulutusala: _____ (esim. informaatiotutkimus, elokuvakulttuuri…)

Ammatti: _____, vuosia ammatissa: _____

Omien taitojen arviointi:

Arvioi kuinka kokenut/asiantunteva olet seuraavien taitojen suhteen:

	vasta-alkaja				erittäin kokenut
Tietokoneen käyttö työvälineenä	1	2	3	4	5
Tiedonhaku Internetistä	1	2	3	4	5
Tiedonhaku arkistoista (mukaan lukien sähköiset arkistot)	1	2	3	4	5
Aihepiirin tuntemus: radiokulttuuri	1	2	3	4	5
Aihepiirin tuntemus: radiotekniikka	1	2	3	4	5
Aihepiirin tuntemus: televisiokulttuuri	1	2	3	4	5
Aihepiirin tuntemus: televisio- ja lähetystekniikka	1	2	3	4	5
Aihepiirin tuntemus: arkistotoiminta	1	2	3	4	5

Jos sinulla on jo kokemusta muiden radio-, televisio- tai elokuvakulttuurin sähköisten arkistojen käytöstä, mitä nämä arkistot ovat:

_____

_____

_____

_____

Consent form

Kuvauslupa

Radio- ja televisioarkiston ohjelmatietokannan käytettävyystestaus tullaan kuvaamaan videokameralla ja testihenkilön toiminnasta RTVA-sovelluksessa tallennetaan myös videokaappaustallenne

Tallenteita voidaan käyttää vain tieteelliseen tutkimustyöhön ja / tai opinnäytetyöhön. Tallenteiden käyttö muissa yhteyksissä on kiellettyä ilman tallenteissa esiintyvien henkilöiden lupaa.

Tällä asiakirjalla annan luvan videoida käytettävyystestauksen sekä toiminnastani RTVA-sovelluksessa voidaan tallentaa myös videokaappaustallenne.

Vakuutan edellä antamani tiedot oikeiksi:

Paikka ja aika (PP.KK.VVVV)　　　　Allekirjoitus:

_____