MASTER THESIS IN INFORMATION SCIENCE

A comparative usability study of how novices and experts see the balance between the need for advanced features and ease of use in a web-based video editing tool

Author

Sebastian Karlsen

Advisor

Frode Guribye

May 2019

Abstract

Video as a medium has become increasingly widespread, and the possibilities of capturing and editing has grown with new technology. There has been a major shift in the user mass working with video, and there are not just professionals and experts doing this work anymore. Video editing is now done by amateurs and novices as well, and this represents a change where spectators turn into creators.

In this study, a web based video editing software named Viz Story has been evaluated in order to explore to what extent a software like this can support the work of both novices and expert video editors. Further, it has been investigated what the trade offs are between ease of use and the power of such a tool, and if both user groups will see Viz Story as user friendly.

Viz Story was evaluated by two user groups, novices and experts. The results indicates that a web based video editing software like Viz Story can support the work of novice users to a great extent, but the lack of power and functionality makes it less supportive of the work done by experts. Viz Story is seen as user friendly by both user groups, but the trade off between ease of use and power makes it less attractive to people who has a desire to do advanced video editing.

Acknowledgements

I would like to express my gratitude and thank my advisor Frode Guribye for inviting me to write this thesis, and for all guidance, patience and support.

Thank you to all the participants in this thesis for your time and effort, and thank you Kine for proofreading my work.

At last, thank you to my fellow students and friends for discussions, help and hope.

Table of Contents

List of Figures

List of Tables

Chapter 1 Introduction

Video has emerged in the digital world as a popular way to reach an audience, and Coker et al.(2017) claims that if text was the main medium throughout the analog era, video is the medium of the digital age. According to Coker et al.(2017), there were in 2016 over 8 billion video views per day on Facebook, more than 300 hours of video were uploaded to YouTube every minute and Snapchat had more than 10 billion videos viewed every day.

As digital video have become increasingly widespread, and video equipment such as mobile phones, is more accessible than ever before, the amount of video material available on the internet is growing fast. According to Juhlin et al. (2012), video traffic has become the bulk of data communication on the internet, with the projection that video data will make up two thirds of the entire data traffic by 2018. There has also been a fusion between the terms 'amateurs' and 'professionals', and a new category of users has emerged as *prosumers.* Prosumers is a term used to describe how new technology make consumers into producers (Juhlin et al., 2012).

When users change from spectators to creators of the video content, the tools for creating and editing video would not always fit the level of skills for all the users. This leads to a situation where far more amateur videos is shot than watched, and people almost never edit their material(Kirk et al. 2007). When the opportunity of editing video for non-professional arise, one can not expect their skills to be at a professional level and Kirk et al.(2007) claims that efforts to introduce editing tools aimed at amateurs do not consider this issue.

Knowing that the mass of people doing video editing has extended beyond the high-skilled people, and includes novice users and amateurs, the tools for editing video would need to adapt to this development. The emergence of user-friendly editing tools, alongside with the existing advanced editing tools, could support more people to master the process of video editing.

This thesis presents a usability evaluation of the web based video editing software Viz Story, and has been conducted to investigate if a web based video editing software could support the work of both high-skilled users and novice users, what the possible trade offs in the editing software could be, and if Viz Story is seen as user friendly to both novice and expert video editors.

Viz Story is a web based video editing software and publishing tool aimed at content creators, and it is developed by the norwegian media company Vizrt. Vizrt introduces Viz Story as intuitive, powerful

and easy to use without specialist training(Vizrt, 2019b). The software is made to help content creators very quickly produce and share videos to multiple platforms, and in different aspect ratios. Viz Story is further presented in section 2.4.

This study is done as a part of a research project between the University of Bergen and the media company Vizrt. The project is named "*Better Video Workflows via Real-Time Collaboration and AI-techniques in TV and New Media*" and focuses on how to integrate artificial intelligence techniques to improve video workflow and how collaborative video editing can be supported by Viz Story. The project also investigates the trade offs between ease of use and a flexible and powerful tool.

1.1 Motivation for the study

Considering the rapid growth of people who can create and publish their own multimedia content, especially video, there would be a need for editing softwares which meet this growth. This increase in the number of people who create content means that the range of skills will vary from beginners to experts, and offering only advanced editing tools would not meet the needs of everyone.
As more non-professional people are getting into video editing, they would need editing tools that do not expect them to already be experts. But at the same time the higher skilled people could be expected to want more advanced editing softwares that also meet their needs. A video editing software that could meet the needs of both experienced and inexperienced people at the same time is ideal, and it is of interest to investigate if a web based video editing software could do so.

It is further of interest to investigate the possible trade offs in a web based video editing software compared to advanced editing softwares, and in what way this may affect any work done by the user groups. Also, a closer look into if novice and expert users will see a web based video editing software as user friendly would be an area to explore.

1.2 Research Questions

Based on the motivation for this study, three research questions has been outlined and are the following:

RQ1: *To what extent can an online web based video editing software support the work of novice and expert video editors?*

RQ2: *What are the trade offs in having a simplified video editing software?*

RQ3: *Will both user groups see Viz Story as user friendly?*

While a web based video editing software indeed would allow both novice and expert users to edit video as that's its purpose, the research questions aims to find out if such a editing software would be adopted by both groups of users, and if it perhaps could replace more advanced editing tools.

To answer the research questions, it was necessary to have a video editing software that was a web based for the study. For this, Viz Story was chosen. To further conduct the study, participants with different level of skills within video editing was recruited. As the research questions includes novice and expert users, participants with low and high level editing skills went through a usability evaluation of Viz Story. The participants were also interviewed to gather valuable data.

1.3 Structure of the Thesis

This list gives an overview of the structure of this thesis.

Chapter 1 Introduction to the thesis, followed by research questions, aim and motivation for the study
Chapter 2 Introduction to the background and related studies
Chapter 3 Presentation of the research methods
Chapter 4 Presentation of the evaluation, trial and results
Chapter 5 Discussion of research methods and results
Chapter 6 Conclusion of the study

Chapter 2 Background and Related Work

This chapter will present relevant literature and related work to the research of this thesis.

2.1. Human-Computer Interaction

Human-Computer Interaction(HCI) as a field first emerged in the early 1980. It is a field which combines several theories and practices from fields such as computer science and cognitive and behavioral psychology, with the focus on how users interact with technology. In Wania et al. (2006, p. 1) HCI is defined as *"a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of the major phenomenon surrounding them"*.

For the last decades, HCI has inspired new solutions for the benefit of the users, making them the main focus that the technology should serve, and not vice versa. The increased access to the internet, combined with better capability of personal computers, made the 1990s a period of significant change in technology. This led to a significant boost on HCI research, where people had higher demands and expectations to the technology as users(Ghaoui, 2006).

Bødker(2015) presents and gives a description of three phases, which is referred to as waves, that HCI as a field has been through. The first wave had its focus on cognitive science and human factors, where humans were studied as a subject through guidelines, formal methods and testing. The second wave changed the focus to groups in work settings and their interaction with different applications. In this second wave, methods such as design workshops and prototyping were added to the field. At last, in the third wave, the focus is on technology spreading from the workplace to peoples homes, everyday life and culture.

2.1.1 HCI Research as Problem-Solving

In Hornbæk & Oulasvirta(2016, p. 4957), the aim of HCI research is told to "*solve important problems relevant to human use of computers*" and they argue that most HCI research is about three problems: empirical, conceptual and constructive.

Empirical research is defined as "*creating or elaborating descriptions of real-world phenomena related to human use of computing*"(Hornbæk & Oulasvirta, 2016, p. 4958). This means investigating phenomena novel to HCI, using qualitative research and identifying factors, where the effects of these factors are measured and quantified (Hornbæk & Oulasvirta, 2016).

Conceptual research is further defined as "*explaining previously unconnected phenomena occurring in interaction*"(2016, p. 4958). The results of conceptual research can be theories, concepts, methods, principles and models (Hornbæk & Oulasvirta, 2016).

Lastly, constructive research is described as "*producing understanding about the construction of an interactive artefact for some purpose in human use of computing*" (2016, p. 4958). The objective with this research is not the construction of an artefact or a prototype itself, but to understand the process with its ideas and principles, and to justify decisions that has been made (Hornbæk & Oulasvirta, 2016).

Having described these three types of problems, Hornbæk & Oulasvirta(2016) defined a research problem in HCI as "*a stated lack of understanding about some phenomenon in human use of computing, or stated inability to construct interactive technology to address that phenomenon for desired ends*" (2016, p. 4960).

In this study, a real-world phenomena related to human use of computing has been addressed, and investigated. This thesis contribution to the research field of HCI is empirical, following the usability evaluation of Viz Story. The thesis aims to create an understanding of the support of a web based video editing software to the work of both novice and high skilled users, as well as investigating trade offs between ease of use and power, and the usability of such software.

2.2 Usability

According to Lewis (2006), the term 'usability' came into general use in early in the 1980s. Before that, terms as 'ease-of-use' and 'user friendliness' was more common, but these has since been replaced both in professional and technical writing by 'usability'.

Usability is not an thermometer-like instrument that can give an exact measurement of the usability of a product, but more a property that depends the interactions among products, users, environments and tasks (Lewis, 2006). Lewis (2006) presents two major conceptions of usability, which has contributed to the difficulty of having a single agreed upon definition of usability. The first conception is that the main focus of usability should be on the measurements related to how the users solve their tasks, while the other conception is that practitioners should focus on the discovery and elimination of usability problems.

Despite these conceptions, a definition of usability has been outlined. In their paper, Krejcar & Hustak (2016) present usability as a design approach which decide how difficult it is for the users to learn and access a website or application. Usability is defined by the International Organisation for Standardization, abbreviated ISO, as the following:

"The extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specified context of use". (Krejcar & Hustak, 2016, p. 3)

Usability can be broken down into five components and these components constitute the term usability. Krejcar & Hustak(2016) gives an overview of these five components:

Learnability - How easy it is to perform basic tasks for new users
Efficiency - How long time it takes for the users to find what they came for
Memorability - How hard it is for the users to repeatedly perform their tasks
Error rate - How often and what kind of mistakes are made by the users
Satisfaction - How comfortable the users feel when using the design

Usability is typically measured by involving users. When a system or product is being tested, the test users are chosen to be as representative as possible of the intended users of what is being tested. The users are asked to perform a set of tasks that are specified beforehand, but real users in the field performing the tasks they want to is also a way of measuring usability (Nielsen, 2010).

2.3 Video Interaction

According to Juhlin et al. (2013), there is a need to articulate a research agenda that focus on the new challenges and opportunities related to the broadened use of video. This agenda is labeled "video interaction" and as a research area it is concerned with "*emerging technologies and social practices in an increasingly flattened hierarchy between, on the one hand, what used to be a well-defined group of production professionals, and on the other hand, the masses of passive viewers of the same media*" (Juhlin et al., 2013, p. 1). In conjunction with the massive growth of video online, Juhlin et al. (2013) present a number of trends regarding how video is now produced, consumed, shared and interacted with. The trends presented highlights a shift to mobile technology and user-generated video content, and the continuation of increased interaction in viewing.

The first trend is the new ways of producing video that has been enabled by low priced production tools and high bandwidth networks. This emerged with the use of analogue and digital video cameras for the consumers, and continued with video recording possibilities on mobile devices. The sharing and distributing of the content also requires less cost and effort with the expansion of internet. Live video production is on the verge of broader adoption by non-professional users, through examples of live broadcasting from the Arabic Spring and other events world wide, as well as broadcasting from lectures at universities. This has shown the potential of how live video can communicate and share experiences with distant viewers(Juhlin et al., 2013).

Juhlin et al. (2013) explains that with the disappearance of barriers regarding production and distribution of digital content, a new group of amateurs has emerged in different fields such as journalism and photography. The new categories of users that have emerged between amateurs and professionals can be labeled as prosumers, which is a description of how new technology make consumers into producers of content such as video.

Secondly, Juhlin et al. (2013) mention a trend that is *"an expansion of services that utilize mobile technology in a broad sense, and that are catering to mobile and socially connected users"* (Juhlin et al., 2013, p. 1). Video as a medium has become well integrated with the large social media sites, and new formats such as the video application Vine are emerging, and can be seen as an extension of Twitters microblog model to video. These applications are available on desktops and mobile devices, and mobile technology allows the capturing of video to be done from different settings, as well as giving the users physical control of the camera. This trend show the increase in different ways to interact with video in new media.

Third, an area that motivate conceptualization of video as interaction is interactive television, and the associated commercial development of broadband TV and online video. Earlier, television was known as mass media broadcasting, where video was the physical format for either "home videos" or recorded television. The rapid growth of online video content has resulted in a broad diversity of viewing habits, content and production formats, and this has led to the distinction between the terms "video" and "television" being erased. Now, there is a diverse and dynamic video medium covering a wide range from mediated live events to videos as a form of dialogue on media such as Youtube, high-end cinema, and short video clips and mobile broadcasts shared instantly in social media (Juhlin et al., 2013).

2.4 Video Editing Software

A video editing software is a software that allows the users to use a computer to edit both video and audio, using a computer keyboard and a mouse or a touchpad. Examples of video editing softwares are Final Cut Pro, Vegas Video and Adobe Premiere(Hood, 2004).

The video editing software allows the users to upload their video material into the software. The video material can be dragged and dropped into a timeline, where it can be manipulated and edited. The users can place video clips where they want on the timeline, insert several clips to it and shuffle them around, placing them in a preferred order. In some editing software, there are one timeline for video clips and one timeline for audio, while in others, everything is gathered on the same timeline. The

design and functionality of a video editing software is largely determined by how the software is made and the speed and power of the computer that is used(Hood, 2004).

2.5 The Tool - Viz Story

The aim of Viz Story is to let the users quickly create, edit and publish their stories online and to social media platforms. It is made to be fast, easy to use and to not require much prior knowledge of video editing from the users. The interface is a web interface and it can be accessed from any browser (Michalsen, 2016).

The key features of Viz Story is the browser-based workflow, direct publishing to social media, easy graphics insertion, audio recording and editing. Viz Story uses templates that allow the users to quickly produce a video with graphics, which fits for use on social platforms such as Facebook and Youtube. With Viz Story, the users have an editing software that will allow them to quickly create videos that is consumable online and on social media platforms (Vizrt, 2019b).
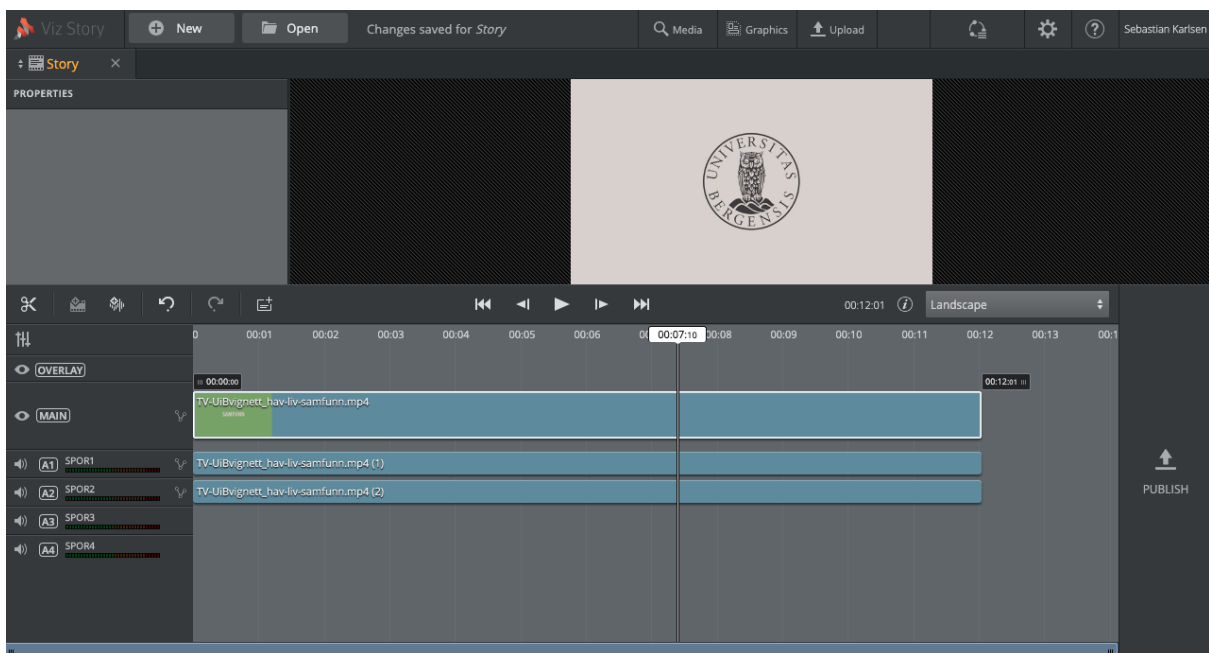
Figure 1: The interface of Viz Story

Viz Story is also cloud-based, which means all work the users have done can be saved in the cloud. This way, the users is not dependent on a specific computer to access their work. Any computer with a web browser and internet connection will give access to Viz Story and the work previously saved.

8

2.5.1 Workflow

The workflow of Viz Story can be divided into three steps. The first step is to obtain a video either from an archive or capturing with a mobile device. Next, uploading the video clip in Viz Story for editing is required. After editing, and with a finished video, it can be uploaded to different platforms. As seen in figure 2, the different platforms to publish to from Viz Story is several. Publishing can be done to online or platforms such as Facebook, Instagram, Youtube and Twitter.

Figure 2: Workflow diagram of Viz Story(Vizrt, 2019b)

2.6 Content Creation

Being a content creator means actively creating and publishing original content to an audience on one or several media platforms(Jaret, 2012). Traditionally, content creators was people who worked within one specific field of expertise, such as journalism, books, screenwriting and television. Following the evolution of media and technology, this has now changed and comprises not just professions, but also people who simply creates their own content as amateurs. This content could be blogs, web sites, photos and video.

As the new group of content creators has risen, Popomaronis(2019) mentions three trends that lead to what he calls "the big bang" for digital content creation. The first trend is related to technology, and because of the smartphones, everyone can create visual content. Smartphones with high-quality cameras and examples of simple editing tools have become far more accessible, allowing people to develop their skills related to creating content. The second trend is the transition of the editing tools, from expensive software like Adobe Premiere, to options costing as little as $20 delivering the much of the same production options. The third and final trend is the greater access to gaining knowledge.

Today, people can teach themselves how to do design and boost their production skills in only a few hours. These three trends have similarities to the trends mentioned by Juhlin et al. (2013), presented in section 2.3. The lowered barriers for producing video, enabled by cheap production tools and recording devices are some of the reasons more people produce and edit such content.

2.7 Convergence Journalism

The rapid growth of people editing video applies not only to people editing in their homes of their own will, but includes workplaces as well. According to Hoffman (2011), the expectations to journalists and their skills have become different in recent years and journalists can no longer afford to specialize in only one field or skill. They now have to be able to take photos, produce well-written articles and sometimes capture and edit videos to stay relevant as journalists.

This evolution within the field of journalism is labeled convergence journalism, and requires an understanding of the media technology landscape and being flexible to navigate it to the benefit of the work (Kolodzy, 2013). According to Kolodzy (2013), people want news fast and convergence journalism aims to meet those expectations by using all tools available in the toolbox. Text, pictures, graphics, audio and video are tools that will benefit a news story, and are disciplines journalists should know. This shows that not only have video become an important part in telling a story, but in some cases there is a need to produce a video fast in order to meet the expectations of people who want news right away.

2.8 Related Studies

This section presents work and studies that are relevant for this study. A literature review was conducted to get an overview of this material.

2.8.1 Simplifying Video Editing with Intelligent Interaction

Video editing can be difficult for several reasons. It is time-based, can include dual tracks of audio and video, and some editing tools or softwares force users to work in very small levels of details(Casares et al., 2001). In their paper, Casares et al.(2001) describe visualization and interaction techniques, to reduce some of the challenges related to video editing. The techniques were implemented in an editing software called Silver, a tool designed to make editing easier for novice users. In their paper, a user study was conducted to investigate the effectiveness of Silver.

Casares et al. (2001) outlined three unique challenges of video editing, challenges that they claim are not found with other media. The first challenge is that video is a time-based medium, which can make

it difficult for users to browse and look through the video. Very often, users must search linearly through long video clips to find an exact clip or sequence. A second challenge of video editing is that video is a dual medium. A video does not just consist of a track of moving pictures, but also an audio track. These tracks must be synchronized, but the option of overlaying them must also be present, for example during transitions from one shot or clip to another. The third challenge that is outlined is the level of complexity. To perform most of the editing operations, such as cutting a clip, users must manually choose specific frames, which may involve zooming and numerous repetitions of fast-forwarding and rewind operations.

These challenges can make video editing a tedious, error-prone and difficult activity. Some of the commercially available video editing tools, such as Adobe Premiere, allow video editing of high quality, but they do not address adequately the three challenges mentioned. This makes them harder to use, especially for novices (Casares et al., 2001).

As a solution, Casares et al.(2001) designed the editing tool Silver which "*shows that metadata can be used to create an intelligent interface for aiding novice users in the performance of otherwise difficult or tedious editing tasks*" (2001, p. 8). The metadata used to create the intelligent interface was clip titles, transcript and shot breaks.

2.8.2 Understanding Videowork

In their paper, Kirk et al.(2007) elucidate the patterns of behavior of home movie makers. They did so through a study of 12 families and a focus group of 7 teenagers. The goal of the study was to provide a deeper understanding of what people do with video, documenting all the capturing, editing, archiving or sharing they do, and offering a useful interpretation of this.

The study was split into two parts. The first part was interviewing the 12 families in their own homes, whereas the second part was the focus group of 7 participants. This group was designed to elicit other perspectives on issues raised in the interviews with the families and to explore how younger age group make use of video. Before conducting the interviews and the focus group, a life-cycle model of home video was created, and it has four stages.

The first stage is called *pre-capture*, and "*helps identify the importance of an event that leads users to identify a value in video* " (Kirk et al. 2007, p. 64). The video becomes a way of documenting or celebrate special events with a device used to capture video. The second stage in the life-cycle model is *at-capture*, which includes the capture of video, editing on the device and sharing of the video from the device the video is captured on. The next stage is *post-capture* and consists of downloading the

video file to a computer, editing on the computer, and making a backup of the video. The fourth and last stage is *end use*, where the users share or show the video to others.

The interviews conducted by Kirk et al. (2007) revealed that within the narrow scope of home video and movies, there are at least two types of video data. The first type of video data is the one that is captured spontaneously in an ad hoc way, and the other type is video that is captured in a more planful and intentional way. These two forms of video are "*associated with different capture devices, capture practices, editing practices, and above all, end-uses*" (2007, p. 68). The two forms of videowork is labeled as lightweight and heavyweight. Videowork in this study is defined as "*a name for the practices in which users engage when working with video technologies*" (2007, p. 61). Lightweight videowork is about capturing a moment in an event to laugh, rue and reflect on the activities within that event. This videowork do not capture things that matter, but simply complement the experience, such as a video on a mobile phone.

Heavyweight videowork is about capturing events that matter, and includes more planning and capturing far more video with good quality. This could be video filmed with a camcorder, edited and made into gifts or DVDs to watch with family or friends.

2.8.3 Home Video Editing Made Easy

The use of video is increasing and becoming popular among the non-professional users, as many of them own video cameras and use them to record events such as weddings or vacations (Girgensohn et al, 2001). With the video cameras, people can record and transfer their video material to a computer, and edit and publish it.

However, the process of editing the video can still be problematic as there may be a lot of material that needs to be discarded as it is of poor quality, boring or redundant. This can be difficult and time consuming as the users have to look through all the material to find the parts to be kept, and then trim and edit the video to make it visually appealing. Searching through the video material is done as a linear search, rewinding back and forth to find the material to keep (Girgensohn et al, 2001). Adobe Premiere and Apple's Final Cut Pro are editing softwares that are difficult to learn and use, and their focus is on enhancing the quality of the video by offering transitions, titling and special effects. Simpler video editing softwares, such as iMovie and VideoStudio, are easier to learn and use but still require the linear search of material to keep.

In their paper, Girgensohn et al. (2001) present a hypothesis that video editing can be simplified by pre-processing and structuring the video for the editing process. This is done by first automatically divide longer video clips into several shorter clips. These shorter clips will contain one event each, and

are trimmed to remove "unsuitable" video. Unsuitable video is explained as "*video where the camera is moving too quickly, the camera is unsteady, or the image is too dark*" (2001, p. 1). These parts of the video are singled out by analyzing the video clip for camera movement and luminance level. Next, the clips are clustered and arranged in piles by the keyframe representing each clip based on how similar the keyframes are. A keyframe is a "*frame representing video sequence*" (2001, p. 2).

In order to test their hypothesis, Girgensohn et al. (2001) built Hitchcock, which is a semi-automatic home video editor made to simplify the video editing process. "*Hitchcock was designed to incorporate the automatic pre-processing of the video with an intuitive user interface to present the video clips to the user*" (2001, p. 2). The key features of Hitchcock is the automated analysis to find clips of good quality, intuitive interface for combining clips into a video and the algorithm to gather the video clips in piles that makes sense. A user study was conducted to see how the automatic creation of clips and the pile navigation supported the users through the process of editing video. The study revealed that the users were satisfied with the automation, but at times had problems overriding the decisions made by it. These findings pointed out the need for a good balance between user control and automation. Thus, a new version of Hitchcock was built with additional controls for navigation and allowing the users to override the decisions made by the system (Girgensohn et al, 2001).

2.8.4 A System for User-Friendly Matchmove

Video editing can be challenging and is in some cases mainly left to the professionals (Rudoy & Manor, 2013). Some of the most basic video manipulations involve editing softwares that are not adapted to amateur users, and in their paper, Rudoy & Manor (2013) propose a system that allows amateur users to do a basic matchmove by adding inlay to a video clip. The system does not require the users to have any prior knowledge or experience and is based on simple user interaction.

According to Rudoy & Manor (2013), video editing comprises three main tasks which is sequencing, matchmoving and compositing. *Sequencing* is the the managing of the temporal dimension of the video, including modification of the time flow and the rearrangement of scenes. *Matchmoving* means matching between the motion of an artificial object and the camera movement, to get a correct placement of the object in each frame. The third task is *compositing*, which focuses on the seamless composition of two or more sequences.

Rudoy & Manor (2013) states that in the field of professional video editing, there is a high presence of advanced editing tools for each of these tasks. Adobe Premiere and Final Cut Pro is often used for sequencing, while a common matchmoving tool is Boujou. For compositing, Adobe After Effects is

suitable. These three editing tools have in common that they are very expensive softwares and demand high skills from the users, as well as intensive interaction.

In the field of amateur video editing, there is a lack of tools that are able to handle compositing and matchmoving. For sequencing, Adobe Premiere Elements is one of the alternatives, but this and other tools are limited to basic effects like overlays and transitions.

To cover some of the deficiencies and offer more tools to amateur editors, the system, which is presented without a name, is proposed. Rudoy & Manor (2013) concludes that their system simplifies the matchmoving and that the system is capable of editing a wide range of videos, as well as further simplifying user interaction required by their system.

2.8.5 Video Editing in the Mobile Context

As todays mobile devices enable people to capture more video, the editing of these videos become relevant. When video is captured with a mobile device, it can be difficult to get the video clip just as intended, especially as video captured with such devices is done in a spontaneous and unprepared manner (Jokela et al, 2007a). In many cases it would turn out useful to have the possibility to edit the video clip after capture, e.g. to remove irrelevant material, make the clip shorter or put together several short clips to a longer one, as well as doing audio work. There exists several video editing softwares for editing video on a computer that can be used to for these editing operations, but this require the clip to be transferred to a computer. Further, a computer might not be available at the location where the video is captured, which prevent instant editing and sharing of the video.

Jokela et al. (2007a) present the Mobile Video Editor, which is an application for editing video on mobile devices. This application makes it possible to edit a video clip locally on the mobile device immediately after capture, as well as removing the need to transfer the clip to a computer for editing. Mobile Video Editor also allows the users to share their video clips.

In their paper, Jokela et al. (2007a) describe a field trial with the Mobile Video Editor application, conducted to give an understanding of how the users would use the application in everyday life. The objective of the field trial was to evaluate Mobile Video Editor in a real-life environment and to understand the usage of video editing in the mobile context. 14 participants used the application for one month in their everyday life. The result indicated that that the video editing features provided by Mobile Video Editor were mostly adopted by younger adults and teenagers, who appreciated the opportunity to create personal content. The older users did not have time for editing their video clips and did not consider it worth the extra time and effort(Jokela et al., 2007a).

2.8.6 Mobile Video Editor: Design and Evaluation

In another paper presented by Jokela et al. (2007b), a usability evaluation of Mobile Video Editor, the application presented in section 2.5.5, is conducted. They give an overview of the main user goals for video editing in the mobile context, and then present the usability evaluation and the results from this.

The user goals presented by Jokela et al. (2007b) was based on a Contextual Inquiry study followed by a Context of Use analysis. The analysis covered tasks, equipment, characteristics of users and environment within the domain of video editing. Further, criteria such as relevancy to the amateur user, error criticality and frequency of use was used forming the user goals. Based on the analysis, the following user goals was identified(Jokela et al., 2007b, p. 347):

- Selecting the clips to be edited from the raw source material
- Combine several separate video clips into one video
- Cut a clip
- Enhance the video with text, images, music and special effects
- Store the completed video in the device
- Share the created videos with family or with peer group

In the usability evaluation, ten participants with different backgrounds were recruited. All of the participants had experience with capturing video, but none of them were experienced users of video editing software, nor had they used or seen the application before the evaluation (Jokela et al., 2007b). The evaluation was performed on a Nokia 7610 mobile device, which had a fully functional prototype of Mobile Video Editor installed. The participants were given seven pre defined tasks and they were encouraged to think aloud while performing them (Jokela et al., 2007b).

The results of the usability evaluation provided positive results, and in general, the participants got a rapid understanding of the user interface and were able to locate and find the functions to complete the tasks. The participants pointed at some problems, such as professional terminology and functions being too fast which lead to much happening at once. Overall, they indicated that there was a need for this type of application for making short video clips on a mobile device (Jokela et al., 2007b).

2.8.8 Creating Live Video Together

In their paper, Engström et al. (2012) explore the use of a live video broadcast system by a group of amateur camera operators that filmed an event on a network of camera phones. The operators choices regarding camera angles and positions when filming was examined, and how these choices was taken in the attempt to provide interesting visual content and a logic context.

According to Engström et al. (2012), the recent years have seen a number of parallel trends in how video is produced, consumed and distributed on the internet. Video makes up a great share of traffic online, and a key component in this traffic flow is mostly due to user-generated content on sites such as Vimeo, Youtube and Facebook. This content has evolved from single-user, single-clip uploads to being collaboratively produced rich media(Engström et al., 2012). The paper present a field trial of a prototype system called Instant Broadcasting System (IBS), which combines collaboration and liveness. IBS lets the operators create user-generated content, e.g. broadcastable live video from a network of mobile phones with cameras. The issue of concern raised in the paper is that professional production of video involves practical and technological skills that are not easily transferred to amateurs. With the IBS system, a new genre of tools for collaborative video production among users that are not professionals or experts is represented.

With their field study, Engström et al. (2012) aims to provide a new understanding of how live video can be produced as a group activity by users that are non professional. The analysis and results of the study indicates that the combination of live transmission and collaborative production shows promise for new forms of participatory media, but also has some challenges. Some of the challenges are related to skills, but not all of them. Some challenges are also related to experience, e.g. when professional operators rely on their knowledge of the roles of the people they work with. Their experience allows them to anticipate their colleagues actions and can align their own work to this. Amateur operators cannot rely on such experience and anticipations, and must therefore rely on their practical everyday experiences for coordinating their work and actions. This non professional visual practice was thus labeled 'amateur vision' (Engström et al., 2012).

2.9 Related Editing Softwares

Video editing softwares that are relevant for this study is presented in this section. The section will include editing softwares that are aimed at novice users, and more advanced editing software with higher complexity.

2.9.1 Silver

As presented in section 2.5.1, Silver is a digital video editor developed to address problems of video editing. Based on interviews with professional video editors, Silver was developed to make editing more accessible to most people, especially novices(Casares et al., 2001). Silver provides multiple views of the video the user is working on, with both storyboard and timeline view. Silver also provide an editable transcript view, and these were some of the key innovations Silver brought to the field when it was released.
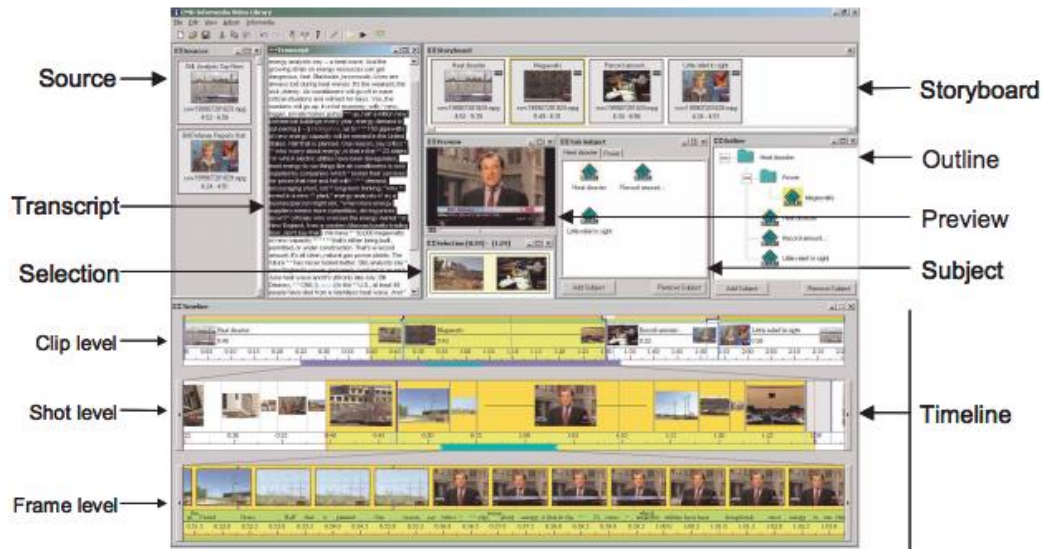
Figure 3: The interface of the Silver editor (Casares et al., 2001).

2.9.2 Adobe Premiere Pro

In section 2.5.1, Adobe Premiere is briefly mentioned as a video editing software that is difficult to use for novice users, meaning it is more advanced than Viz Story and Silver.

Adobe Premiere Pro is a high-end video editing software, well known amongst pro video editors and people with high editing skills(PCMag, 2019). The interface of Adobe Premiere offers a timeline which is very scalable and offers the tools like ripple, slip, roll and slide. Further, the interface includes different panels and menus, and preconfigured workspaces for things like color, titles and editing(PCMag, 2019).
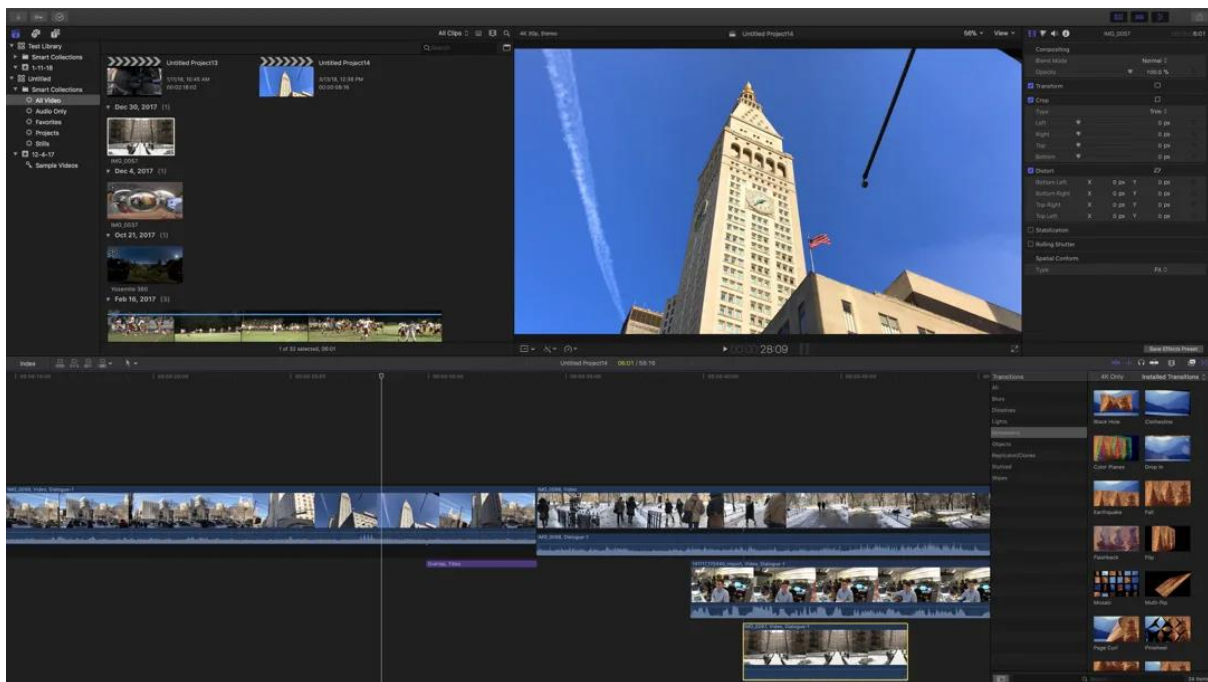
Figure 4: The interface of Adobe Premiere Pro (PCMag, 2019).

2.9.3 Final Cut Pro X

Final Cut Pro X is developed by Apple and is a video editing software for producing, editing, and creating high-quality video(Apple, 2019). Final Cut offer features like special effects, audio work, grouping of clips, and a set of professional editing and trimming tools, making it an advanced editing software aimed at high skilled video editors. When a video is finished edited, publishing can be done directly to websites such as Youtube and Vimeo.

Figure 5: The interface of Final Cut Pro X (Apple, 2019).

2.9.4 Frame.io

Frame.io is a video review and collaboration software where the users can upload, review and share video (Rush, 2019). The function and idea behind Frame.io is similar to the use of Dropbox, and it allows video producers and editors to share their files, comment on clips in real-time and compare old and new versions or edits of a video. Integrations with other editing softwares, such as Adobe Premiere Pro, allows commenting, drawing and editing of a video clip in the editing software.
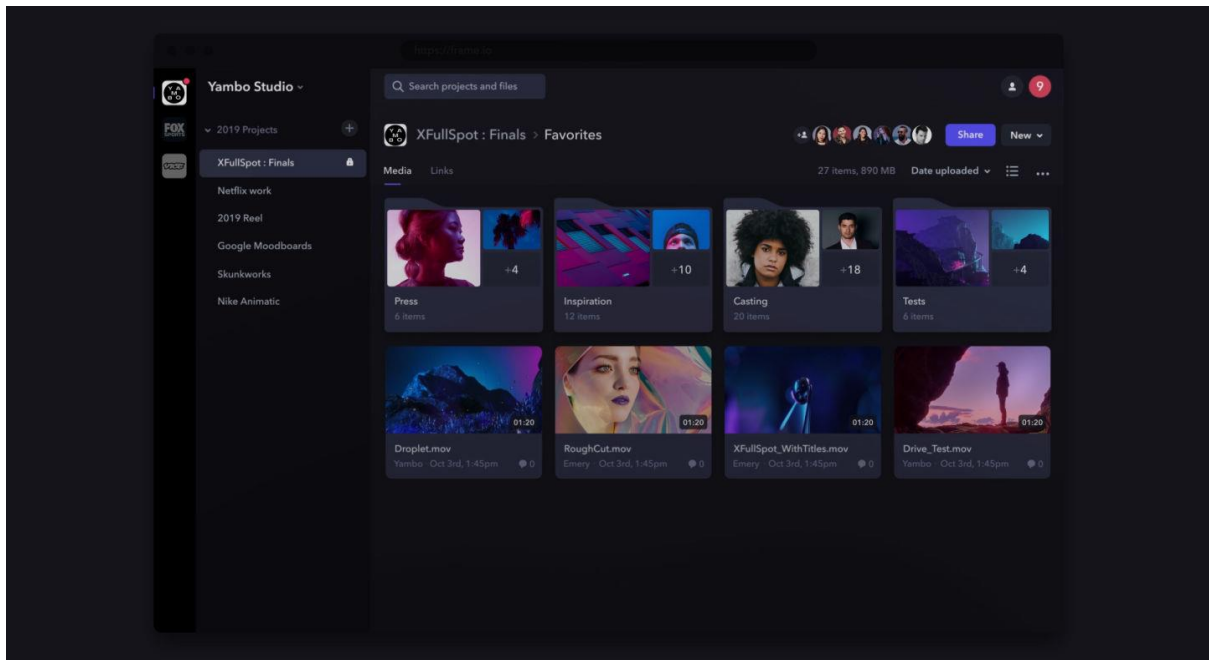
Figure 6: The interface of Frame.io (Frame.io)

2.10 Chapter Summary

This chapter has presented the research question of this thesis and the result of the literature review. The chapter has given an overview of HCI as a research field, introduced video editing software and content creation. Further, the chapter has presented the result of the literature review, showing how video editing can use intelligent interaction to become more simple and how videowork can be understood.

To end the chapter, video softwares relevant to this study has been presented. One user-friendly software called Silver, a more advanced which is Adobe Premiere Pro, and at last, a video review and collaboration software named Frame.io.

Chapter 3 Methodology

This chapter presents the methods used to answer the research questions outlined for this thesis (see section 1.2). The methods and techniques are presented to give an overview of how they work and how they were relevant to answer the research questions. The term *method* is referring to the way a trial or evaluation is built and carried out. This involves deciding on the participants and preparing them for the evaluation, which software or hardware to use, making tasks, questions and finding out how to collect your data (MacKenzie, 2013).

According to MacKenzie (2013), before conducting a HCI trial or evaluation there is one important thing that needs to be in place, which is ethics approval.

"Researchers must respect the safety, welfare, and dignity of human participants in their research and treat them equally and fairly" (MacKenzie, 2013, p. 159)

HCI research involves humans, and every participant in an trial should always be informed of their rights. The nature of the research, any risks or benefits, the right not participate and/or terminate their participation at any time and the right to confidentiality and anonymity are things that the participants should be made aware of before the trial (MacKenzie, 2013).

Before conducting any of the usability evaluations and interviews in this study, the participants were made aware of their rights through an informed consent form. All of the participants read and signed the informed consent form and approved the completion of both the usability evaluation and the interview. The form can be found in appendix A.

3.1 Usability Testing

Usability testing emphasizes how usable a product is. The goal with usability testing is to test if the product is usable by the intended users and that they are able to achieve the tasks the product is designed to do (Rogers et al., 2011). Usability testing can be done in both natural and controlled settings, but in this thesis, the usability testing was conducted in controlled settings.

A central component of usability testing is collecting data about each user's performance on the predefined tasks they are given. The predefined tasks, or the performance measures, can generate data about the following things such as error rates, time to complete a task and completion success (Rogers et al., 2011).

During a usability test, there can be one or more observers who are in charge of the testing and observe one or more participants performing a set of specified tasks with a product or system, in a test environment (Lewis, 2006). This is what distinguishes usability testing form other methods, such as interviews and usability inspections. During interviews and focus groups, the participants do not

interact with a product or system through tasks, and with inspection methods like heuristic evaluation, there is no observation of users performing tasks. In field studies users can be observed while performing relevant tasks, but the control the observers have over the participant and the tasks are restricted. This is not necessarily negative, but it is a defining difference between usability testing as a method and field studies.

3.1.1 Tasks for usability testing

Before conducting the usability testing in this study, a set of tasks was created. The tasks aimed to cover some of the most basic tasks during a process of editing a video, such as cutting, adding graphics and video to the timeline, and finding the user guide.

When deciding which tasks to include in your usability testing, you should ensure that the tasks can capture as many of the usability difficulties as possible (Rubin & Chisnell, 2008). Rubin & Chisnell present three guidelines to help outline the tasks in the right way, which is to select tasks based on frequency, criticality and vulnerability.

Prioritize by frequency means selecting tasks that represent the most frequently performed tasks by the users of the product you are testing. The most frequent tasks are the ones that the users will perform almost every time they interact with the product. Usability tests are often filled with several obscure tasks that less than 5% of the users will ever find or use. It is important to keep in mind that the users does not share the priority or enthusiasm of the developer's when it comes to these obscure tasks (Rubin & Chisnell, 2008).

Prioritize by criticality means including critical tasks which are the ones that, if they are performed incorrectly or missed, have serious consequences either to the product, the user or the company which delivers the product. You want to choose tasks that uncover severe deficiencies of the product, if there are any (Rubin & Chisnell, 2008).

Prioritize by vulnerability refers to selecting those tasks that you would expect, before testing, will be hard to perform or have known design flaws. Sometimes, developers will claim that all functions work equally well, and they would not want known problems exposed during the test. Because of this, it is important to use your own critical judgement when selecting tasks, to be sure that any expected problems or flaws will be revealed (Rubin & Chisnell, 2008).

In terms of these three guidelines, the set of 8 tasks was created and used in the usability testing. The tasks are the following:

1. Open a video clip of your own choice from the archive so that it is ready for editing
2. Take the clip you have started editing and remove around 5 seconds from the beginning and around 5 seconds from the end

3. Add a graphic element of your own choice where you want it in the clip
4. Change the format of the video so that it has the right format to be published on YouTube
5. Remove the existing graphics on the video and add a new graphic element
6. Add a new video clip to the timeline, without removing anything that is already there
7. Find the user guide
8. Click on the publish-button

3.1.2 Observation

Observation can be a useful data gathering technique at any stage during a research process(Rogers et al., 2011). According to Rogers et al. (2011), observation early in the design can help designers understand users context, task and goals. Observation conducted later in the development may be used to investigate how well a prototype or program supports these tasks and goals.

The observational method includes a collection of common data gathering techniques used in HCI, such as interviews, case studies, focus groups, field investigations and think aloud protocols. The observation tend to give data about the quality of interaction between a user and a product, and is likely to involve note-taking, photographs and audio and video recordings(MacKenzie, 2013).

During the usability testing, observation was used as a method to collect additional data while the participants interacted with Viz Story. When the participants performed the usability tasks, note-taking was used in combination with recordings of audio and the computer screen.

3.2 System Usability Scale

The System Usability Scale, hereafter abbreviated SUS, is one of the most known methods to measure the usability of a product and it is a likert-scale, or survey scale, which consists of 10 general statements about a product(Brooke, 1996). The SUS is labeled as "quick and dirty", which allows practitioners to quickly and easily assess the usability of a system or product (Bangor et al., 2008).

The SUS has attributes that make it a good and safe choice for usability practitioners. Bangor et al. (2008) presents four attributes that show why the SUS is a convenient choice.

The first reason is that SUS is not tied to one specific technology or product, which makes it flexible enough to assess a wide range of technologies, from websites and computer interfaces to voice response systems and hardware platforms. The second reason is that the survey is very quick and easy to use, and can be utilized by both administrators and study participants. In other words, SUS is a good choice regardless of the experience as a researcher. Further, SUS provides a single score as a result

which is understandable for a wide range of people, from computer programmers to project managers. The last reason is that SUS is nonproprietary, and therefore also a cost effective tool.

The participants in a SUS-test must decide how much they agree with each of the 10 statements in the test. Each statement have a five-response option, and are rated from strongly disagree to strongly agree. The response option translates to 1-5 in numbers. 1 means that the user strongly disagree and 5 means that the user strongly agrees and is satisfied.
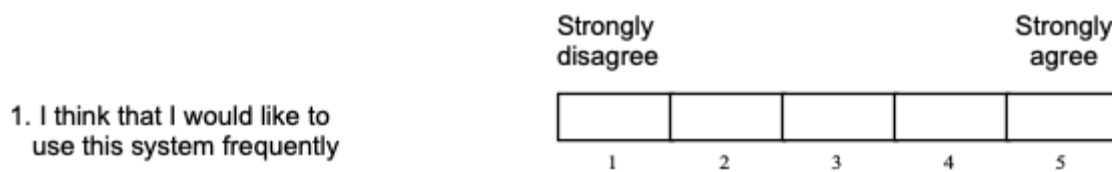

Figure 7: Example of a statement from the System Usability Scale (Brooke, 1996)

The SUS is divided into five positive statements and five negative statements. Statements 1, 3, 5, 7 and 9 are positive, while statements 2, 4, 6, 8 and 10 are negative. According to Brooke (2013), this is done to avoid response biases. By alternating the statements as positive and negative, the goal is to have the respondents read each of the statements and make an effort to really think if they agree or disagree with the statements. This is important, as the SUS invites to rapid responses (Brooke, 2013).

To calculate the total SUS score, each score from every item is added up. For items 1,3,5,7 and 9 the score contribution is the scale position, from 1-5, minus 1. For items 2,4,6,8 and 10, the contribution is 5 minus the scale position. A good score for the positive statements is a high score, while a good score for the negative statements is low. The two scores, for positive and negative statements, are summarized and this sum is multiplied by 2.5 to obtain the final score from the SUS test (Brooke, 1996). The answer will be a number ranging from 0 to 100, but this is not a percentage.

Jeff Sauro has reviewed research on SUS and analyzed data across 500 studies, including over 5000 participants and the average SUS score from these studies is 68. A score above 68 is considered above average, and any score below this is below average. According to Sauro (2011), it is worth noting that the SUS score ranging from 0 to 100 is not a percentage. He suggests that the best way to interpret a SUS score is through a process he calls normalizing. Using this process, the score is converted to a percentile rank with letter-grades from A+ to F, where A+ is the best score.

The graph below shows how a SUS score would convert to percentage and a letter-grade.
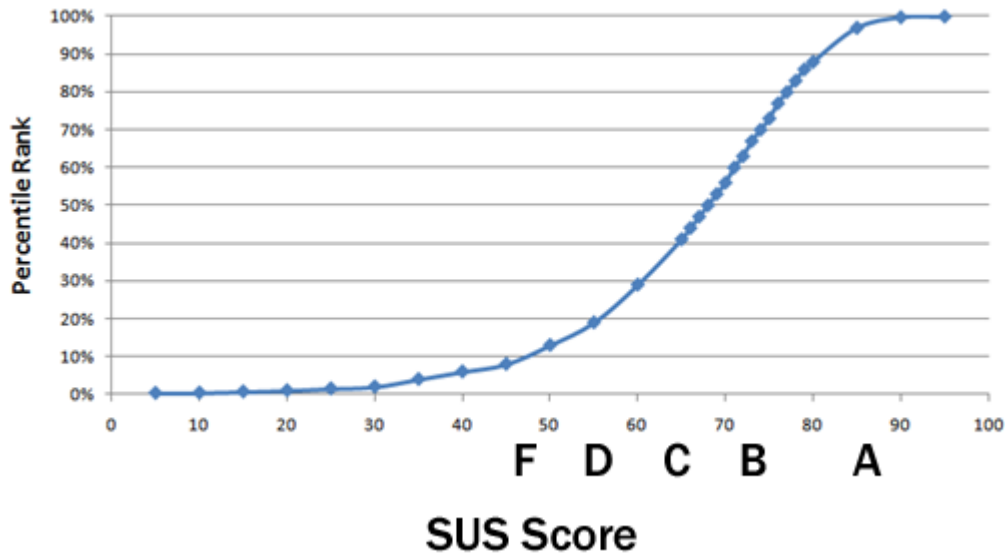
Figure 8: SUS score and percentile rank (Sauro, 2011).

As Sauro(2011) explains, a SUS score of 74 would convert to a percentile rank of 70% and the grade B. While a SUS score of 70 technically correct would represent 70% of the maximum score, 70 is closer to the average score of 68, which converts to 50%.

Another approach to interpreting a SUS score is presented by Bangor et al(2009) and is adjective ratings. Figure 5 shows that the adjective ratings match with the mean SUS scores.
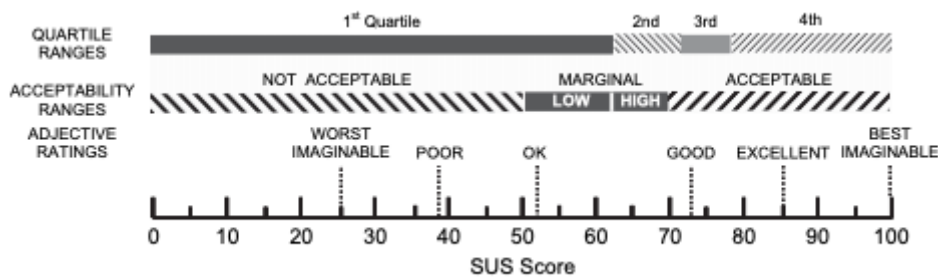
Figure 9: Comparison of SUS scores by quartile and acceptability ranges, with adjective ratings (Bangor et al, 2009).

Products with a SUS score above 70 is at least passable, while scores in the high 70s to upper 80s indicates that a product is good. The superior products obtain a score of 90 and above. If a product scores lower than 70, it should be considered a candidate for further examination and improvement, and should be labeled marginal at best (Bangor et al., 2009).

The System Usability Scale given to the participants in this study was translated from english to norwegian. The norwegian SUS form by Dag Svanæs, NTNU 2006, was used to make sure that every statement was understandable for every participant, thus making them more secure of what each

statement meant and to avoid confusion. The SUS form is included in appendix C. In Bangor et al. (2009) there was a concern that a larger portion of the tested participants did not ask for clarification if something regarding the statements was unclear. In their study, it was noted that about 10% of the participants was unsure about the word *cumbersome* in Q8. This resulted in replacing the word with *awkward*, as this was considered a more commonly used word in the english language that *cumbersome*. It was reported that this replacement was done with good success (Bangor et al., 2009).

3.3 Interview

Interviews as a method can be split into different types, e.g. structured, unstructured and semi-structured interview, as well as focus group(Rogers et al., 2011). In this thesis, semi-structured interview was used as the interview method to gather information.

3.3.1 Semi-structured interview

As clarified by Lazar et al.(2017), semi-structured interview is appropriate when you want the opportunity to ask for clarification, add questions during the interview or follow the interviewee answers wherever they may lead. The comments and answers from an interviewee can lead to questions that was not originally included in the set of questions for the interview. Compared to a fully structured interview, using semi-structured interview as a method will open up the possibility of exploring answers and topics in a more deeper and broader way, and this can give answers and discussions of issues that was overlooked before the interview.

In this thesis, semi-structured interviews were used to gather data from two user groups, novice and experienced users. The two groups of participants were presented with to different sets of questions, customized to their experience with video editing. The group with novice users were asked questions which focused on the usability of Viz Story, while the expert users got questions which focused on the functionality and features of the program and how it supported their work. Before conducting the interviews, an interview guide with the questions were made. This guide is found in appendix B.

3.4 The Setup

To conduct the usability testing and the interviews in a satisfying way, an appropriate environment with the right equipment was important. The testing and interviews were done in a room with only the practitioner and the participant present, to fully provide peace to work and concentrate. The equipment used was a laptop, Macbook Pro, a computer mouse and a mobile phone. The laptop was used as the

tool to conduct the usability testing and screen recordings, while the mobile phone was used to record audio of both usability testing and interviews.

3.5 The Research Process

The research process of this study can be split into 5 stages and are the following:

1. *Literature review:* This was conducted to find relevant literature and related studies to the research in this thesis, and to explore if any studies have covered the research questions this study aims to investigate and answer.

2. *Choosing methods:* Suitable methods needed to be chosen to provide information and data that could lead to the answering of the research questions. Usability testing, System Usability Scale and semi-structured interviews was chosen as methods for this study.

3. *Data gathering:* The data gathering was done by conducting the methods chosen in the previous step with the participants in the study. The data gathering provided notes, recordings of screen and audio, as well as completed SUS forms.

4. *Analysis of data:* The data collected was transcribed, compared, analyzed and discussed in the light of the research questions outlined for the study.

5. *Conclusion:* Following the analysis and discussion of the data, a conclusion to the research questions was provided.

3.6 Chapter Summary

This chapter presented the methods used in this study, starting with usability testing and tasks related to this testing, followed by observation and a thorough review of the System Usability Scale and interview. The methods presented in this chapter has been used during this study to gather information which lead to the answering of the research questions.

Chapter 4 Evaluation

Following the development of the set of tasks for usability testing and two sets of questions for the following interviews, Viz Story was evaluated. The participants in the study was asked to do the tasks for usability testing and fill out the System Usability Scale, before they were interviewed about their experiences and the functionality of Viz Story.

This chapter describes the study and presents the results.

4.1 The Trial

First, the participants were given 8 tasks to complete in Viz Story. The tasks are presented in chapter 3, section 3.1.1. These tasks were meant to roughly represent a video editing process, and the goal was to take the participants through the most common parts of such a process. Then, the participants were given a questionnaire called System Usability Scale, and asked to complete this. At the end, an interview was carried out to explore the participants perception of Viz Story and to gather in-depth data about their experiences.

Before conducting any usability testing and interviews, a pilot study was carried out to make sure that the tasks and questions were understandable, and to potentially discover any issues related to them. The pilot test did not unveil any issues related to the usability testing, nor the interviews.

To conduct this trial, a total of 8 participants were recruited. They were split into two groups, depending on their experience with video editing. One group consisted of four participants with little experience with video editing. Their experience ranged from having edited a couple of videos several years ago, to having done some editing during their time at high school. The expert group consisted of four participants with high level editing skills. Being an expert user in this study means that they had years of experience, ranging from 2 to 10 years, through own businesses related to video editing, having worked with video editing on projects or studied tv-production.

All of the participants were recruited based on their video editing skills. The participants were recruited using a personal network and by reaching out to persons that could provide information about potential participants. Apart from recruiting participants through personal network, participants were found through requests sent to BSTV(Bergen Student TV) and the tv-production study programme at the University of Bergen.

Most of the trials took place at the faculty of Social Sciences at the University of Bergen, while one trial took place at Media City Bergen(MCB). The trials were conducted using a laptop, with the option to use the touchpad on the laptop or a computer mouse. Audio were recorded using a mobile phone, while the screen recordings were done with QuickTime Player.

The group with experienced participants received a cinema gift certificate after the evaluation, as a thank you for their time and effort. The reason why this was the only group who received this, was that there was expectations of little to no relation to these participants, and it was considered more likely to get their help if they got something in return.

4.1.1 Tasks

All of the participants in the group with little experience were presented with the tasks in the order as presented in section 3.1.1. In the group with experienced participants, the order of the tasks was changed for two of the participants. They were given the tasks in the order 1, 3, 7, 2, 4, 5, 6 and 8. This was done to see if a different order would stimulate new or different findings from the process, but this was not the case.

While the participants completed the tasks, observations were made to capture any additional details from their interactions with Viz Story. They were directly observed and the data were recorded by taking notes, as well as audio recordings. Also, during three of the usability tests with experienced users, recordings of the computer screen were made.

4.2 Results of usability testing

As described in section 4.1.1., the participants were presented with 8 tasks to complete. The data gathered from the usability testing have been analysed to find patterns and to see how the participants completed the tasks. This section present the results from the testing.

Task 1: Open a video clip of your own choice from the archive so that it is ready for editing

All of the participants completed this task, some easier than others. The main problem during this task is after the participants have created a new project and are about to add a video clip to the timeline.

Figure 10: The options at the very top of the interface of Viz Story

To create a new project, the "New"-button, as shown in figure 10, is used. Everyone, apart from participant 2 and 7, then chose to click on the "Open"-button and select a video clip, which results in another new project, which is shown in figure 7.
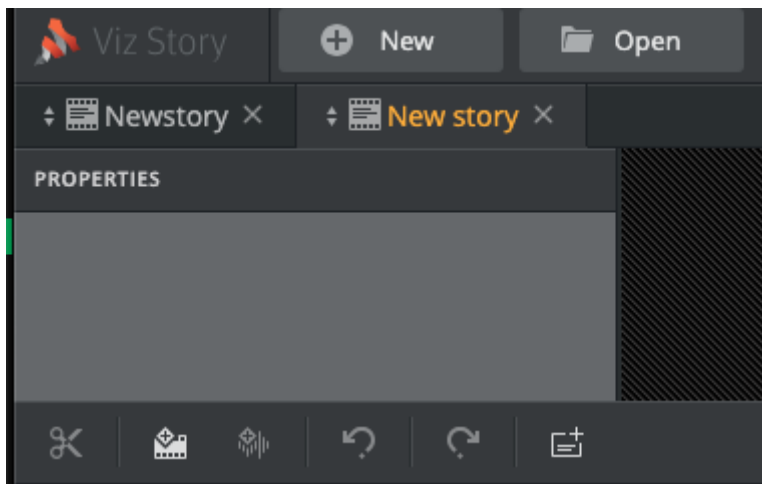
Figure 11: An example of two projects being created, called "Newstory" and "New story".

This caused some confusion, and participant 5 asked during the usability test after he had created a project to work in "*...it says "Create new story" again, will the clip be added to the project I created?*".

Apart from confusion and some uncertainty, task 1 did not lead to any major errors or problems for the participants.

Task 2: Take the clip you have started editing and remove around 5 seconds from the beginning and around 5 seconds from the end.

In this task, the distinction between the inexperienced and experienced participants became more clear. Participant 3, who was inexperienced, gave up on this task after trying for a while. The participant said "*...there is not even a keyboard shortcut to cut the video clip. I have no clue what I'm doing*". The keyboard shortcut for cutting is the C-button, but the participant never tried using this, nor checking the overview of available shortcuts. This indicates that even though the participant could not fully complete the task, there would not take much time learning it.

This is in great contrast to one of the experienced participants. Participant 5 managed to do this task quick and easy, and made use of the C-button on the keyboard to cut the clip and then removed the selected parts with backspace.

From observation, it was clear that the experienced participants completed this task with more ease than the participants with less experience.

Task 3: Add a graphic element of your own choice where you want it in the clip

This task proved to be manageable for all of the participants. Everyone added a graphic element to the video clip without any problems or errors. Some of the participants took some time to customize the graphics, and added text that would appear on the graphic element.

Participant 8, from the experienced group, explored options and managed to animate the graphics that were added during the usability testing. This indicated that the participant felt confident during the task, and this was also the impression of the rest of the participants in both groups.

Task 4: Change the format of the video clip so that it has the right format to be published on YouTube/Facebook/Twitter.

To change the format of a clip to a certain social media was the task that proved to be the most challenging for the participants. Format in this context means height format, width format and so on, not file format.

To change the format itself did not cause any problems and was something all of the participants managed to do. But there was no feedback from Viz Story about which format that could be an appropriate one for a given social media.

Participant 3 was asked to change to a format that could fit Facebook, and immediately says "*What could be a fitting format for Facebook? I don't understand what a Facebook-format is...*". The participant ends the task by saying "*I don't know, this could probably fit* " and decides to use the format the video was in to begin with.

Participant 7 was asked to change the format to something that could fit for Twitter. The participant is thinking loud and asks "*What format is used for Twitter?*" before the format is set to an option called "Square". "*If this is a format that could fit for Twitter, I would have to google it to get it confirmed*" the participants says. The participant is the asked to change to a format that would fit for Youtube, and says "*Then I 16:9 is the right one*" and changes to the format called "Landscape" and says that based on his knowledge as an experienced video editor, this is the right format.

All of the participants managed to change the format, but they struggled with the lack of feedback of which format that could be right to use, so in those terms, the error rate for this task was high.

Task 5: Remove the existing graphics on the video and add a new graphic element.

As with task 3, adding graphics was not a problem for the participants. The difference from task 3 is that the participants needed to remove graphics before adding something new in this task, but this did not cause any problems. The participants used either backspace, or right clicked and chose "Remove graphics" to remove the existing graphics, as shown in figure 8.
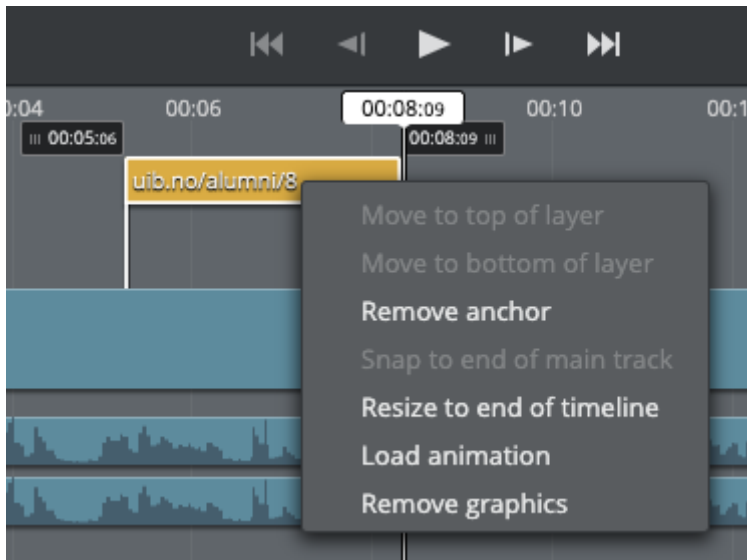
Figure 12: The menu with the option to remove graphics from the timeline, shown at the bottom of the menu

Task 6: Add a new video clip to the timeline, without removing anything that is already there

During this task, the same confusion as in task 1 occurs. When the participants are asked to add video clips to the timeline, the "Open"-button as shown in figure 10, is the option some of the participants are drawn towards. As mentioned in the presentation of the results from task 1, this leads to the creation of a new project, when the goal is to add a video clip in an existing project. As one can see in figure 10, the "Media"-button is an option, and this is where one can add a new clip without ending up with a new project.

All of the participants completed this task, but participant 2 and 5 experienced that the clip already on the timeline shrinked when they added a new clip. Participant 5 tried changing the clip back to its original size, by trying to zoom in on the timeline. This did not work, and neither participant 2 nor participant 5 could get the clip back to its original size.

Task 7: Find the user guide

This task was completed fast and easy by every participant, without exceptions. As participant 7 said "*Very simple, a question mark. I found it, that went fast.*"

31

Task 8: Find and click on the publish-button

The task of finding and clicking the publish-button went fast for all of the participants, without any major problems. Participant 7 was the only participant who explored other options before finding and clicking publish. At first, "Upload" was considered, but the participant quickly understood that this was not correct. Then the participant clicked on a button named "Publishing Queue", but realized that this was also incorrect before finding the publish-button.

4.3 Analysis of System Usability Scale

This section will present the results from the System Usability Scale used to evaluate Viz Story.

After the participants had finished the tasks, and before the interview, they were asked to complete a System Usability Scale(see section 3.2) to get an overview of how they rate the usability of Viz Story.

By completing the System Usability Scale before the interview, the participants would get the opportunity to further elaborate their answers from the questionnaire if it was considered necessary.

The scores from the System Usability Scale are presented in table 1 below, grouped by the level of experience of the participants.

Experience	Inexperienced				Experienced			
Participant	1	2	3	4	5	6	7	8
Score	70	55	75	72,5	67,5	90	82,5	67,5
Average group score	68,1				76,8			
Total average score	72,5							

Table 1: The scores from System Usability Scale

As shown in table 1, the total average score from all 8 participants is 72,5. This is, according to Sauro(2011), a score above average. A score of 68 is considered average, and anything less than this is below average. The score of 72,5 would translate to approximately 69% and the grade B according to Sauros normalizing process(see figure 8). If the lowest score of 55 from participant 2 and the highest

score of 90 from participant 6 is removed from the calculation of the score, the average score is still 72,5.

Even though the score of 72,5 from the SUS evaluation is above average, the score from participant 2 was significantly lower than both the average and any of the other scores. The score of 55 from participant 2 would translate to only 20% and the grade D using the normalizing from Sauro(2011). This participant did not feel confident using the system(Q9) and was also the participant who felt the most that the system was very cumbersome to use(Q8). Participant 2 was a part of the inexperienced group, but the score is not a part of a pattern in any of the participant groups, nor the average score.

The highest SUS score was given by participant 6 from the experienced group, who generated a score of 90. Using the normalizing process, this would translate to 98% and the grade A.
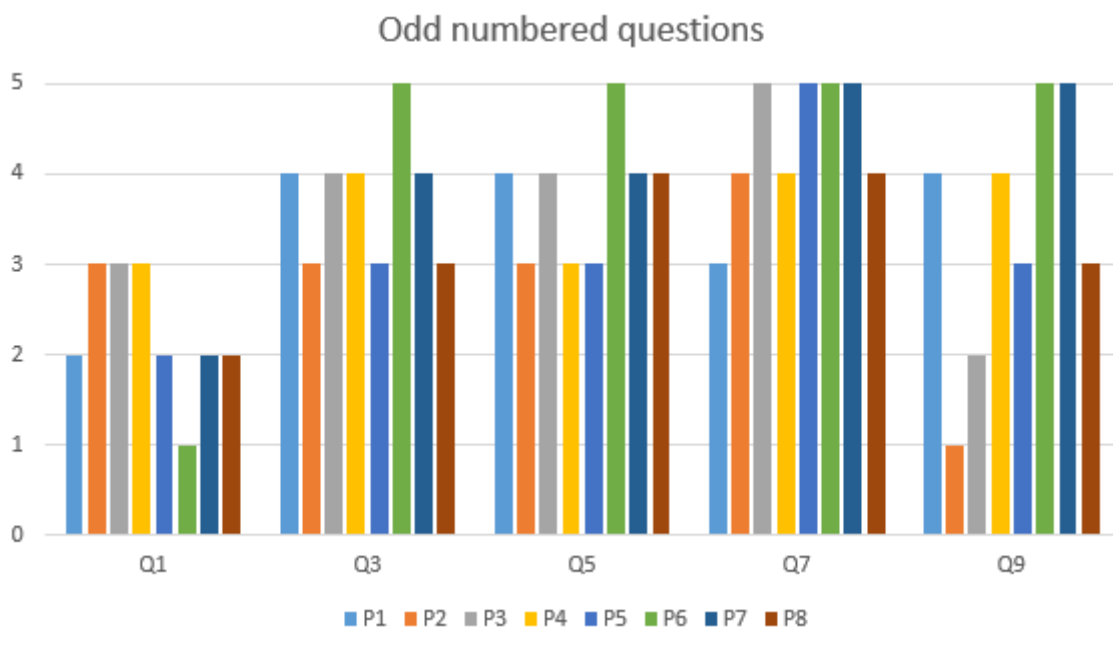
Figure 13: Participants answers to the odd numbered SUS-questions. **Q1)** I think that I would like to use this system frequently. **Q3)** I thought the system was easy to use. **Q5)** I found the various functions in this system were well integrated. **Q7)** I would imagine that most people would learn to use this system very quickly. **Q9)** I felt very confident using the system.

As one can see in figure 13, a question that stands out is Q1, if they would like to use the system frequently. The scores from the inexperienced group(participants 1-4) are slightly higher than the scores from the experienced group(participants 5-8). Participant 1 gave a score of 2 for Q1, and justifies this by saying that he does not do much video editing anyway but further explains "*it seems like an easy and simple program, so if I were to do video editing at one point, I could easily have used it*".

Participant 6 gave the highest scores on all of the odd numbered questions, except on Q1, where the score 1 was given. The participant justified this by saying that Viz Story is an easy program, but it is far too simple and limited, and that the preferred choice would be a more advanced video editing program, as this is more suitable for his work and skills.
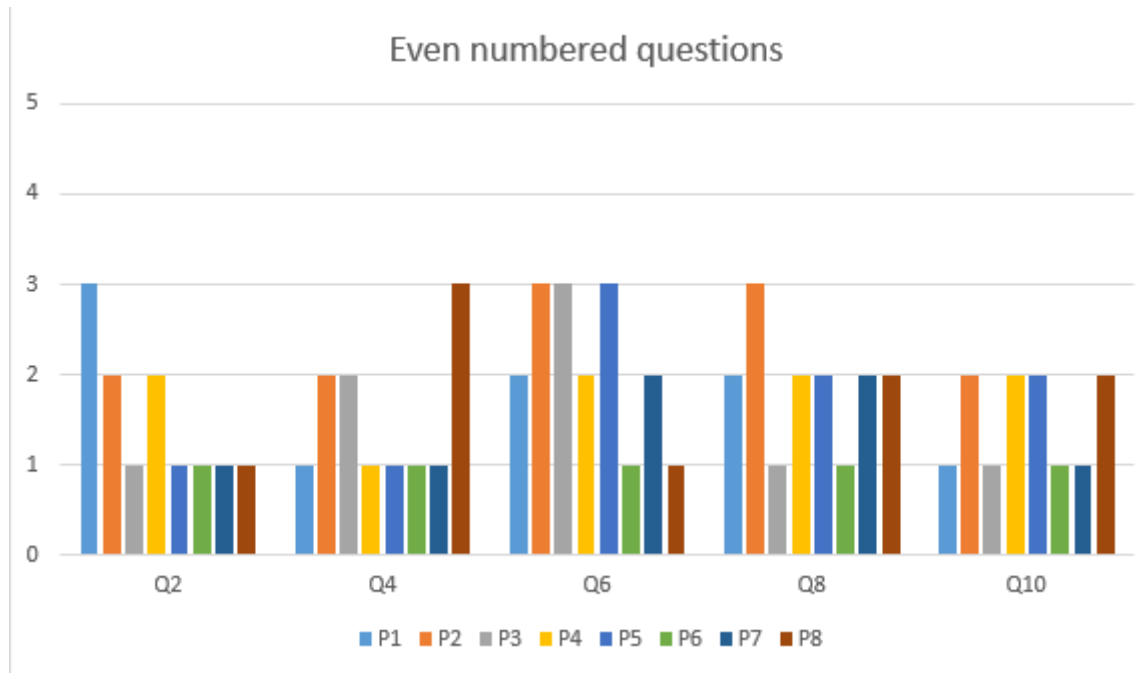

Figure 14: Participants answers to even numbered SUS-questions. **Q2)** I found the system unnecessarily complex. **Q4)** I think that I would need the support of a technical person to be able to use this system. **Q6)** I thought there was too much inconsistency in this system. **Q8)** I found the system very cumbersome to use. **Q10)** I needed to learn a lot of things before I could get going with this system.

As shown in figure 14, the question that stands out the most of the even numbered SUS-questions is Q6, if the participants feel that there is too much inconsistency in the system. The scores on Q6 from the inexperienced participants are higher than the scores from the other group. This could be explained by their lower editing experience and skills, leading to the feeling of inconsistency with a new system.

Overall, there are not any severe results that stands out, but they do give and indication of the participants perception of Viz Story, and gave the opportunity to explore some answers to gather information that could prove to be useful.

4.4 Analysis of interviews with inexperienced participants

The interviews in this study were customized for each of the participant groups, with the purpose of getting insight into the participants perception of Viz Story and the functionality it offers. The group of inexperienced participants got questions regarding the use of Viz Story as novices, and this section will present the analysis of these answers.

4.4.1 General use of Viz Story

After the usability testing, the inexperienced participants were asked how they experienced Viz Story and how they would rate the degree of difficulty of the program.

In general, this group of participants thought Viz Story was a basic program and simple to use. Participant 3 said "*..mostly, it seems as the focus here is big buttons, to make it user friendly for everyone.* ", and participant 2 stated that "*There are many things here that I recognize from similar programs*".

When asked to rate the degree of difficulty, they all agreed that it was an easy program. Participant 4 said "*Some difficulties in the beginning(...) but very easy once you get going*" and says that some difficulties related to getting to know the program is expected. Participant 2, who was the most experienced participant in this group, said this when asked to rate how difficult Viz Story was "*This was very easy to use, maybe too easy. I'm thinking, who is this program made for? I missed some functionality(...) I don't know who this program is intended for, but if it's for people without technical skills, I can see the value of it* ". Participant 3 also said that "*this is a program that everyone can learn how to use, just by clicking around or watch a tutorial*".

According to the inexperienced participants, Viz Story is a program that is easy to use, and something that most people can learn how to work with.

4.4.2 Working with Viz Story

Further the participants were asked how it was to work with Viz Story, and if there was any complications during the time they spent with the program.

All of the participants stated that they managed to work with Viz Story without too many major complications. As this was a new program to every participant, some difficulties and uncertainty was expected, as stated by participant 2 "*It was okay to work with, but I searched for functions and ways to do things as I'm used to from before. But there is nothing wrong with that, it's just about preferences*". This was also the perception of participant 4, who said "*I expected to spend some time to learn things as I have never used the program before. Viz Story has got all the components an editing program needs, you just have to find them*".

Asked if there were any parts during the usability testing that could have been easier to complete, participant 1 and participant 2 mentions the confusion regarding the creation of a new project when adding a new video clip to the timeline, while participant 3 highlights the task of changing format to a specific social media.

When asked more directly if there was parts of the process while working with Viz Story they felt was complicated, two tasks was highlighted. Task 4(see section 4.1.1) was pointed out as the task causing most problems by the inexperienced participants. Participant 4 said "*This could be done in a better way, for example where you get some kind of feedback from the program. As it is now, you need to know beforehand what format is the correct one.* "

This was also the continuous problem for the other participants, where the lack of feedback prevented them from fully completing the task.

4.4.3 Comments about Viz Story

At the end of the interview, every participant were asked if they had any additional comments, or if they had thought of something during the usability testing that they were not asked about. Participant 2 mentions the visuals, saying "*I liked the dark design, but grey font on a black background is not always the best combination. I would also prefer stronger colors on the key functions, like the publish-button*".

None of the participants reported on any severe errors, and their additional comments were mainly about the design and how they felt this program was appropriate for novice users.

4.5 Analysis of interviews with experienced participants

The group of experienced participants were interviewed with focus on the functionality and features of Viz Story. The purpose of this approach was to discover if Viz Story had the power to support the work of people with high editing skills.

4.5.1 General use of Viz Story

In the same way as the inexperienced participants, the experienced participants were asked how working with Viz Story was, and to rate the degree of difficulty.

This group of participants mostly agree with the other group, saying that Viz Story is a very simple and easy program. But the difference is that the experienced participants feel that Viz Story is too simplified, with limited possibilities and less functions than other video editing programs they are used to. Participant 6 said "*This program seems very simplified. I make money from video editing, and this would not be sufficient enough for this purpose. This program would probably work for less experienced persons who want to make video clips for social media*". The participant is then asked how Viz Story is simplified and says "*It was big buttons, few buttons. You saw right away where you*

were going. In the program I use, Premiere Pro, you often need to click through several menus to find things. It's much more advanced with more possibilities".

The lack of possibilities did not seem to be just negative, as highlighted by participant 8 "*This program looks poor. But I think that could be a good thing if you're not an experienced user, you don't have thousands of things to click on or many possibilities to get lost. This looks like a smart choice for those who don't have a background within video editing* ".

As with some of the inexperienced participants, there was also some minor difficulties related to preferences and what the experienced participants was used to from the programs they normally work with. However, this did not cause any big problems for the participants.

All four of the experienced participants rated the degree of difficulty as very easy. Participant 6 said about the degree of difficulty "*This was really easy. On a scale from 1 to 10, I would rate this as 0*", and on the same scale, participant 7 gave the rating 1. The participants was not asked specifically to use this scale, but did so on their own initiative.

4.5.2 Functionality of Viz Story

During the interviews with the experienced participants, the focus was on the functionality of Viz Story.

Asked if they could do as they wanted with the functions available in Viz Story, they all agree that the most important functions are present. But still, there are not the same variety of functions compared to the advanced video editing programs they are used to working with. Participant 7 said "*Everything works just the way you would expect from a video editing program, but I missed more alternatives in the way you can do things*". Asked to elaborate, the participant continues "*I would like more opportunities to add effects, transitions, background music. I was able to complete the tasks I was given, but without all the alternatives I'm used to having* ". Participant 6 has the same view, and says that overall, Viz Story seems to offer the most important functions you need to edit a video.

Participant 8 mentioned that it was a surprise to see that Viz Story had similarities to Premiere Pro, and highlighted the keyboard shortcuts. "*I'm surprised to see that the keyboard shortcuts are the same as in Premiere. It would have been frustrating if I was asked to work with Viz Story, and everything was different from what I'm used to*".

The participants all agree that there was a lack of functions and alternatives during the editing process, but none of them were prevented from completing any of the tasks due to this. Participant 7 states that "*If Viz Story had offered more advanced functions, for example with effects and transitions, I would probably have done things more similar to what I'm used to*", while participant 8 said that there was nothing fundamental that was missing.

The participants was also asked whether there was any functions, apart from the most basic ones, they were missing or feel is crucial to have while editing video. The participants mentioned various audio work, special effects and transitions, but none of them felt that the absence of what they mentioned was an obstacle or prevented them from doing their work.

4.5.3 Viz Story compared to other video editing programs

To get an impression of how Viz Story is compared to more advanced video editing programs, they participants were asked to rate and compare Viz Story to the programs they are used to work with. The advanced editing programs the experienced participants are working with are Premiere Pro and Final Cut. Comparing these two programs with Viz Story, the participants says that Viz Story is very basic and simplified. Participant 6 said "*If there is a person who has never edited videos before, I would recommend Viz Story over Premiere. It would be best to start easy and make some simple videos before starting to work with Premiere and the more advanced options*". This is backed up by participant 7, who said "*Viz Story seems like a program you start working with when you're learning how to edit video. Viz Story and Final Cut are two very different programs, one is basic and one is advanced. It would probably be a good idea to start with Viz Story before moving on to something more advanced.*"

Participant 5 said "*This program seems a bit too limited, but it's probably a good choice when you need to edit a video very fast and want to publish it right away*".

4.5.4 Comments about Viz Story

As with the inexperienced participants, the experienced participants also got the opportunity to make comments and elaborate on things freely, to try to catch any information they had not been asked about.

As pointed out by participant 2 in the inexperienced group, participant 7 also commented the dark design, and called for more colors to make important functions more visible. The participant said "*I would have preferred some colors to mark important functions, which would make them easier to spot*". It is worth noting that this participant had some issues finding the publish-button right away, and this could be the reason more colors to mark key functions was desired.

When asked this question, participant 6 took the initiative to look closer into Viz Story, and the participant got to interact freely with Viz Story. The participant looked closer into keyboard shortcuts, audio work, functions on the timeline, and something called key frames, which is a function where one can fade out audio and the picture of a video clip. The participant was asked questions during the time freely spent with Viz Story, to get more details about the participants perception of the things that was

tested. The participant concluded that the program has what is needed to edit a video, and there is nothing fundamental missing but the functionality was too limited. This is also pointed out by the other participants.

4.6 Chapter Summary

This chapter has given an overview of the trial conducted during this study. It has presented the results from the usability testing and the System Usability Scale, followed by the results of the interviews with the inexperienced and experienced groups of participants.

Chapter 5 Discussion

This thesis has thus far presented Viz Story, the results from its usability testing and the results from the interviews with the two participant groups. This chapter will present the discussion of the study's research question, as well as the work leading to the answering of the research questions outlined for this study:

RQ1: *To what extent can an online web based video editing software support the work of novice and expert video editors?*

RQ2: *What are the trade offs in having a simplified video editing software?*

RQ3: *Will both user groups see Viz Story as user friendly?*

To find the answer to these questions, a web based video editing software was needed. For this purpose, Viz Story was chosen and thus became the starting point of the study. Further, methods for evaluating Viz Story and investigating how it supported videowork for the two user groups was decided upon and is described in chapter 3. Usability testing was conducted, combined with interviews as described in chapter 5 and this provided data that was decisive for the answering of the research questions.

This chapter will present the discussion of the research methods used in this study and the discussion of the results and findings from the usability testing and the interviews.

5.1 Discussion of methods

Before conducting any testing or interviews, a literature review was conducted to create an overview of related studies and work and to acquire a relevancy for the research in this study. The literature review revealed that attempts have been made to customize and make editing tool adapted to novice users. Furthermore, it showed that video editing softwares that already exists are advanced and difficult to use for novice users, and this is not compatible with the increasing amount of people who edit video. A study also aimed to provide a deeper understanding of what people do with video(see section 2.5.2), while another study(see section 2.5.3) conducted by Girgensohn et al (2001) looked further into how automation could support novice users through a video editing process.

To explore and create an understanding of a web based video editing software and how it supported the work of two user groups, it was important to observe how the users interacted with Viz Story. Through the usability testing, the interaction between Viz Story and the participants in the study could be examined further. The usability testing consisted of a set of 8 tasks that the participants were asked to perform. The group of participants, a total of 8 persons, were recruited and split into two separate groups based on their experience with video editing. This was done to study and find out how Viz Story performed as a web based editing software depending on the user skills, and if there was any differences in how it supported the work of the two groups.

During the usability testing, observation was used as a method to gather additional information about the interaction between Viz Story and the participants. Before the testing, the participants was encouraged to think aloud while performing the tasks, to reveal their perception of the interaction while it was ongoing. To not miss any of the thoughts or comments from the participants during the testing, audio recording was used and later transcribed. This resulted in text containing valuable information about the interaction during the usability testing. After guidance from the supervisor of the thesis, it was also decided to use screen recording as a method to gather additional data during the last three usability tests, with participant 6, 7 and 8.

After the usability testing, each participant scored Viz Story through the System Usability Scale. This resulted in a score that gave an indication of how usable the participants thought Viz Story was, and gave the opportunity to further interpret and investigate in what way Viz Story did or did not fully support the participants work.

To further follow up and gain insight in the participants experience with Viz Story, a semi-structured interview was conducted. As with the usability testing, to not miss out on any valuable information, audio recording was used and later transcribed for analysis. Semi-structured interview was chosen as it allow a set of predefined set of questions and topics to be the starting point of the conversation, with the possibility of exploring unexpected answers or topics. During the interview, the participants had the opportunity to reflect and elaborate freely and this led to follow-up questions that was not planned beforehand.

5.2 Discussion of the results from usability testing and SUS

This section will discuss the results that came from the usability testing of Viz Story and the System Usability Scale, and discuss them in the light of the research question and aim of this thesis. The results will be discussed in two sections, one for each of the participant groups.

5.2.1 Usability Testing and SUS: Inexperienced Participants

The usability testing with the inexperienced participants revealed that Viz Story can be labeled as user friendly. Even though they were novice users, their performances showed that they were able to complete most of the tasks. As expected, not every participant could get through the testing without failing or not completing a task. However, it needs to be considered that the participants had no experience with Viz Story and were novice users, so some errors would be normal and was expected. In general, the participants mastered the use of Viz Story and did not ask for any extensive assistance.

The total SUS score given by both of the participant groups was 72,5(see table 1 in section 4.3). When the SUS score from only the inexperienced is calculated, it slightly decreases to 68,1 and this is the average SUS score (Sauro, 2011). According to Q3, the inexperienced participants believe that the system was easy to use, which is also reflected in the usability testing. The score from Q6 further shows that the inexperienced participants found some inconsistency in Viz Story, and this could relate to some of the errors that were made during the usability testing and their low editing skills. However, Q7 indicates that the inexperienced participants think that Viz Story would not require much time to learn, and spending more time with Viz Story may reduce the feeling of inconsistency in the system.

The lowest SUS score given by any of the participants from the two groups, is given by participant 2. The total score from this participant was 55, and is considerable lower than the group average of 68, the total average for Viz Story in this study of 72,5 and the average score from the inexperienced participants. The participant gave the lowest score on Q9, meaning low confidence using the system, and justified this by saying the timeline was difficult to navigate, thus leading to less control of the work being done. It is worth noting that this participant also gave a high score on Q7. As mentioned, Q6 indicates that the participants experienced some inconsistency in Viz Story, although it was not a disturbingly high inconsistency according to their scores.

The highest score from the inexperienced participants came from participant 3 who gave a score of 75. Like participant 2, this participant gave a low score on Q9. However, the participant gave a full score on Q7 and the lowest score on Q10, meaning that the participant consider Viz Story to easily be learnt. Participant 1 and 4 gave a high score on Q9, and participant 1 stated that Viz Story was a program that could very well be used if the participant should edit video sometime.

Overall, the inexperienced participants was able to use Viz Story and complete most of the process the tasks took them through without major complications. The few problems and lack of confidence using the system can, according to their SUS answers, be reduced by quickly learning how to use Viz Story.

5.2.2 Usability Testing and SUS: Experienced Participants

The experienced participants went through the same usability testing as the inexperienced ones. The tasks were the same, but the order of the tasks were changed for two of the experienced participants. This was done to see if there would be any different or new discoveries or complications following the change of the order, but this did not happen.

The usability testing with this group strengthened the findings from the testing with the inexperienced participants. It gave an indication of Viz Story being user friendly and simple, too simple according to the experienced participants. One participant stated during the testing that Viz Story looked like a poor editing software, and this was confirmed by the other participants that pointed out the lack of functions and the limited options while editing. The experienced participants completed the tasks with ease, and experienced fewer complications than the other participant group. From observation, it was clear to see that they were very familiar with editing video, and although none of them had any experience with Viz Story, their prior knowledge made them quickly adapt to working with it. The problems that occured for the participants was due to Viz Story being a completely new editing software for them, and thus some options and functions were solved and placed differently in the interface. There was no problems during the usability testing that prevented any of the work.

Following the usability testing, the experienced participants completed the System Usability Scale. The average SUS score from the four experienced participants is 76,8, which is higher than the score of both the inexperienced participants and the total average. This could be explained with the combination of the simplicity of Viz Story and the high skills of the participants, meaning that the interaction between the system and the participants were done without severe problems. This was also indicated by observation during the usability testing.

Q4 from the SUS, the question regarding if one would need technical support to use the system, gets the lowest score from 3 out of 4 participants, meaning that they believe they could handle this system on their own. This was also clear during the testing, the participants handled Viz Story in a way that did not indicate any need for support. The usability tests were conducted using a Macbook Pro, and participant 8, who gave a slightly higher score than the rest on Q4, pointed out that working on a Macbook was a bit unfamiliar. This may have influenced the answer of needing technical support, but from observation, the participant worked well with Viz Story.

The experienced participants also agree with the inexperienced participants on Q7, if most people would learn to use Viz Story quickly and 3 out of 4 gave the highest score on this question. The

experienced participants pointed out during the usability testing that there was a lack of features and options to solve tasks in Viz Story, but they seem to find the existing functions in Viz Story well integrated, from their scores on Q5. Compared to the inexperienced participants, they give a lower score on Q6, which refers to inconsistency in the system, and this can be seen in light of their high skills and their knowledge to how editing softwares works. Viz Story does not seem to be unnecessarily complex either, referring to Q2. All of the experienced participants give the lowest score on this statement.

An interesting finding from the usability testing and SUS, can be extracted from Q1. In general, the experienced participants find Viz Story easy to use, not complex and feel confident using the system, and this is also the impression from observation and usability testing. However, the scores from Q1 indicates that they are not very eager to use the system frequently, giving a low score. Participant 6 give a full score on every of the odd numbered statements, but give the lowest score possible on Q1. These scores on the odd numbered statements is not just given by participant 6, but is a trend among the experienced participants.

Overall, the usability testing conducted with the experienced participants, and the SUS scores given by them, indicates that Viz Story is a very simple and easy video editing software that most people could learn quickly. However, the participants found the functionality of Viz Story to be limited and much less than they are used to from advanced video editing softwares, resulting in a low enthusiasm to actually use it to edit video.

5.3 Discussion of interviews

This section presents the discussion related to the interviews conducted with the two groups of participants. The interviews were conducted after the usability testing and the SUS. The two participant groups got different sets of questions, although the initial questions were the same, as seen in the interview guide in appendix B. The discussion will be presented in two sections, one for each of the participant groups.

5.3.1 Interview: Inexperienced Participants

The focus of the interview with the inexperienced participants was how novice users experienced a web based video editing software, and if Viz Story would be able to fully support their editing work. Their first impression of Viz Story was good, and they felt it was simple and basic in a positive way. Even though their experience with video editing was low, they all rated the degree of difficulty of Viz Story as easy. Participant 2 was the person with most editing experience in this group, and stated that

Viz Story gave the impression of being almost too easy and asked who this editing system was really made for. The participant could see the value of such a video editing software if it was aimed at people with limited technical skills. Further, the participant stated that Viz Story would not be the best editing option due to lack of functionality. From these statements, it can be drawn connections to the impression the experienced participants got of Viz Story during the usability testing.

In general, all the participants felt they mastered the tasks in a good way, although some problems occurred, e.g. with cutting and adding new videos to the timeline. When asked if there were anything complicated about the tasks they did with Viz Story, the participants mentioned finding a format fitting for a specific social media. Changing the format was never a problem, but knowing which one that could fit to a social media lead to some uncertainty.

The problems that occurred during the usability testing were addressed in the interviews. The answers from the participants did not indicate that these were of such a character that they could not learn how to solve the tasks and finish all of their work.

When given the opportunity to elaborate on their experiences with Viz Story, none of the participants reports of any situations or problems that occurred as something that would not support their work. Instead, they keep confirming the findings that Viz Story was easy and simple, and that it support their work as novice users. Participant 3 reaffirmed that it seemed as a program that could be used by people with limited editing skills, while participant 4 highlighted the drag and drop-function as a brilliant function making the work easy.

5.3.2 Interview: Experienced Participants

The interviews with the experienced participants aimed to find out how people with high editing skills would perceive the support of their work from Viz Story, which is less advanced than other video editing softwares.

All the experienced participants said that Viz Story was a simplified and easy editing software with a good overview of the interface. The same was stated by the inexperienced participants, so from this study, there is no doubt that Viz Story can be labeled user friendly. Further, there seems to be an agreement among the experienced participants that the program is indeed easy, but too easy and limited. Participant 5 stated that the interface was similar to other editing softwares and that it was easy to find the features. Further, the participant explained that despite this, the work felt restrained and that Viz Story gave a feeling of being limited due to less features and options for carrying out tasks. The same issue was pointed out by participant 6. This participant highlighted the simplified

interface with big buttons and how everything was straightforward working with Viz Story, but said that the lack of features excluded the program as an alternative for more advanced editing of video. Participant 6 normally edit videos in Adobe Premiere and has video editing as a source of income. The participant explains that a simplified editing software like Viz Story would never be sufficient enough for this kind of work, and that it has significantly less features than Adobe Premiere. These findings from the statements of participant 5 and 6 can be linked with the statements of participant 2, who also pointed at the lack of features.

This finding is further backed up by participant 8, who stated that the only thing Viz Story and Adobe Premiere had in common was some of the basic principles of video editing softwares, which is expected, as both softwares has editing as their purpose. Participant 8 explained that the perception of Viz Story was that it is aimed at novice users, and that the limited features could be a good thing for less skilled video editors as there was less possibilities to get lost or make errors. However, participant 8 mentioned that the limited features again excludes Viz Story as an alternative for editing a video with the needs of a high skilled video editor. Participant 7 also confirm this finding, saying that Viz Story would not be sufficient enough to edit an advanced video with special effects and high-quality graphics. The participant explains that it would be a good alternative when the goal is to edit a quick and easy video for publishing on a social media.

When the participants was asked closer about the lack of features and functionality of Viz Story, things as special effects, audio work, better zoom-option on the timeline and keyframes is mentioned. These features were things they made use of while working with advanced editing softwares, but not features that are crucial to be able to edit a video. This shows that there is nothing fundamental lacking in Viz Story, but the absence of certain features makes Viz Story less attractive for the work of high skilled and expert users.

Overall, the participants explains that Viz Story does what is expected from a video editing software, but not much more than that. They all agree that it is an editing software aimed at novices, to quickly edit videos to be published on social media such as Youtube or Instagram. When it comes to being a video editor with a desire for more features and options, there are more advanced editing software that are more appropriate.

5.4 Discussion of Research Questions

This section presents the discussion of each of the three research questions, with one subsection for each.

5.4.1 To what extent can an online web based video editing software support the work of novice and expert video editors?

During this study, there has been clear indications that both novices and expert users can use Viz Story as an editing tool, regardless of their level of editing skills. Firstly, this shows that in relation to the increasing use of video production, e.g. in journalism as presented in section 2.7, a web based video editing software like Viz Story can be useful to novices and support their work. If a journalist with low editing skills is asked to create a news story which includes a video that needs editing by the journalist, the results from this study indicates that an editing software like Viz Story could support the editing work to a great extent. Further indications of this, is how the experienced participants in this study all agreed that Viz Story gave a clear impression of being suitable for users with low editing skills, and was a very simplified editing tool.

As explained by Juhlin et al. (2013), new technology make consumers into producers and the results in this study indicates that Viz Story is a part of this transition. The results show that in Viz Story, novice users have an editing software that allow them to edit video with limited skills, and thus Viz Story can be seen as an addition to the new technology, which makes the transition of users from consumers to producers easier. Kirk et al. (2007) presented to forms of videowork in their paper, which they labeled lightweight and heavyweight(see section 2.8.2). The heavyweight videowork includes work that is seen as professional, capturing video with a camcorder and editing the material into a finished video. With the evolution of video, now amateurs have the equipment and opportunities to perform heavyweight videowork. Following the increase in people owning their own equipment for capturing video, and with a video editing software such as Viz Story, the threshold for editing is lower and is more available.

It can be argued that a simplified video editing software which support the work of users with low editing skills, could appear less attractive to experts. Being suitable for amateurs, it may be expected that the editing tool would appear more primitive and not as sufficient as advanced editing tools. This was confirmed by the usability testing and statements from the experienced users during interviews. As presented in sections 5.2.2 and 5.3.2, the results indicates that Viz Story is too basic and simplified

as an editing tool for expert video editors. They were fully able to use Viz Story for editing video, but the lack of features and options while editing was decisive as they labeled it not sufficient enough for editing advanced videos. This indicates that an editing tool like Viz Story would not support the work of experts to the same extent as for novices and amateurs.

5.4.2 What are the trade offs in having a simplified video editing software?

As Viz Story appeared basic and simplified to the participants in this study, it became clear from the results of the data gathering that it was a significant trade off between ease of use and power and features offered by the system. While the inexperienced participants was satisfied by the ease of use, as presented in sections 5.2.1 and 5.3.1, the experienced participants felt that Viz Story was too easy and simplified. However, the limited range of features was seen as a positive thing for novice users, as the interaction became straightforward without too many possibilities to make errors.

When the focus of Viz Story is simplicity and ease of use, one of the advantages is that a broader mass of people can use it and master video editing. Based on this, one could assume that it would make Viz Story a video editing software that most people would use, and that could be an option for everyone who edit video, both novices and experts. However, when the ease of use is so significant, it is reasonable to believe that other aspects of the system have been affected by this. As mentioned by Popomaronis (2019), people use less time to learn and gain production skills. This can be connected to the new and simple editing tools which are easy to use, but offer less features and power than advanced editing tools. A simplified editing tool like Viz Story have less features, thus it will take less time to get familiar with the system. This can be seen as positive, but for some users, this trade off between ease of use and power will be too much.

The experienced participants argued that the limited power and features in the editing tool completely excluded Viz Story as a tool for editing advanced videos, and for this reason they would not use it for their purposes. By having a simplified video editing software the trade off was significant, and according to the experienced participants, a very limited offer of power, features and options in the editing process will not be sufficient enough in many cases.

5.4.3 Will both user groups see Viz Story as user friendly?

In the paper by Casares et al. (2001), presented in section 2.5.1, video editing was partly automated to make the process easier by using an editing software called Silver. This was done to give novice users more support, thus being a user friendly option to more advanced editing softwares. This proved to be a success, and can be seen as an indication that user friendliness do not always limit the users, even

though the experienced participants in this study felt so due to the trade offs explained in the section above(section 5.4.2).

In section 2.2 it is explained that usability, formerly referred to as user friendliness, is defined as to which extent users can achieve specific goals with a product in a specified context. In light of the definition presented by Krejcar & Hustak (2016) and the results from this study, there are indications that the user friendliness of Viz Story match this definition. Some of the five components that constitutes the term usability, presented in section 2.2, can also be connected to the participants perception of Viz Story. The learnability and efficiency was present as the participants easily performed basic tasks and quickly found what they came for, which also became clear from Q3 and Q7 from the SUS.

As in the case with Silver, and Viz Story in this study, there was clear indications that the system was user friendly, and this can be seen as beneficial for user groups with limited editing skills. However, findings in this study indicate that user friendliness can also affect some users, in this case experts, in a way that is not solely positive. Conducting usability testing and working within the field of HCI may lead to a perception that the more usable and user friendly a system is, the better. Participant 8 said during usability testing that Viz Story was more user friendly than Adobe Premiere, but Viz Story looked like a poor editing tool, so Adobe Premiere would be the preferred tool. This is an indication that a system with the most convenient usability will not always be the first choice just based on the ease of use. In this study, the imbalance in the ease of use and features of Viz Story is too significant, and the user friendliness and limitations can be seen as a disadvantage for the users with high editing skills.

Following the analysis of the results from the usability testing and the interviews, Viz Story was considered user friendly by all participants. The inexperienced participants was satisfied with the simpleness of Viz Story, which in general allowed them to quickly get familiar with the system and let them edit video in an easy way. The experienced participants felt limited with Viz Story, they indicated that the ease of use was present, and that it would benefit novice users. Even though all participants labeled Viz Story user friendly, this should not be seen as an indication that it will be appropriate for all users, regardless of their editing skills.

5.4 Limitations of the research

When conducting research there may be challenges or limitations that occurs, and this is also the reality of this study. This section will highlight the limitations of this study.

The number of participants in this study can be seen as a limitation. A total of 8 participants took part in the study, and these were split into two smaller groups of four participants in each. This means that there were only four participants representing the inexperienced and the experienced video editors, and this is a small amount. A higher amount of participants representing each of the two user groups would have generated more reliable data to eventually back up a stronger conclusion.

The time spent with Viz Story for each of the participants during the usability testing was limited. To fully get to know and learn a new video editing software could take hours, and it was unlikely to expect this amount of time from the participants. Therefore, some impressions or complications of Viz Story could have been missed or not been explored enough during this study, thus affecting answers given during the System Usability Scale or the interview.

Even though Viz Story is not an advanced video editing software, it would be extremely time consuming to test and go through every single feature in the program. This means that the usability testing has considered a smaller amount of features and functions than the editing software offer in total.

5.5 Chapter Summary

This chapter has presented a discussion of the methods used in this thesis to conduct the research, as well as the limitations of the research. Further, the results and findings from the usability testing has been discussed, followed by the discussion of the interviews conducted with the participants. Also, the three research questions are discussed in three sections.

Chapter 6 Conclusion

The research conducted and presented in this thesis has aimed at understanding how and to what extent a web based video editing software can support the work of both novice and high skilled users, and if the software is sufficient enough for both user groups. Further, the study investigated what the trade offs are by having a simplified editing software, and if both user groups in this study would see Viz Story as user friendly.

Compared to other video editing softwares presented in chapter 2 in this thesis, Viz Story is less advanced. Therefore, it was the basis for the research, including the usability testing, System Usability Scale and the interviews.

The study was conducted to see how users with the two different level of skills would carry out their work with Viz Story, and further compare and analyze findings up against each other. Firstly, the usability testing did not reveal any severe errors of the editing software itself, meaning that it was fully operational for editing video. The inexperienced group were fully able to interact and work with Viz Story, despite their low level of skills. This was also reflected in their interviews, where they stated that it was basic, easy and simple to use. One participant also said that regarding the low level of editing skills, Viz Story seemed like a good option for editing video. None of the inexperienced participants expressed any major concerns regarding Viz Story's ability to support their work, but rather felt that they were able carry out their work without any severe complications.

The experienced participants share the view of the other participant group, and said that this program was easy and simple. Through observation, these participants appeared confident while using Viz Story, and it was obvious that they were used to working with editing softwares and familiar with how such an interface works. Despite their comfortable interaction with Viz Story, the experienced participants all agreed that the limitations and lack of features would not allow them to work and edit video in a way they consider satisfying. The experienced participants all said the same, that Viz Story is brilliant for novice users and a good option for quick and easy editing. When asked to compare Viz Story with advanced editing softwares, the participants says that Viz Story is more user friendly, but the amount of features offered by the advanced softwares is significantly more, thus making them a more suitable option for their level of skills. According to the experienced participants, Viz Story is fully capable of supporting non-professional work, but it will not be sufficient enough for their purpose of editing video.

To summarize, Viz Story is seen as user friendly by both user groups and is capable of supporting the work of novice users, but not as much the work of users with high skills and their desire to make the most out of the editing. The trade off in having a simplified editing software, made clear by the lack of features and options, is the reason why high skilled users do not feel that Viz Story can support their work to a satisfying extent, but these limitations is seen as beneficial for novice users.

References

Apple (2019) Final Cut Pro X: What is Final Cut Pro? Retrieved May 11th 2019 from

https://support.apple.com/kb/PH12732?locale=en_US

Bangor, A., Kortum, P. T. & Miller, J.T. (2008) An Empirical Evaluation of the System Usability

Scale. Retrieved May 6th 2019 from

https://www.tandfonline.com/doi/abs/10.1080/10447310802205776

Brooke, J. (1996) SUS - A quick and dirty usability scale. Retrieved November 24th 2018 from

https://hell.meiert.org/core/pdf/sus.pdf

Brooke, J. (2013) SUS: A Retrospective. Retrieved May 6th 2019 from

https://dl.acm.org/citation.cfm?id=2817913

Casares J., Myers, B.A., Long, C., Bhatnagar, R., Stevens, S.M., Dabbish, L. & Corbett, A. (2001)

Simplifying Video Editing with Intelligent Interaction. Retrieved May 2nd 2019 from

http://www.cs.cmu.edu/~silver/silverui.pdf

Coker, K., Flight, R. & Baima, D. (2017). Skip it or view it: The role of video storytelling in social

media marketing. Retrieved October 29, 2018, from

http://www.mmaglobal.org/publications/MMJ/MMJ-Issues/2017-Fall/MMJ-2017-Fall-Vol27-Issue2-Coker-Flight-Baima-pp75-87.pdf

Engström, A., Perry, M. & Juhlin, O. (2012) Amateur Vision and Recreational Orientation: Creating

Live Video Together. Retrieved May 20th 2019 from
https://dl.acm.org/citation.cfm?id=2145304

Frame.io (2019) Retrieved May 5th 2019 from

https://frame.io/

Ghaoui, C. (2006) Encyclopedia of Human-Computer Interaction. Retrieved May 2nd 2019 from

http://1.droppdf.com/files/3XK1J/encyclopedia-of-human-computer-interaction.pdf

Girgensohn, A., Bly, S.A., Shipman, F.M., Boreczky, J.S., Wilcox, L. (2001) Retrieved May 7th 2019

from

https://www.semanticscholar.org/paper/Home-Video-Editing-Made-Easy-Balancing-Automation-Girgensohn-Bly/cd3da609a2927a4a560f65b8f7fba1780106fa51

Hoffman, S. (2011). Updating the Journalist's Toolbox: Analysis of the multimedia skills that

journalism graduates need and employers want in today's converged newsroom. Retrieved
October 2nd 2017 from

https://shareok.org/bitstream/handle/11244/11158/Hoffman_okstate_0664M_12944.pdf?sequence=1

Hood, G. (2004) What is Digital Video Editing Software? Retrieved May 3rd 2019 from

http://www.signvideo.com/dig-ed-softwr-rtcl.htm

Hornbæk, K. & Oulasvirta, A. (2016) HCI Research as Problem-Solving Retrieved May 3rd 2019

from https://dl.acm.org/citation.cfm?id=2858283

Jaret, S. (2012) What Does it Mean To Be a Content Creator? Retrieved May 14th 2019 from

http://www.contentengine.tv/what-does-it-mean-to-be-a-content-creator/

Jokela, T., Mäkelä, K. & Karukka, M. (2007a) Empirical Observations on Video Editing in the Mobile

Context. Retrieved May 13th 2019 from https://dl.acm.org/citation.cfm?id=1378140

Jokela, T., Mäkelä, K. & Karukka, M. (2007b) Mobile Video Editor: Design and Evaluation. In

Human-Computer Interaction. Interaction Platforms and Techniques p. 344-353. Retrieved
May 13th 2019 from https://link.springer.com/chapter/10.1007/978-3-540-73107-8_39

Juhlin, O., Zoric, G., Engström, A. & Reponen, E. (2013) Video Interaction: A Research Agenda.

Retrieved May 16th 2019 from
http://www.mobilelifecentre.org/sites/default/files/10.1007_s00779-013-0705-8.pdf

Kirk, D., Sellen, A., Harper, R. & Wood, K. (2007) Understanding Videowork. Retrieved May 2nd

2019 from https://dl.acm.org/citation.cfm?id=1240634

Kolodzy, J. (2013). Practicing Convergence Journalism - An Introduction to Cross-Media Storytelling.

USA: Routledge, Tyler & Francis Group. Retrieved May 27th 2019 from

https://books.google.no/books?hl=no&lr=&id=8Oyo6mjc89QC&oi=fnd&pg=PP2&ots=-
e97Eniola&sig=FjxK9RWMo79QXFEsqXFLk3GS62I&redir_esc=y#v=onepage&q&f=false

Krejcar, O. & Hustak, T., (2016) Principles of Usability in Human-Computer Interaction. In *Advanced

Multimedia and Ubiquitous Engineering: Future Information Technology Volume 2* p. 51-
57. Retrieved January 17th 2018 from

https://www.researchgate.net/publication/285448260_Principles_of_Usability_in_Human-
Computer_Interaction

Lazar, J., Feng, J. H., & Hochheiser, H. (2017). Research Methods in Human-Computer Interaction.

(L. Lawrence, Ed.) (2nd ed.). Cambridge: Todd Green.

Lewis, J.R. (2006) Usability Testing. Retrieved May 6th 2019 from

> http://sistemas-humano-computacionais.wdfiles.com/local--files/capitulo:modelagem-e-simulacao-de-sistemas-humano-computacio/usabilitytesting-ral.pdf

MacKenzie, S. (2013). Human-Computer Interaction: An Empirical Research Perspective (1st edition). USA: Morgan Kaufmann Publishers Inc.

Michalsen, G. L., (2016). Vizrt lager verktøyet som kan revolusjonere videoredigering for en digital og mobil TV-framtid. Retrieved October 17th 2017 from

> https://www.medier24.no/artikler/vizrt-lager-verktoyet-som-kan-revolusjonere-videoredigering-for-en-digital-og-mobil-tv-framtid/362517

Nielsen, J. (2010) Defining Usability. Retrieved May 16th 2019 from

 https://booksite.elsevier.com/samplechapters/9780123751140/02~Chapter_1.pdf

PCMag (2019) Retrieved May 5th 2019 from

> https://uk.pcmag.com/features/94269/adobe-premiere-pro-vs-apple-final-cut-pro-x-whats-the-difference

Popomaronis, T. (2019) Content Creators are Evolving and Businesses Need to Be Aware of These 3 Trends(if They Want to Keep Up). Retrieved May 3rd 2019 from

> https://www.inc.com/tom-popomaronis/content-creators-are-evolving-businesses-need-to-be-aware-of-these-3-trends-if-they-want-to-keep-up.html

Rogers, Y., Preece, J. & Sharp, H. (2016). Interaction Design: Beyond Human-Computer Interaction(3rd edition). United Kingdom: John Wiley & Sons Ltd.

Rubin, J. & Chisnell, D. (2008) Handbook of Usability Testing - How to Plan, Design, and Conduct Effective Tests(2nd edition). USA: Wiley Publishing Inc. Retrieved January 11th 2018 from http://ccftp.scu.edu.cn:8090/Download/efa2417b-08ba-438a-b814-92db3dde0eb6.pdf

Rudoy, D. & Manor, L. (2013) Video Inlays: A System for User-Friendly Matchmove. Retrieved May 8th 2019 from https://dl.acm.org/citation.cfm?id=2503741

Rush, B. (2019) What is Frame.io? Retrieved May 5th 2019 from

> https://support.frame.io/frame-io-explained/what-is-frameio

Sauro, J., (2011) Measuring usability with the system usability scale(SUS). Retrieved April 16, 2019

> from https://measuringu.com/sus/

Vizrt (2019a) Company - About us. Retrieved April 20th 2019 from

http://www.vizrt.com/company/

Vizrt (2019b) Create Easily - Brand Smart - Publish Fast. Retrieved April 29th 2019 from

https://www.vizrt.com/products/viz-story

Wania, C., Atwood, M., & McCain, K. (2006). Mapping the field of Human-Computer

Interaction(HCI). Retrieved September 12th 2017 from

http://onlinelibrary.wiley.com/doi/10.1002/meet.14504301233/epdf

Appendix A - Consent Form

Deltakelse i forskningsprosjekt
Evaluering av Viz Story

Formål
Formålet med denne studien er å evaluere brukervennligheten til Viz Story. Dette er et videoredigeringsprogram utviklet av medieselskapet Vizrt. Studien har som mål å kartlegge brukervennligheten til programmet, og undersøke hvordan to brukergrupper opplever bruken av det.

Deltakere vil ikke bli evaluert, kun Viz Story.

Hva innebærer det å delta?
Deltakelse i studien innebærer at du gjennomfører brukertesting av Viz Story. Første del innebærer informasjon og gjennomgang av deltakelsen. Så følger utførelse av oppgaver og bruk av programmet. Deretter vil du bli bedt om å fylle ut et spørreskjema(System Usability Scale), før det avsluttes med et intervju. Det vil bli gjort lydopptak av brukertestingen og intervjuet.

Frivillig deltakelse
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Hva skjer med opplysningene og informasjonen som blir samlet inn?
Ingen personopplysninger vil bli samlet inn i forbindelse med denne studien, og alle resultat vil bli anonymisert. Informasjonen som blir samlet inn vil bli lagret for analyse og deretter slettet. Deltakere vil ikke kunne bli gjenkjent i studien.

Informasjon om studien
Dersom du har spørsmål eller ønsker å vite mer om studien, ta kontakt med Sebastian Karlsen på mail Sebastian.Karlsen@uib.no eller telefon 91357462.
Veileder for studien: Frode Guribye, Frode.Guribye@uib.no

Samtykke til deltakelse
Jeg har mottatt informasjon om studien og er villig til å delta

_____

Signatur deltaker   Dato

Appendix B - Interview guide

Intervjuguide

Spørsmål:

Åpningsspørsmål:
- Har du deltatt i brukertesting ved en tidligere anledning? Eventuelt i hva?
- Har du hørt om Viz Story før dette?
- Ser du mye på video på sosiale medier? Eventuelt hvilket sosiale medie?

Overgang:
- Har du redigert film/video ved en tidligere anledning?
- Hvordan vil du rangere dine egne ferdigheter når det kommer til videoredigering?
- Kjenner du til andre program som brukes til videoredigering?

Nøkkelspørsmål(erfarne brukere):
- Hvordan opplevde du selve bruken av VS?
- Kan du si noe om vanskelighetsgraden ved å bruke VS?
- Hvis det opplevdes lett: Følte du på noen måte at bruken av VS var så lett at det kan føre til lav kvalitet på resultatet av redigeringen?
- Følte du at alle de nødvendige funksjonene var tilstede i VS for å lage en video med høy nok kvalitet?
- Tenkte du noen gang i løpet av oppgavene at det burde vært flere avanserte funksjoner som gir flere valg og muligheter i redigeringen?
- Sett bort i fra de mest grunnleggende funksjonene i videoredigering, som for eksempel klipping og grafikk, kan du nevne funksjoner du mener trengs for å redigere det du synes er en god video?
- Var alle disse tilstede i VS eller var det noen du savnet?

Nøkkelspørsmål(uerfarne brukere)
- Hvordan opplevde du selve bruken av VS?
- Kan du si noe om vanskelighetsgraden ved å bruke VS?
- I hvilken grad følte du at du behersket å bruke VS og komme deg gjennom oppgavene?
- Var det noen deler av prosessen du tenker kunne vært lettere å gjennomføre? Hvis ja, hvilke?
- Følte du det var det noen spesifikke funksjoner(oppgaver) i VS som kompliserte prosessen med å redigere video?

Avslutning:
- Annet å tilføye/kommentarer?

Appendix C - System Usability Scale

Noen spørsmål om systemet du har brukt.

Vennligst sett kryss i kun en rute pr. spørsmål.

	Sterkt uenig				Sterkt enig

1. Jeg kunne tenke meg å bruke dette systemet ofte.

   1   2   3   4   5

2. Jeg synes systemet var unødvendig komplisert.

   1   2   3   4   5

3. Jeg synes systemet var lett å bruke.

   1   2   3   4   5

4. Jeg tror jeg vil måtte trenge hjelp fra en person med teknisk kunnskap for å kunne bruke dette systemet.

   1   2   3   4   5

5. Jeg syntes at de forskjellige delene av systemet hang godt sammen.

   1   2   3   4   5

6. Jeg syntes det var for mye inkonsistens i systemet. (Det virket "ulogisk")

   1   2   3   4   5

7. Jeg vil anta at folk flest kan lære seg dette systemet veldig raskt.

   1   2   3   4   5

8. Jeg synes systemet var veldig vanskelig å bruke

   1   2   3   4   5

9. Jeg følte meg sikker da jeg brukte systemet.

   1   2   3   4   5

10. Jeg trenger å lære meg mye før jeg kan komme i gang med å bruke dette systemet på egen hånd.

   1   2   3   4   5

SUS
Norsk versjon ved Dag Svanæs
NTNU 2006