A User Test with Accessible Video Player Looking for User Experience

Johana Maria Rosas Villena, Rudinei Goularte, and Renata Pontin de Mattos Fortes

Mathematics and Computer Science Institute,
University of São Paulo P.O. Box 668 - Zip Code: 13560-970 São Carlos, SP, Brazil
{johana,rudinei,renata}@icmc.usp.br

Abstract. There is a huge availability of videos that have been produced in a very fast and wide way, along with the popularity of Internet. The video authors should carefully consider the scenario since many users have different needs. It is important to keep in mind the user experience because involves a person's behaviors, attitudes, and emotions about using a particular system, for example, the video player. In addition, usability and accessibility of video players need to be considered. The object of this study is to examine users' needs, expectations and requirements for accessible videos. We developed an accessible video player to evaluate with users. We present the results in the form of guidelines, which highlight the characteristics of users; the characteristics that the video need to satisfy the users' needs and the context in which users commonly watch the videos.

Keywords: user experience, video accessibility, user test.

1 Introduction

The popularity of the Internet has boosted many possibilities of media dissemination. Along with the technological advances on the Internet, there is a huge availability of videos that have been produced in a very fast and wide way. The video authors should carefully consider the scenario, since many users have different needs. Thus, it is very important to keep in mind the user experience because it involves a person's behaviors, attitudes, and emotions about using a particular system, for example, the video player. In addition, usability and accessibility of video players need to be perused.

ISO 9241-210:2010 specifies that 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 [4]. It also affirms that usability criteria can be used to assess aspects of user experience. Nevertheless, the standard does not go further in clarifying the relation between user experience and usability.

The accessibility requirements must be considered in order to produce and reproduce videos, so that any user can access their contents regardless of the limitations imposed by either deficiency or some temporary restriction. The current video players present barriers for many people, especially to the elderly, for example, the videos do not have subtitles nor change the font size on video subtitle.

C. Stephanidis and M. Antona (Eds.): UAHCI/HCII 2014, Part IV, LNCS 8516, pp. 623–633, 2014.

The object of this study was to examine users' needs, expectations and requirements for accessible videos. We conducted studies with twenty five users, the participants were between 23 and 82 years old. We have applied triangulation methodology of the survey, user test and observation to identify the requirements, problems and users' needs. Thus, we also developed an accessible video player to test with these users.

The results are presented in a list of guidelines, which highlight the characteristics of users, the characteristics that the videos need to satisfy the users' needs and the context in which the videos will be used. Both academia and industry can benefit from knowledge of these requirements when designing the further studies and development work concerning the user experience of watching videos in an accessible video player.

The paper is organized as follows: Section 2 describes the concepts of user experience, usability and accessibility; the accessible video player is presented in Section 3; Section 4 addresses the user requirements; finally, Section 5 concludes the paper and suggests some future works.

2 Usability, Accessibility and User Experience

ISO 9241-11:1998 explains that usability extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use [2].

ISO 9241-171 defines accessibility as: the usability of a product, service, environment or facility by people with the widest range of capabilities [4].

There are many definitions of User Experience (UX) that explore different perspectives. The ISO 9241-210 defines UX as person's perceptions and responses that result from the use or anticipated use of a product, system or service [3]. Hassenzahl, Law and Hvannberg explained that UX goes beyond usability [5]:

- Usability focuses on performance of and satisfaction with users' tasks and their achievement in defined contexts of use; UX balance these aspects with beauty, challenge, stimulation and self-expression.
- Usability has emphasized objective measures of its components, such as percentage of tasks achieved for effectiveness and task completion times and error rates for efficiency; UX is more concerned with users' subjective reactions, their perceptions of the system themselves and their interaction with them.
- Usability has often focused on the removal of barriers or problems in systems as the methodology for improving them; UX is more concerned with the positive aspects of system use, and how to maximize them, whether those positive aspects be joy, happiness, or engagement.

Petrie [6] categorized the methods for usability, accessibility and UX evaluation in: automated checking of conformance to guidelines and standards, evaluations conducted by experts, evaluations using models and simulations, evaluation with users or potential users, and evaluation of data collected during the use of a system.

There are guidelines on accessibility: IBM Human Ability and Accessibility Centre, ISO standards (10779, 9241-20, 9241-171), WAI guidelines (WCAG, UAAG, ATAG), Section 508 of the Rehabilitation Act of the United States Federal government[6], automatic tools (AIS Toolbar, Opera, WAVE, etc.), guidelines in important companies (Firefox, Microsoft, Joomla, Eclipse, Adove Flash, etc), etc.

There are guidelines on usability: Heuristic evaluation proposed by Nielsen, expert walkthrough evaluation, parts 12-17 of the ISO 9242 standard [6], golden principles of good interface design by Shneiderman, automatic tools (LIFT, WebSAT, etc.), evaluations with users, etc.

3 Accessible Video Player

We have developed an accessible media player, Facilitas Player, using HTML5, JavaScript, jQuery, jQuery UI and CSS to provide functionalities to make videos accessible. The current controls include basic controls as play/pause, stop, volume controller and full screen and new controls as caption, search, list with search result, links, speed up, speed down, rewind 10 seconds, forward 10 seconds, configuration, help, and light on/off. Some functionalities of accessibility include highlight and keyboard access. The link for the Facilitas Player is http://5.135.182.74:8080/.

Some of the accessibility features of Facilitas player are in conformance with the UAAG: G1.1: Alternative content, G1.3: Highlighting, G1.4: Text configuration, G1.5: Volume configuration, G1.8: Orientation in Viewports, G2.1: Keyboard access, G2.4: Search, G2.7: Preference settings, G3.3: Help and G2.8: Toolbar configuration.

Link control enables the developer to add links to the video. Each link is linked to a specific time in the video. Links provide a short description of the video content and a long description when the link is selected, facilitating the search into the video.

Fig. 1. Facilitas Search Control and Link Control

For instance, in Fig. 1, the video has six links. If we select the "Tip: dark chocolate" link, the video skips to the third link time and a long description appears.

The search control enables the search for a word or phrase that appears in the subtitle text. The player will show all results and when a result is selected, it skips to that point on the video. For instance, in Fig. 1, we searched for the word “butter”, returning a set of two entries. When a result is chosen, the player reproduces the selected part of the video.

A light functionality is represented as a lamp icon on the video (Fig. 1) and is used to distinguish the video from the rest of the page. Another functionality of Facilitas Player is the configuration, which enables text configuration to change style, color and size in real time, as shown in the bar at the right side of Fig. 2.

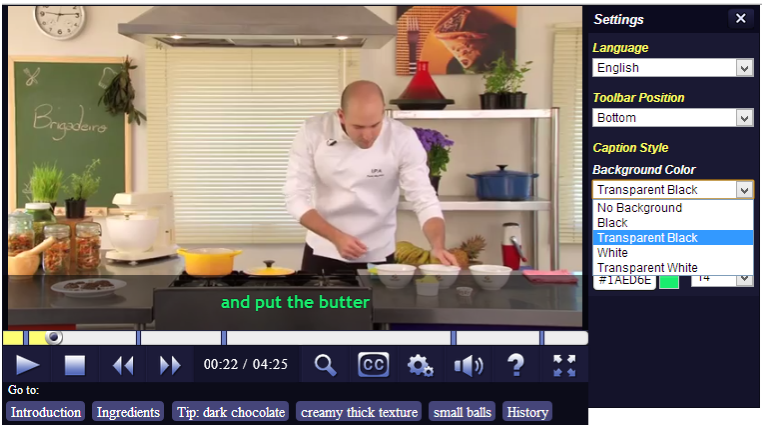

Fig. 2. Facilitas Caption background Color

A control to move the Facilitas toolbar still in development, the toolbar will be docked at the top or bottom of Facilitas Player. A control to change the caption background color was developed (Fig. 2). A Help Control show the keyboard shortcuts of Facilitas Player. Finally, each control have a description to facilitate the navigation.

4 User Requirements

We have applied triangulation methodology on the basis of a survey, evaluation with users and observation to identify the requirements, problems and users' needs. Our aim was to target both explicit and implicit requirements when choosing the three different methods. All of these studies took a place concurrently during the year 2013.

4.1 Survey

Surveys are commonly used as a method to identify requirements. The questionnaire in the earliest phase of product development is exploratory, surveys can help to identify current practices, needs of and attitudes to the new system ideas and does not

aim to confirm any particular theory [7]. For this research, the survey allow to collect data to identify the user profile, problems and users' needs. The data-collection was carried out using a questionnaire in Portuguese for 24 Brazilian people and 1 Peruvian. Besides the questionnaire, a Term of Agreement was elaborated to clarify the objectives of the research, the risks, benefits and their freedom to participants to quit their participation at any time. The user requirement questionnaire contained 18 questions related to user profile, problems and users' needs. It is important to mention that we have invited the participant users during the user center design we had adopted while developing the Facilitas player.

The data gathered by the answers to the questionnaire were collected in two places, the local Educational Institute to attend to Informatics courses for elderly and the university. The questionnaire represents overall view of users' requirements of video players. It should be observed that this research was aimed at the elicitation of user needs. We meet with each participant individually to collect the data. The total number of respondents was 25 and a description of the user profile is given in Table 1. None participant were between 41 - 50 years old.

Table 1. Description of user profile

	Age 23-30	Age 31-40	Age 51-60	Age 61-70	Age 71-82
Age	28%	8%	20%	32%	12%
Gender					
• Female	43%	50%	80%	43%	100%
• Male	57%	50%	20%	57%	-
Marital Status					
• Single	71.4%	-	-	-	-
• Married	14.3%	100%	80%	87.5%	33.3%
• Cohabiting	14.3%	-	-	-	33.3%
• Divorced	-	-	20%	12.5%	-
• Widow	-	-	-	-	33.3%
Occupation					
• Pensioner	-	-	20%	75%	33.3%
• Student	71.4%	50%	-	-	-
• Unemployee	-	-	40%	12.5%	66.6%
• Seller	-	50%	20%	-	-
• Entrepreneur	-	-	20%	12.5%	-
• Employee	14.3%	-	-	-	-
• Teacher	14.3%	-	-	-	-

About digital awareness, the participants presented the characteristics as shown in Table 2. We can see that the majority of people with some kind of impairments are the elders. It is worth to notice that older participants present less time of use the computers.

Table 2. Digital awareness and impairments

	Age 23-30	Age 31-40	Age 51-60	Age 61-70	Age 71-82
Use of the computer					
• <2 years	-	-	25%	25%	100%
• 2 and 4 years	-	50%	25%	12.5%	-
• 4 and 6 years	-	-	25%	-	-
• > 6 years	100%	50%	25%	62.5%	-
Visual Impairment					
• Big difficulty	14.2%	-	-	12.5%	33.3%
• Some difficulty	14.2%	-	100%	87.5%	66.6%
• None	71.4%	100%	-	-	-
Hearing Impairment					
• Big difficulty	-	-	-	12.5%	-
• Some difficulty	14.3%	-	40%	12.5%	100%
• None	85.7%	100%	60%	75%	-
Motor Impairment					
• Some difficulty	-	-	-	-	33.3%
• None	100%	100%	100%	100%	66.6%
Cognitive Impairment					
• Some difficulty	-	-	-	50%	100%
• None	100%	100%	100%	50%	-

The participants reported that the most common Video Players on the web they watch were: YouTube (30%), followed by News (28%), None (10%), and others (32%). The most used controls of Video Player were play/pause (29%), followed by stop (13%), language (11%), change the caption size or color (7%), full screen (7%), and others (33%).

The common problems the participants faced were when they wanted to watch a video in another language (20%), to set the volume to higher (20%), unavailable caption (15%), caption size (13%), quality (10%), fast caption (8%), codecs (8%) others (6%).

The main motivations for watching a video are to be entertained (42%), to obtain information (26%), to learn new things (23%) and the rest of the participants did not watch videos on Internet, they only watch TV.

The most common video content for entertainment was about music, followed by movies, foreign television series, sports, soup opera and anime. The most common video content for obtain information was news, followed by documentaries, education and capture images. Regarding to interest in learning new things, the participants reported that the most common video content was cooking videos, followed by learn languages, how to do videos and tutorials.

4.2 User Test

We used two applications of Morae software[1], i.e. Recorder and Manager, to facilitate the research process and data analysis. Recorder enabled the capture of audio, video, user input and on-screen activity. Manager application enabled the analysis of the video records.

We performed an experiment to identify the more important functionalities of videos and those the participants chose to complete some tasks. The participants were provided with five videos using Google Chrome browser. We have asked them to choose two of them. They completed a series of tasks in which they had to answer three questions for each video. The first two tasks were questions about the video content. For each question about the video content, they had to show the scene where the answer could be found. They used some controls to find the scene: search, link, speed up, speed down and time bar. The third task referred to subtitle configuration and they used the settings panel to configure the color, size and font.

We used five videos with subtitles in Portuguese for the testing. Two of them have audio in English and three in Portuguese. For each video, we created between 2 and 7 links (5 on average). The videos lasted 4 to 10 minutes (6 on average).

As we had mentioned before, we used user center design to developed the Facilitas player. The process was divided in two parts. First with 10 users, where the participants completed some tasks, some problems were identified and solved; the process was explained in [9]. The second part was a user test with 15 older people, where was reported issues related to their personal difficulties during the user test are [8].

Considering all 25 users, the main characteristics that the video need to satisfy the users' needs are:

- The language: 40% of the participants explained that foreign language difficult the video understanding. Another problem of the foreign videos is that the participants (12%) can not read all subtitles because the personage speak is fast. One participant has problem with the language of the video, he/she started watching the video with English speak and Portuguese subtitles, but after 3 minutes, we notice his/her difficulty and we needed to change the video. Also 96% of the participants watched the video with subtitles, whereas that some videos are in the native language.
- Volume: 28% of the participants said that the low volume is another difficulty that frequently appear when they watch a video.
- Subtitle configuration: 28% of the participants explained that, in the common players on the web, the size and the color of the subtitle can not configured.
- Subtitle: 20% of the participants reported that videos have unavailable subtitle.
- Quality: 12% reported that the video quality is an issue when they watch videos.
- Other reported problems were the codecs, the contrast of captions, small screen, lack of keyboard navigation and shortcuts, going back (rewinding) to some part of video to hear it again and fear to make mistakes and close everything.

[1] Morae Software - `http://www.techsmith.com/morae.html`

We list the context in which the videos would be used and the controls that can be used for that content. The participants are labeled with a letter followed by a number (P1 = Participant 1).

- Learning: P1 and P3 watch videos to learn languages, so P3 has focused on search control because she thinks that it is a tool to review the meaning of the word she did not understand during her study. P3 said that for studying languages it would be interesting to hear the word pronunciation, for this reason, she used speed down control. 28% of the participants said that controls to rewind 10 seconds and to forward 10 seconds are useful for learning. P3 said that she would like to use annotations. P15 said that she would like to use search control when she is cocking and need to find some information in the video, also she liked the links of the video, because it should be easy follow the videos gradually. P20 watches videos to learning online courses and he said that links would be interesting to jump to some chapter. P23 would like to use the links on videos to learn about how to do videos (i.e. details of fix or maintain a car).
- Biography: Participants want to create videos, which were strongly related to their personal life, such as family meetings, trips, past experiences or important dates. P1 wants to create a video with his biography, he wants to talk, record short films, show photos and include subtitle. P1 is retired and wants to show his life to his grandchildren. P14 wants to create familiar videos; she would like to use the links to show some important parts of the video.
- Teaching: P4 suggested a new control to mark some parts of video to show them again to other people, since he is a speaker. He said that the links are important when he asks something to the public, after that, he wants to show the answer using the link. P5 wants to capture images of video, since she likes to paint pictures, she could use the marks to found the image. P25 said that the links are useful because she always makes annotations of the time of the video to show their students, instead, she would like to create the links.
- Entertainment: P7 and P13 used to watch soup opera. P8 had hearing impairment and she likes to watch ballet videos, but the volume not enough. P13 used to watch movies and horse raising, he would like to use links to return to some important part of the movie or speed down control to saw with detail the champions of the raising. P13 said that change background color of the subtitle is interesting and it should be related to the type of the video, for example, for beach scene on a sunny day, the background should be white.

In Fig. 3 we can show an example of how the specific controls can help to reach the objective. We identify, that there are two types of user needs, when the user want to produce a video and to reproduce a video. To reproduce a video there are some special controls, for example, the most requested ones, by the participants for learning a new language, were the search, speed down, rewind, forward, links and annotations. To produce a video, for example, for teaching, the participants said that marks and links are essential.

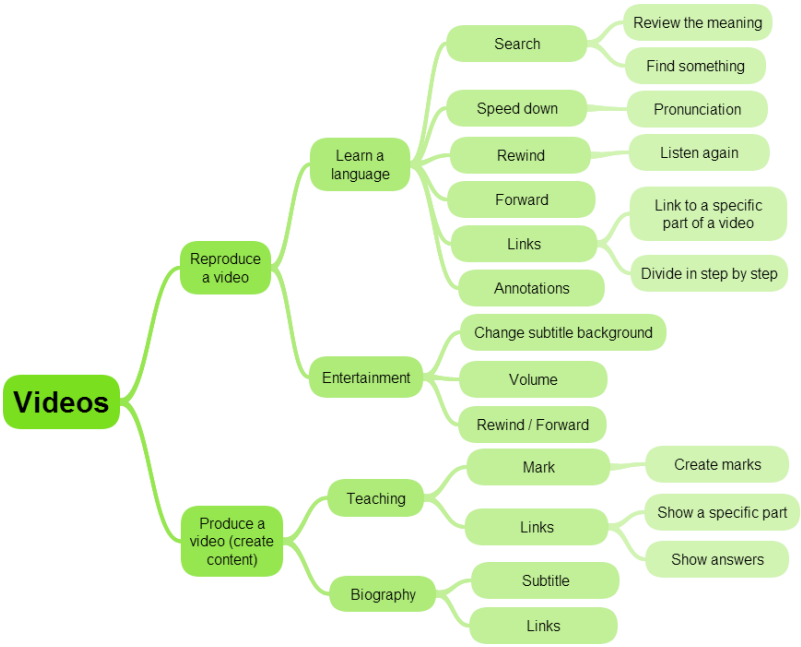

Fig. 3. Context in which the videos would be used and the controls for that context

4.3 Observation

Observation is way of gathering data by watching behavior, events, or noting physical characteristics in their natural setting. Observations can be overt (everyone knows they are being observed) or covert (no one knows they are being observed and the observer is concealed). The benefit of covert observation is that people are more likely to behave naturally if they do not know they are being observed. However, the observer will need to conduct overt observations because of ethical problems related to concealing his/her observation [1]. For our experiment, the observations method was the overt one.

There are three groups of older people that we observed during two months, they regularly frequent the local Educational Institute to attend to Informatics courses for elderly. The summary of this course includes themes as email, Facebook, Skype, download programs, excel tips, videos, etc. When they learned how to watch the videos, they used YouTube. There were some problems identified: older people forgot how to access to YouTube, the steps to find or search a video and the use of headset to listen the video, also they felt fear to make mistakes, had difficulty to click into the button, to make double click and to move the mouse, etc.

Some of the participants expressed they not only go to the Institute to study but also to make friends, most of them are pensioner and they like to participate in groups of elderly people. Most of them have some kind of disability (visual, hearing, cognitive or motor), but not all accept this disability. One female participant declared that

she did not have visual disability and she did not use any kind of help device (glasses) but when she goes to the class, she always needs to increase the font of the webpage.

The participants are also familiarized with spending time with their Institute friends, they organized barbecues, and they took photos and recorded videos. When the class finished, they share these media with their colleagues and shared in Facebook. The older people are active users of technology, and then it is important to contribute with them with accessible tools for produce and reproduce media.

There is another group of students, they have computer skills, most of them used the computer since they were a child, and they were excited when new things were shown to them, for example, links, search, and subtitle settings of Facilitas Player.

5 Discussion and Conclusions

This study examined user requirements for videos in order to improve the findings about UX of video players. We conducted three user studies, survey, users test and observation, to form an initial user's idea of the characteristics that a video need to be accessible.

The results are presented in the form of guidelines of UX to summarize the user requirements, which highlight the characteristics of users; the characteristics that the video need to satisfy the users' needs and the context in which the videos will be used. Researchers, designers, developers and content producers can use them.

The guidelines about the characteristics of the video depending on the user's perspective are:

- The video need to satisfy entertainment, information and learning needs.
- Provide different languages, volume configuration, available subtitle, subtitle configuration and quality configuration can improve the User Experience.

The guidelines about the characteristics that the video need to satisfy the users' needs are:

- The language of the video is the main characteristic: it is important that the video be in the tongue language because can difficult the understanding.
- Configuration of the volume: allow increase the volume is important for all type of users not only when the user present hearing disability.
- Subtitle configuration: the configuration of color, size, font and background of subtitle make a positive impact in the user experience.
- Subtitle: when a video have a subtitle, the users prefer watch with the subtitle, regardless of the language of the video.
- Quality is an important characteristic that need to be considered.

The guidelines about the context in which the videos will be used are:

- To learn new things: include languages, how to do videos as carpentry, make up or cooking, tutorials or online courses.

- To make a biography: produce a video with basic characteristics to show for a specific public.
- To teach: prepare some parts of the videos to show to a specific public.
- To entertainment: watch different types of videos, for example, music, films, soup opera, sports, foreign television series or anime.

There are some limitations of the current results and the need for further work. Increasing the quantity of the participants, we can collect more requirements for videos. In addition, we can specify better the user needs for a user objective in some context.

We identify, that there are two types of user needs, when the user want to produce and reproduce the video. In this paper we focus in reproduce part, it is necessary research about the production part.

Acknowledgments. The authors would like to acknowledge to the program *Estudantes-Convênio de Pós-Graduação – PEC-PG,* of *CAPES/CNPq – Brazil* for the financial support provided to this project.

References

1. Evaluation Eta, Data Collection Methods for Program Evaluation: Observation. Evaluation Briefs (16) (2008)
2. International Standards Organization, Ergonomic requirements for office work with visual display terminals (VDTs) - Part 11: Guidance on usability, ISO 9241-11:1998. Ed.1 (1998)
3. International Standards Organization, Ergonomics of human-system interaction. Part 171: Guidance on software accessibility, ISO 9241-171 (2008)
4. International Standards Organization, Ergonomics of human system interaction - Part 210: Human-centered design process for interactive systems, ISO 9241-210:2010, Ed. 1 (2010)
5. Hassenzahl, M., Law, E.L.C., Hvannberg, E.T.: User experience: towards a unified view. In: Proceedings of the 2nd COST 294-MAUSE International Open Workshop (2006)
6. Petrie, H., Bevan, N.: The evaluation of accessibility, usability and user experience. In: Stepanidis, C. (ed.) The Universal Access Handbook. CRC Press (2009)
7. Jumisko-Pyykkö, S., Weitzel, M., Strohmeier, D.: Designing for user experience: what to expect from mobile 3d tv and video? In: Proceedings of the 1st International Conference on Designing Interactive User Experiences for TV and Video (UXTV 2008), pp. 183–192. ACM, New York (2008)
8. Rosas-Villena, J.M., Ramos, B.C., Fortes, R.P.M., Goularte, R.: An accessible video player for older people: issues from a user test. In: Procedia Computer Science of the 5th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion - DSAI, Vigo, Spain (2013)
9. Rosas-Villena, J.M., Ramos, B.C., Fortes, R.P.M., Goularte, R.: Web Videos – concerns about accessibility based on User Centered Design. In: Procedia Computer Science of the 5th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion, DSAI, Vigo, Spain (2013)