Master 2 in Human Computer Interaction and Design

Learn from the present, design for the future:

A user-centered approach to inspire the design of video prototyping tool

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March 1st – August 31st

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Contents

Summary

Video is a powerful medium to capture and convey information about user interactions with the designed systems. Using videos to prototype allows HCI researchers to rapidly explore the design of interactive system including its interaction and context of use. According to my preliminary study with HCI researchers, students and professional interaction designers, the amounts of resources and time required for video capturing and editing are the main obstacles to do video prototyping. While the use of video prototypes can be found throughout academia and industry, i found few works that address these obstacles. Therefore, my internship in Ex-Situ aims to explore video prototyping and design a new tool that could support rapid video prototyping. This master thesis presents my work during the internship, including a user study via questionnaires and informal observations of VideoClipper during creative workshops. In addition, I have carried out structured observations with iMovie to analyze user behavior during video prototyping and see to what extent current video-based software support video prototyping. The findings inform my design of VideoBoard and I propose future research that could take video prototyping tool to the next level.

Keywords

Interaction design, Video prototype, Rapid prototype, Structured observation

CHAPTER 1

Introduction

I did my master thesis project at Ex-Situ, Inria as an intern supervised by Germán LEIVA and Wendy MACKAY. Ex-Situ researchers make use of video prototype[6] to design novel interaction techniques for professional users such as designers, dancers, musicians. My internship builds on top of a previous Ex-Situ project by Germán called VideoClipper. Users can capture video, labeled with titlecards support various of design activities. My project is not limited by Videoclipper, and i strike to explore possibilities to better support the design of interactions with video prototyping tools.

Motivation

HCI researchers go through a series of design activities to reach the final design of interactive systems. A general process of interaction design involves mainly four activities, namely establishing requirements, designing alternatives, prototyping, and evaluating[12]. Among these processes, prototyping is a critical phase where designers present their ideas lively in different ways.
Some designers prototype with computer languages or electronics in order to illustrate the interactive system in its operating environment. They utilize high-fidelity prototypes to create interactive prototypes that support user interactions, allowing designers to explore and test with real users. Other disciplines like to prototype in lower precision with pen and paper, drawing wire frames, storyboards and paper mock-ups. In such ways researchers could use static images to illustrate user interfaces, interaction sequences and context of use. They consider low-fidelity prototyping an accessible way to quickly present their ideas for communication and re-design[13].
There are various reasons to choose either low-fidelity prototype and high-fidelity prototype during early phase. Each has its distinct advantages and disadvantages. High fidelity prototypes tends to present the design in realistic settings, allowing designers and developers to take real-life constrains into account and test with users to iterate their design. However, high fidelity prototypes takes much time and resources to develop. Once a system is established, the designers and developers need to start over again if they want to experiment a completely different design. Moreover, high-fidelity prototypes are heavily constrained by technological implementation, making it difficult to present novel interactive systems. On the other hand, low-fidelity prototypes focus on exploring design alternatives with rapid prototyping process. It enables fast iterations of design and evaluation to help proposing good designs that are more likely to meet users' need[3]. In terms of drawbacks, low fidelity prototypes allows limited error checking because they are presented in a less detailed level than

high-fidelity prototypes. Also, they provides poor specification to code and they are usually limited in terms of navigation and flow[13].
Video prototypes can be used for rapid prototyping, yet it does not strictly fall into the category of either high fidelity prototypes or low fidelity prototypes. On the one hand, video prototype allows the exploration of design ideas in a quick pace. On the other hand, it does not only present static user interfaces but also dynamic user interactions under realistic scenarios. In other words, video prototype is powerful in presenting not only interfaces but also user interactions using video illustrations in combination with the wizard-of-Oz technique. It provides a realistic sense of user interactions and the context of use without much investment into development. However the lack of supporting software that support rapid capturing and editing prevents the widespread of this technique. While there are many software programs that supports sketch-based prototyping (Adobe Photoshop, Adobe Illustrator, Sketch) and computer-based prototyping (Axure, Adobe XD, Invision), it is hard to find any software tools that particularly support video prototyping. Besides, most of the available video-based design tools such as iMovie, Adobe After-effects, Adobe Premium focuses on post-hoc editing that requires a large amount of time and effort to beautify the videos. The feedback of my preliminary questionnaires showed the major reasons that keep people away from video prototyping. Thus I believe the lack of proper video-based design tool should be blamed and the focus should be shifted away from heavy video editing in order to enable rapid video prototyping process.
The research goal of this project is to to learn from the current video prototyping practise in order to propose new designs of tools that will further support their design activities. To be more concrete, the research question is:

How can we better support rapid video prototype for design purposes based on current practise

To answer this question, i took a user-centered approach to study the design activities of HCI students, researchers and professional interaction designers. In addition, i investigated the use of video artifacts and the use of available video-based design tool iMovie in order to inform my designs.

CHAPTER 2

Related Work

DIVA

Video is powerful medium that are traditionally used for recording observations. It is capable of preserving qualitative data that can be analyzed to different degrees afterward[10]. However, it is usually cumbersome to explore and analyze the huge amount of video data collected from field study[8]. Therefore, MACKAY introduced DIVA[8] as a tool to analyze qualitative and quantitative data from multimedia such as video or audio records. The main display of DIVA presents a spatial view and a temporal view as shown in Figure 2.1. The spatial view along with the notes give reviewers a clear visual representation and brief explanation of the current scene. The temporal view on the other hand, uses labels to help identifying long term patterns. Although DIVA is not an tool for video prototyping per se, my informal observations with VideoClipper showed that users may still run into confusions from time to time even with small amount of video data. Therefore it might be useful to propose video labeling or annotation feature that could give user a better overview of their video prototype.

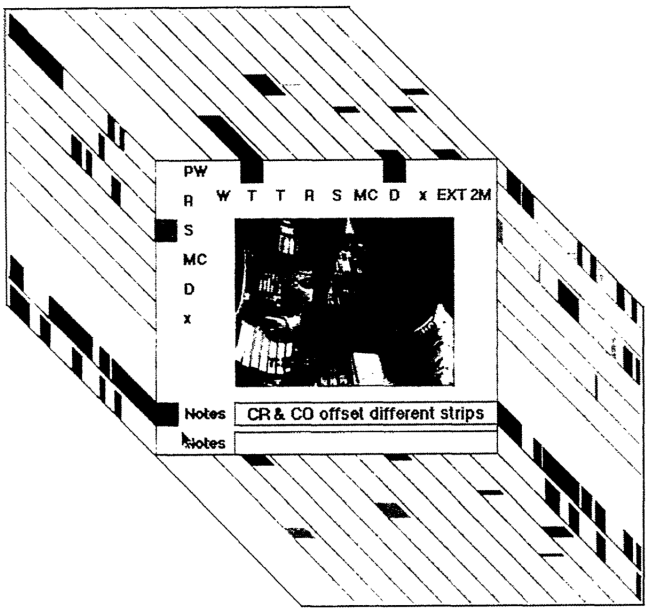


Figure 2.1: DIVA main display. The spatial view is in the center and the temporal view is on the sides.

PaperPoint

Normally, paper prototypes are statics prototypes that are impossible to react by themselves so they are generally used as static model to display interfaces. PaperPoint[14] attempted to support paper-based presentation and interactive paper prototype. Inspired by Microsoft powerpoint, PaperPoint uses digital pen and paper to create slides with hotspots to link different slides. In addition, users can also visit particular slides with buttons. While PaperPoint was originally conceived for presentation, it also supports rapid paper prototyping.

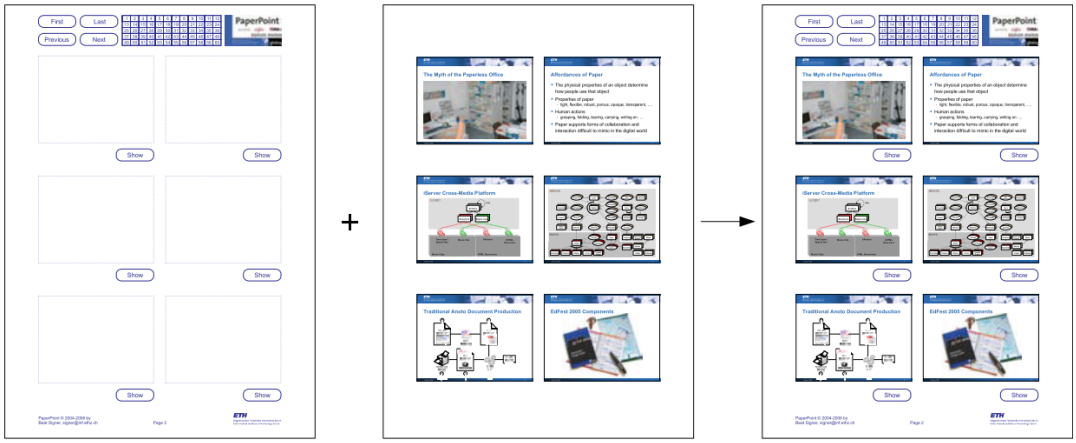


Figure 2.2: Paperpoint printing process

Figure 2.2 shows hotspots as rectangle area in the template where the presenter could use to trigger transitions to different slides. In combination with a Bluetooth pen and screen, researchers can present the click-through prototype. This pioneering research design presents a technology that could turn paper mock-up interactive. It would be handy to shoot video prototypes with such paper mock-ups. However this technique is only capable of reacting to click-based interactions. It is not feasible to feature novel interactions technique with the help of PaperPoint.

The Virtual Studio

Video can be used a tool to explore design in future settings[18]. With an interest on featuring futuristic technology, a group of researchers from Denmark turned to the Virtual Studio in order to make virtual video prototype[1]. The virtual studio provides the blue-wall technology generally used by TV world to broadcast physical objects such as people with virtual images that are generated in 3D models(Figure

2.3). In their paper, they presented the technique to make virtual video prototype using the virtual studio. They have suggested virtual video prototype as a way to feature futuristic technology in real-life based on its envisioned ecology. By embodying the future technology in real-life setting, it forces designers to address concrete designs taking the physical constrains into consideration.

Figure 2.3: A demonstration of virtual interactive wall in combination with physical setup

However, cumbersome process to produce 3D models is required to produce such virtual video prototypes. Besides, blue-wall technology takes much effort to setup physical scenes. Another drawback is that actors are forced to interact with a blank blue screen without awareness of the technology, making it hard to involve users in the making of these virtual video prototypes. Nevertheless, this was one of the few attempts that suggested new technology for video prototyping. In my opinion, it is interesting to include virtual objects or images during video prototyping for better visual representations, but the blue-wall technology is not suitable for rapid video prototyping because it takes too much time and resources to setup.

Machinima

Apart from the virtual studio, another group of researchers from Indiana University made used of Machinima to produce their video prototypes[2]. Machinima platforms are originally designed for video game creation, but its hybrid game platforms provides flexible camera controls, real-time animations, capability of content creation and rich libraries of virtual asset that can be used for video prototyping. Researchers

were able to demonstrate and test new interfaces especially in the field of virtual reality, communications and ubiquitous computing. Yet, they found Machinima lacks precise facial expressions and detailed character interactions to present user interactions and experience explicitly.
To conclude, so far tools that supports virtual video prototyping are disappointing. Firstly, these tools were not developed for video prototyping at the first place, so it takes extra amount of time and resources to produce the necessary assets for video prototypes. Secondly, the process of creating virtual video prototypes are cumbersome, failing my expectation for rapid prototyping process.

iMovie

Based on my study so far, i found little research that attempted to simplify video prototyping process. Thus, i turned to the industry to find video-based application that may assist video prototyping. After using Adobe Premium, Adobe AfterEffect and iMovie, i decided to investigate iMovie further for inspiration due to several reasons. Firstly, unlike Adobe Premium and Adobe AfterEffect, iMovie is capable of not only editing videos but also shooting them. IPad users could download it for free on App Store, making it more appealing for research purpose than other video-based software that generally costs dozens of euros per month. Being able to shoot videos and edit in the same application, iMovie saves users from the trouble of transferring video files from cameras to computers. In terms of editing features, it provides an entry level of editing features such as video trimming, audio recording and transition effects that can be used for video prototyping. In order to investigate further the usability of iMovie and how it contributes to video prototyping, i performed a structured observation study using iMovie. It will be covered in Chapter 5. The result was used to inform my design for future video prototyping tool.

Summary

I have found many use of video prototyping techniques in varies setup [15][18][6][9]. Yet little research has been done on simplifying video prototyping processes. Some research focused on virtual video prototyping, a way to make video more powerful with the help of virtual environment. Although the involvement of virtual objects and characters may assist video prototyping in varies way such as featuring futuristic environment and providing better visual representation, the demonstration of user interactions and user experience did not improve. Besides, virtual video prototype requires extra time and effort for content creation, which is one of the key problem that keeps people away from using video illustration according to my preliminary study. Some researches turned to different external applications, but none of them

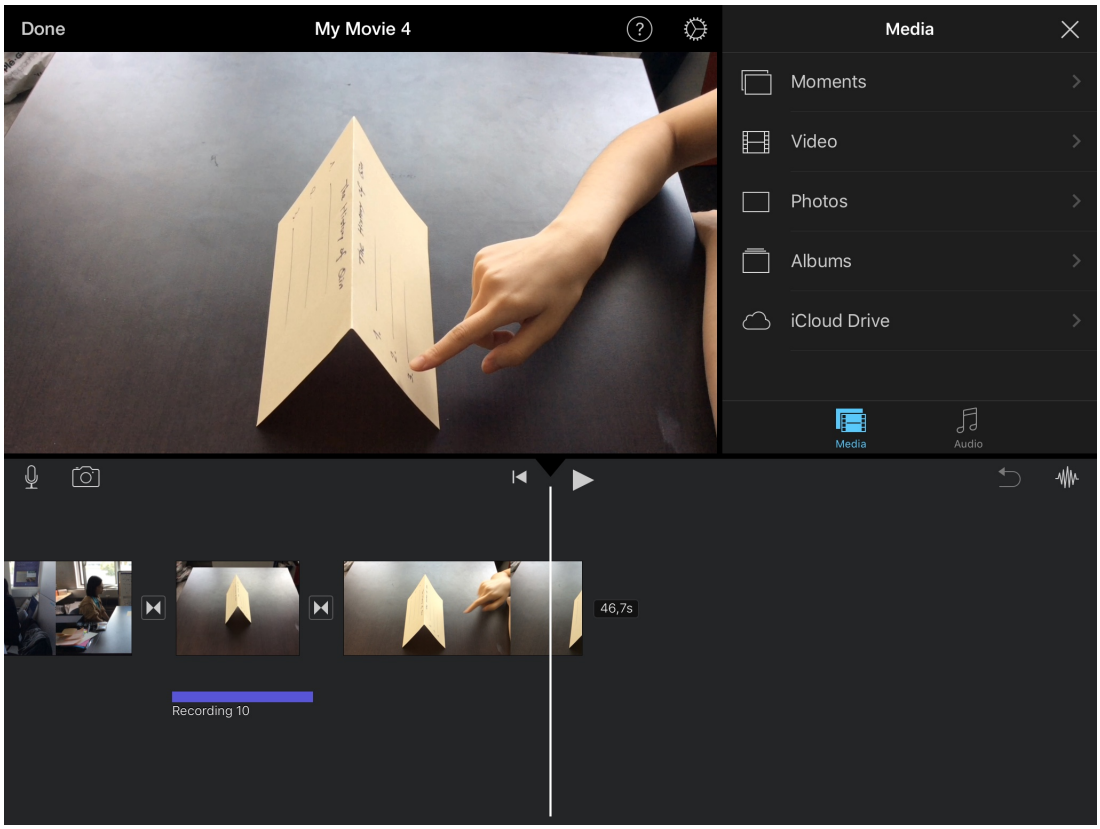


Figure 2.4: iMovie Interface

simplified the process of video prototyping. In order to encourage and support the use of video prototyping for rapid prototyping, we need to come up with designs that simplifies the video prototyping without excessive technologies.

CHAPTER 3

Preliminary Study

In order to gather user information and discover current issues with video prototyping, I performed informal observations and questionnaires at the beginning of my internship. Informal observations includes observations on the practises of video prototyping by different researchers in varies occasions. Meanwhile, the questionnaire conducted critical information on how interaction designers and HCI researchers go through their early design process and especially how they normally prototype for their projects.

3.1 Preliminary Questionnaire

I designed a preliminary questionnaire and sent it to students, researchers and professionals that are related to Interaction Design in order to gather insights from wider range of audience. For the design of questionnaire, the critical incident technique[7] was used in the questionnaire to call out latest experience that are most representative to the participants. In addition, some of the questions are included to help gather market information for my Innovation & Entrepreneurship thesis along with this master thesis.

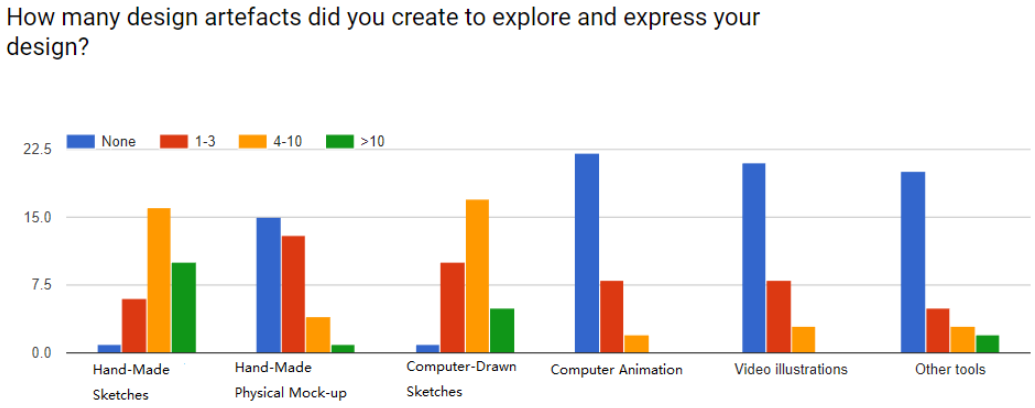


Figure 3.1: People hardly use video illustration and computer-based animation during their development.

The questionnaire was sent to students from HCI disciplines as well as researchers and professionals that are connected via LinkedIn"s Interaction Design Association(https://www.linkedin.com/groups/3754). In total, I collected a total of 33 results from 11 different countries (A.7). Based on the result, all but one has at least

a bachelor degree and most(72.7%) of them have more than 1 year experience in design. Experienced workers with more than 4 years experience and more than 9 years of experience takes up 21.3% and 6.1% respectively. It seems that hand-drawn sketches and computer-drawn sketches are the main tools for them to explore their design in early phase, only one out of 33 did not implement either techniques. On the other hand, computer animations and video illustrations are hardly used as 66% of the participants did not make use of either technique. Meanwhile hand-made physical mock-ups do not seem so popular as 15 of the participants did not use them. Although few participants made use of video illustration during their early design, some use video to illustrate step-by-step details of interaction(45.5%) and to figure out how user move from a state to another (36.4%). In terms of video for communication, only 21.2% of participants do not use video to communicate at all while the rest tend to use video to communicate with different people such as clients(54.5%), users(48.5%) and other designers(36.4%). When it comes to using videos for documentation, 46.9% of participants do not use any video for documentations while others use them to document final design(43.8%), alternative design(21.9%) or intermediate design(18.8%). It is surprising to see that only 1 out of 33 would use video to test with user or to brainstorm. Further questions showed that lack of effort and resources to capture and edit video are the two major reasons that keep people away from using video, with were selected by 71.9% and 78.1% of the participants respectively.

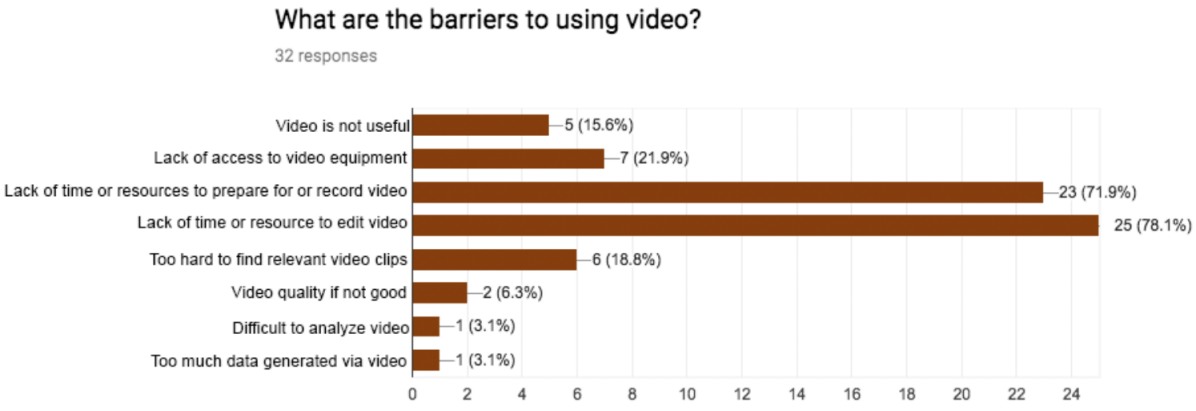


Figure 3.2: Main barrier of using video are the time and resources for video capturing and editing.

In addition to close questions, open questions also provided many interesting feedback. Firstly, many participants believe that visual representations are critical to explore

and refine design ideas, yet few of them chose video as one of their commonly used tool in early stage development. Secondly, some believed the amount of time and effort required to make a video is so significant that they would rather do coding to illustrate their ideas. Also some of them would only like to make a video for the final design because they think video editing is cumbersome. Thirdly, it was interesting to see some suggestions from participants matched our research interests. For example some asked for a more rapid way to prototype in the early stage. In addition, some hoped that collaboration could be easier during prototyping and the design artifacts could be easier to track and store. To conclude, the feedback from the questionnaire revealed that videos are hardly used as we expected. At the same time, the information they provided clearly points out the main reasons why video prototyping are not widely used. Although it is still unclear why video are generally perceived as the tool that is only good for final design, we got plenty of user feedback that showed the expectation for a next generation video prototyping tool. In order words, rapid video prototyping seems to be an ideal option that may fulfill their requirements for a good design tool in early phase.

3.2 Informal Observation

ERC Creativ Workshop

ERC Creativ Workshop is an annual two-days event organized by Wendy for the sake of promoting the concept of substrate and co-adaptation. During this workshop, researchers from HCI and other disciplines join forces to explore novel interaction designs bearing these concepts in mind. This year, 28 participants took part in the creative workshop. They formed five groups to idealize different concepts and eventually produced a video prototype each group to present their ideas. Each group were provided an equal amount of material for paper prototyping and an iPad with VideoClipper for them to capture the video prototype. After the introduction in the morning on the first day, all groups spent roughly two hour in the afternoon for discussion until they started video brainstorming and prototyping. In general, each group had roughly 4 hours for video brainstorming and prototyping, two hours on the first day's afternoon and two hours in the morning next day.
In the end, each group presented an video prototype for approximately 2 minutes, focusing on different topics. Group1 started from an existing idea that was published by one of the group member. They reused her concept that was implemented in a software and applied it to a different software. The owner of the idea took responsibility of most of the arrangement and acted as the user in the video prototype because she knew the interactions the best. It was interesting to see how video prototype helps to illustrate an existing technique in a completely different application. Group2 made a smart use of video by using reality to represent virtual reality. To be

more precise, they captured motions in reality to represent the interactions design in virtual space. In addition, they used text explanation to indicate that the video is in fact illustrating the interactions within a virtual reality application. while one of the actor is showing the interaction with a giant pot, the rest of the team hided behind the pot and pushed it around to simulate the view rotation in virtual reality. Group3 used video prototype to demonstrate futuristic programming interfaces where programming are finished by the computer itself inferring on the inputs and outputs declared by the user. As for Group4, they were a group of 6 but they separated into 3 small groups to capture three variation on the same idea. It was appealing to see such teamwork and how they managed in small groups to shoot different design variation. In the end, they had a bit of time issue because they cannot work at the same time to edit their videos. Nevertheless, their video prototype was interesting because they were featuring three variation of the same idea in a coherent story. As for group5, their task distribution was flexible, almost everyone has been the actor, cameraman or someone that prepares the material. In addition, they put much efforts on capturing use scenario instead of user interface. By featuring the use scenario, they demonstrate in what scenario their application is needed and how it helps to improve user experience and user satisfaction.

In summary, the observation during ERC workshop showed different usage of video prototypes. As previously said, video prototypes are able to illustrate not only user interfaces, but also user interactions, use scenarios and user experience. In addition, it was interesting to see how video prototype could support the design of virtual reality concepts. Main complains collected from the users about VideoClipper were the inconveniences to delete videos and to duplicate a single video clip. As VideoClipper still awaits for inspirations and improvements, sometimes users may encountered bugs that crashes the application, severely influencing user experience. My observation of user behaviors of showed that most users tend to film in a long strip despite the vertical storyboard layout. These behaviors lead to two consequences. Firstly, it causes inconvenience of deleting and copying videos and it makes navigation slower. Secondly, the usage of screen space is ineffective as video are only displayed on the first row as shown in Figure 3.3. These findings raised my awareness of certain issues and informed my early designs.

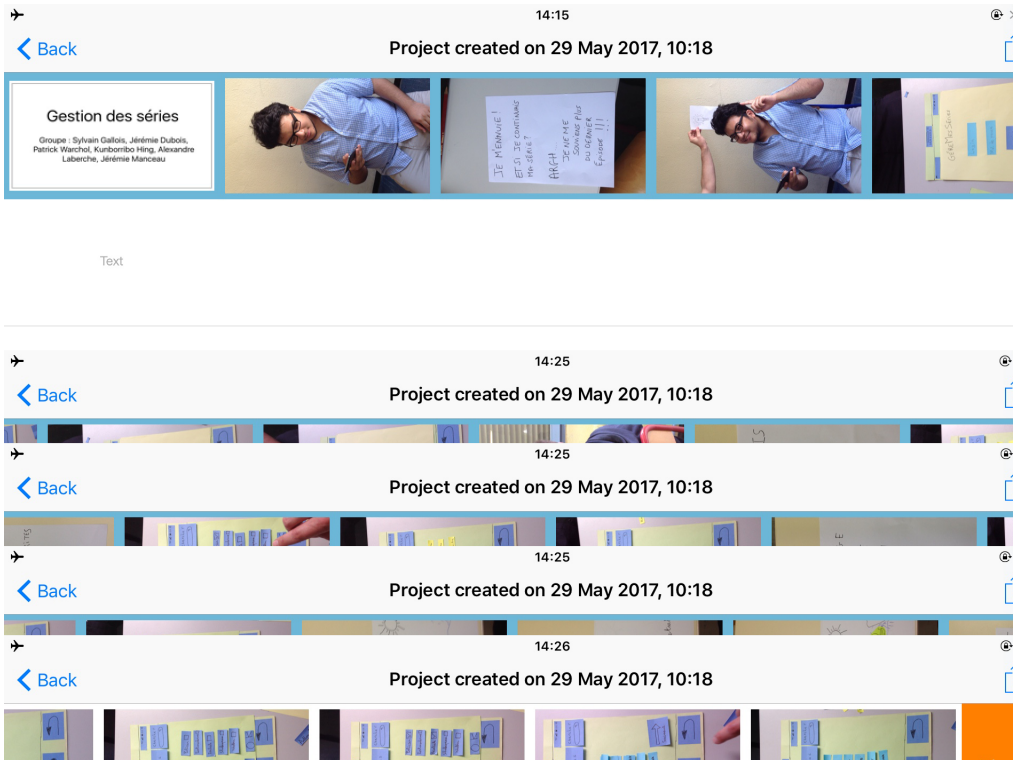


Figure 3.3: Sometimes only a single row is used on VideoClipper. In this case this project contains 26videos in a single row without having any other videos under any other titlecards

CHAPTER 4

Early Design

4.1 Ideation

With the goal to support rapid video prototyping, i have performed multiple brainstorm sessions with different researchers and my supervisors to gather as many ideas as possible. In the first session, we have proposed many ideas that can be categorized into 10 directions (A.1). The first brainstorm session was meant to openly brainstorm any features that may assist rapid video prototyping. All ideas were inspired by our previously experience with video prototype or related works. The focus was put on video prototyping techniques, thinking about additional features or implementations that may benefit designers. After the first round of brainstorm, a second round of brainstorming was performed to identify various use of video during early phase design, seeking to find a suitable entry point for video prototype where it is most needed. In this phase, the attention was put on video itself to identify its position in design. I believe identifying the necessity of video in design phases would help to identify users' need, resulting in useful proposal that solve actual problems. Learning from how researchers currently use video [11], i classified the use of video even more specifically. After brainstorming, seven different use of video are discussed(A.2).

4.2 First Iteration

I picked out several ideas from previous ideation phase to explore their interactions and context of use. Based on the result of my preliminary questionnaires, i decided to put my focus on supporting creativity and collaboration with design alternatives and enhancing video management for easier video tracking and manipulation. Bearing the instrumental interaction design models in mind[4], I made several video prototypes with VideoClipper in order to explore their interactions and share with other researchers for feedback. To be more specific, in the first iteration two ideas are made into video prototypes and presented to other researchers for feedback.

Envelope System

Firstly, an *envelope system* is designed to hold videos with containers. The container was inspired by the titlecard, a feature in VideoClipper. Titlecards can label a group of videos and allow the explanation of a transition. A titlecard is always created on the left while all other videos under this titlecard are stored next to it. By dragging the titlecard, user also drags all the videos that are after it as shown in Figure 4.1.

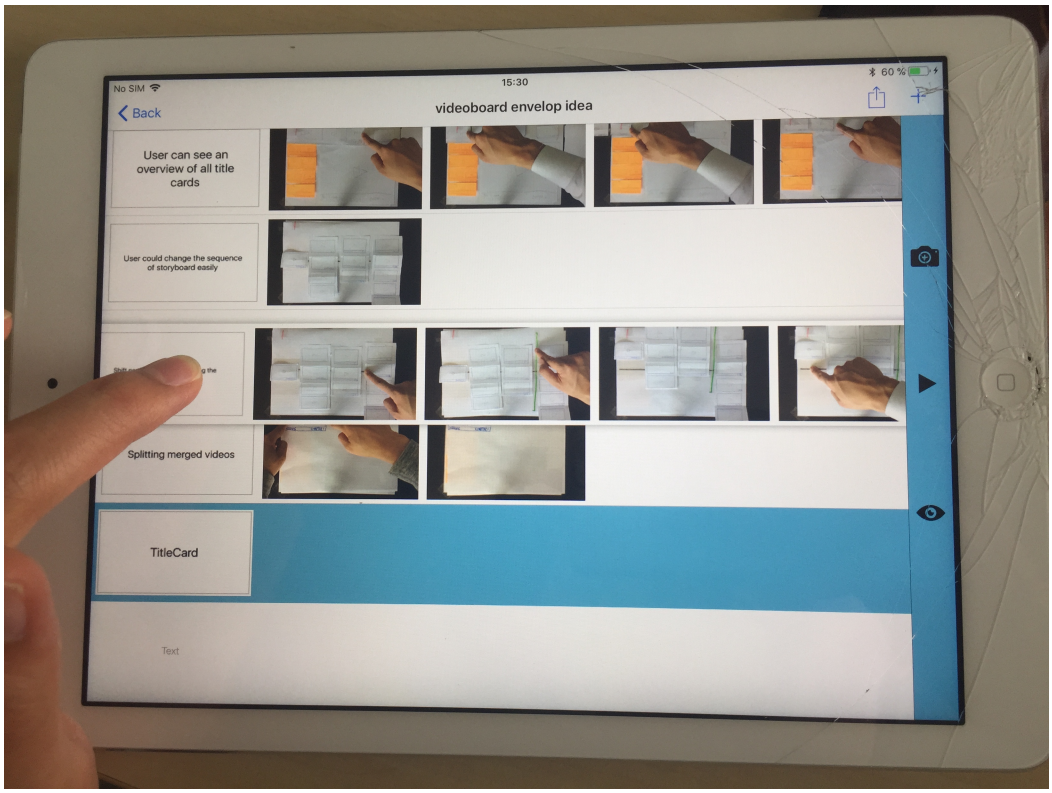


Figure 4.1: Dragging a titlecard involves all the videos in the same row.

In this way, a titlecard acts as a container of all videos and the titlecard itself can be used to annotate these video data. From my informal observations I noticed that the linear layout of video sometimes results in poor performance during navigation and video manipulation. Users had to swipe back and forth to review their videos and they occasionally encountered troubles when they move the videos. Therefore I decided to propose this design where titlecards are used as envelope containers to wrap their videos, instead of just being the header. A visual representation of such envelope is shown in Figure 4.2.
The envelope has some of the titlecard feature such as text annotation and labeling. It also contains either titlecards and videos within itself. In practical case, the text on envelope should be minimized to a singe row so that the users may still see the thumbnails of videos in the envelope as presented in Figure 4.3.

Timeline Design

The second idea features a new video layout where users could see all the videos distributed along a timeline. The timeline lies beneath the videos, going from left

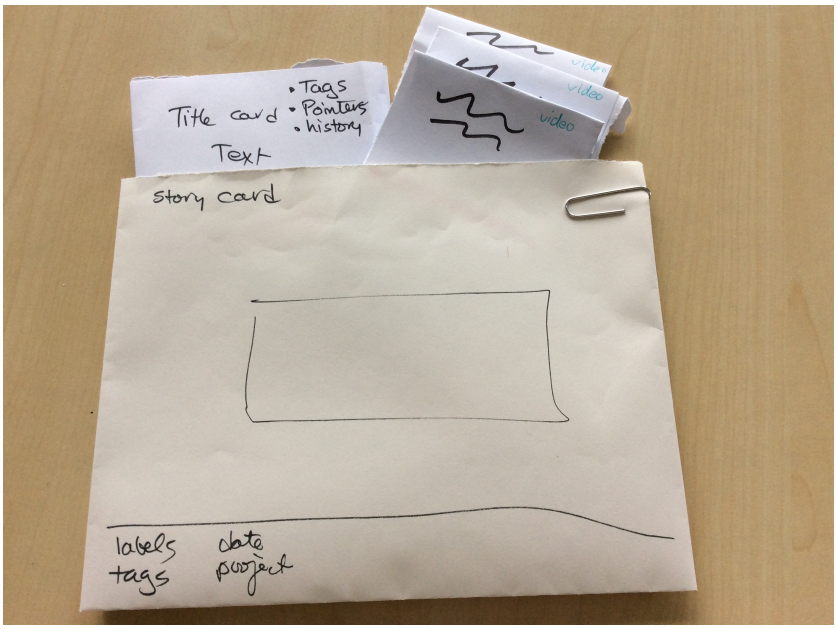


Figure 4.2: Physical presentation of the envelop system

to right as presented in Figure 4.4. The horizontal positions of the videos represent their playing sequence. Videos are distributed on the time line horizontally as the traditional linear layout but alternative videos of a particular video are placed vertically to support design alternatives. If a video has any alternative in vertical, the user may swipe up or down to move other alternative video onto the timeline in order to substitute the original one. Besides interacting with the videos, Users may also interact with the timeline. When the user moves it vertically, the play list of videos will be completely changed. Videos on the timeline after moving will form the new play list, replacing the former play list. Users may create several alternative videos horizontally on one video to diversify one particular plot. They could also create one alternative video in each column and shift the time line horizontally to switch to a completely different story.

Feedback

After presenting the video prototypes and graphical illustrations to other researchers who are familiar with video prototyping, i collected some useful suggestions for future designs. Firstly, the envelope system allows users to wrap multiple videos and titlecards under one envelope, making it possible to label and move several videos together. Yet other researchers generally did not like this idea because it makes individual videos harder to access. The design which allows envelope to contain

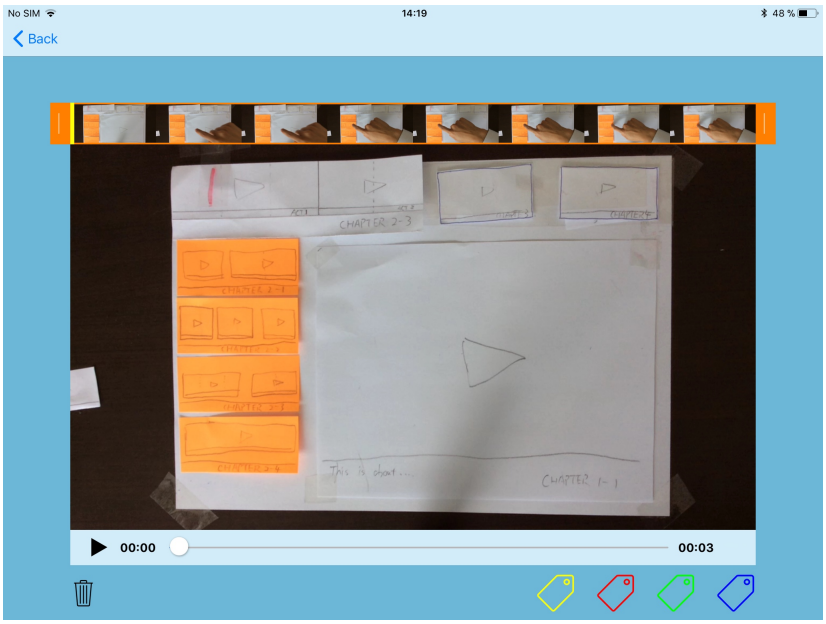


Figure 4.3: Interface of the envelop idea where videos are grouped together under titlecards. In this case the titlecards are labeled by chapter numbers

not only videos by also other envelopes, makes it powerful but also cumbersome. Other researchers described this design as "getting items from drawers", which is interpreted as hidden and inaccessible.
On the other hand, the timeline design which supports design alternatives was found interesting. Nevertheless, the feedback showed that the current design is inefficient because only about four to five columns of video are able to show on the screen provided visible thumbnails. Thus i drew the assumption that such design will hinder the navigation when videos get in quantity as previously found with VideoClipper. A better design needs to be proposed in order to keep the benefits of such alternative design while keeping the navigation easy.

Figure 4.4: A visual representation of the timeline idea where videos are distributed along the timeline while alternative videos are aligned vertically

CHAPTER 5

Structured Observation

When my internship was about to finish, VideoBoard was still under development and it requires some fundamental editing features to coordinate with the novel features that i want to propose. In order to avoid redundant features that may burden video shooting and editing, I planned to formally observe users behavior during video prototyping so that i can provide the essential features to support them. In addition, i wanted to investigate how well does iMovie support video prototyping so far to learn from its pros and cons. In the end, I carried out recruited 15 participants in total, consisting of 12 master students and 3 bachelor students. All of them have previous knowledge in HCI.

5.1 Study Design

The structured observation study is performed on 5 creative sessions. Each creative session requires 3 participants and takes approximately 2 hours. Participants are given a topic to generate ideas, create storyboards and shoot a video prototype. In the end, participants demonstrate their video prototype to me and answer a questionnaire regarding their creative session. I would discuss shortly with the participants after they present their video prototype if i find anything interesting or confusing during the observation. To be more specific, i give an introduction to the participants at the beginning of the creative session, covering the goal of the study and the process they need to go through. In addition, they need to sign a consent form individually and confirm that they are fine with being recorded by camera. Afterwards, each of them receives a handout with guildlines for this creative session. On the handout, the participants are asked to brainstorm novel features and interactions for flexible displays. Figure 5.1 shows an example of such flexible display and it is shown to the participants as reference. They need to go through 3 stages, namely brainstorming, storyboarding and video prototyping. Each stage is estimated to be approximately 30 minutes, but participants will not be stopped if they do not follow it strictly. There are not strict limitations on the process , nor about the final product. Yet in the handout, i suggested them to concerned less about technical details but focus more on the design of interactions. It is also highly recommended to include not only the demonstration of the designed features but also the context of use. After all, the video prototype should be self-explanatory.
There are two main goals of this formal observation. Firstly, i want to observe participants' behavior along this creative session, including how they do brainstorming, draw storyboards and shoot a video prototype. Secondly, i want to know how often

Figure 5.1: An instance of flexible display that is showed to the participants during introduction

do they use different features in iMovie to edit their video prototype. It is also interesting to know how much time did they spend on capturing videos and editing their videos. In order to capture these information, I formulated an observation coding (A.6) to record all the user behaviors along this creative session. It helped me to precisely record how many times did a group use a particular feature in iMovie. In addition to the observation coding, i also made a questionnaire (A.5) to gather qualitative data about the usability of iMovie. Some questions use seven point Likert type scale ranging from strongly disagree(0) to strongly agree(6) and no opinion in the middle. The other questions are open questions that aim to find out any inconvenient incidences and what features of iMovie are preferable to the users. In order to avoid having single attitude throughout the questionnaire, I counterbalanced the questionnaire by asking the first session in positive statement, second session in negative statement and the third session mixed.

Pilot

Before running official sessions, I asked the three bachelor students to run a pilot study in order to verify the experiment design. In total, it took them 1hour and

35 minutes to produce a 17seconds video prototype. They spent 35minutes, 26 minutes, 25minutes respectively on brainstorming ideas, drawing storyboard and making the video prototype. In general the observation went really well and i was able to see interesting behaviors. However the length of video prototype are too short that it requires little usage of iMovie. Based on my previous study during ERC workshop, video prototypes generally exceed 2 minutes. Therefore a video prototype that is under 20 seconds is rather impractical and the results might not be applicable to inform my future design. Considering the fact that participants only have approximately 2 hours, i set the requirement of video prototype to 30seconds so that it is still feasible to finish within the time constrain. Otherwise it would be very hard to recruit participants if i have to prolong the experiment.

5.2 Result

Among all four groups that participated the formal sessions, three of them had experience with video prototyping and VideoClipper while group1 had not done any video prototyping at all before. Surprisingly, through subjective feedback by participants themselves, group1 came up with a quite satisfying result. Meanwhile, as shown in Figure 5.2, i seem to observe a correlation between user satisfaction on their final video and how well the video prototype illustrate their idea. Basically, participants tend to be more satisfied with their video prototype when they found it illustrate their ideas clearly. This finding is used to infer what features or design activities may lead to rather satisfying result.
Overall, all four groups spent different amount of time on different sessions as shown in Figure 5.3. While group1 spent more time than estimated, the other groups spent roughly around 90 minutes to finish. I suspect that group1 spent a bit more time than the other groups because they are less familiar with the video prototyping process. Besides, group1 produced the shortest video despite they spent the most time in the whole process. For brainstorming, there are not significant differences in the time that they spent. In terms of video shooting, group4 spent double amount of time than the other groups. However, it is important to point out that video shooting showed in Figure 5.3 includes preparation for video shooting, such as making paper mock-ups or setting up the scene. It is hard to separate the time spent on preparing material because all groups except for group4 did that in parallel to video shooting. In fact, group4 spent approximately 20minutes on preparing. On the other hand, the amount of time each group spent on storyboarding and video editing is very different. For example group2 spent triple amount of time than group3 in storyboading, and group2 as well as group4 surprisingly spent less than 5minutes in video editing. These differences are due to many different reasons and i will be covering them in the following sections.

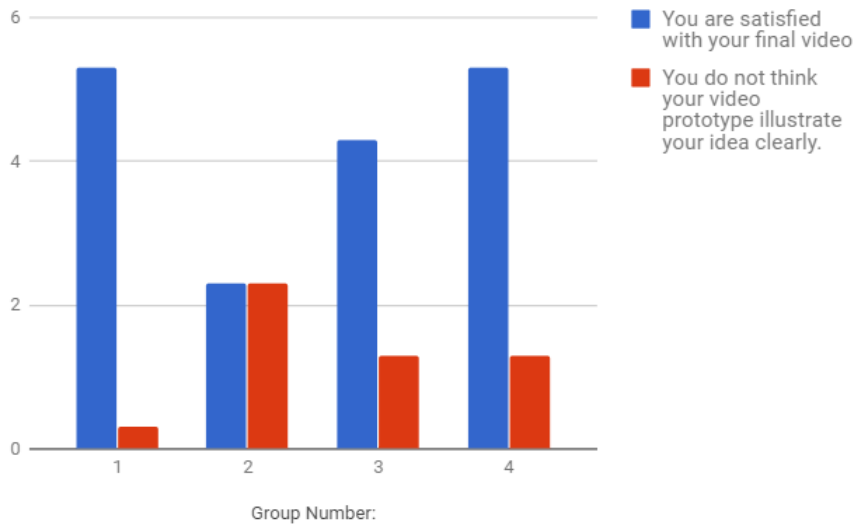


Figure 5.2: Correlation between satisfaction on video prototype and its illustration

Storyboard Usage

It is hard to draw any conclusions by solely looking at the amount of time participants spent on different design activities. Fortunately, participants' feedback upon storyboards revealed some interesting findings. As storyboards are generally considered useful to help with HCI design or product design [5][17]. Good storyboards help designers to think beyond interfaces, raising their awareness about user interactions, motivations and experiences during the use of the system[16]. It is more likely for a team to produce a satisfying design if they have carried out the storyboard session carefully. During my experiment, different groups had different attitude about storyboards. group1 and group4 were more keen on making their storyboards and they did make use of it to guide them through their later process. Group2 invested a large amount of time into making the storyboards, but they draw their storyboards differently compared to group1 and 4. Group2 made 16 drawings for their storyboards, but they hardly wrote down any description about the use scenario, user interactions, or environmental setup. Unlike group2, group1 and group4 made less drawings, but they included descriptions about the user story, user interactions, and the context of use. As for group3, they did not take storyboards seriously so they merely made two sketches as their storyboard. they hardly made use of storyboards since they only had 4 storyboard images in the end. As a result, group 4 did not follow their storyboard as much as others and they are less conscious during video shooting(Figure 5.4).
In the end, it seems that group1 and group4 came up with a rather satisfying thanks

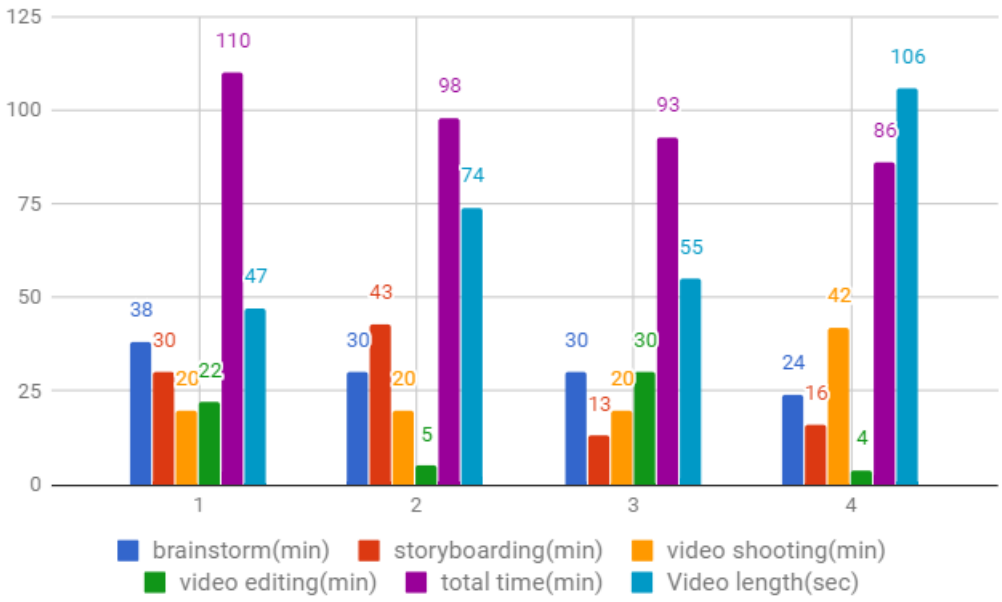


Figure 5.3: Summary of session time of each group.

to the effort they put in storyboards. In fact, group4 only spent 16 minutes on storyboard, so i would say it is not the time that they put into storyboarding but the way they did storyboarding affected the outcome. Therefore, from the level of storyboard usage, it seems that the those teams tend to yield a better final video prototype when they pay more attention to their storyboard. Storyboards play a critical role in design in general and it is of great us during the video prototyping process. Based on this finding, including the storyboard structure in the video prototyping tool might be able to preserve users' storyboard and guide them throughout the video prototyping process in order to produce a decent video prototype. Previously, VideoClipper attempted to introduce this feature and this study encouraged us to maintain such design in VideoBoard.

iMovie Usage

Based on my observations during the creative sessions, different groups made use of the editing features in iMovie to a different extend. Firstly, both group1 and group2 made use of voice-over to explain their story and interactions while group3 heavily used subtitles to annotate user interactions. As for group4, they used neither voice-over nor subtitles. Instead, they wrote their own titlecards on A4 papers and captured them as videos to explain their user story. So far, the voice-over feature seems to be popular than the subtitle feature. Besides, they barely used any editing

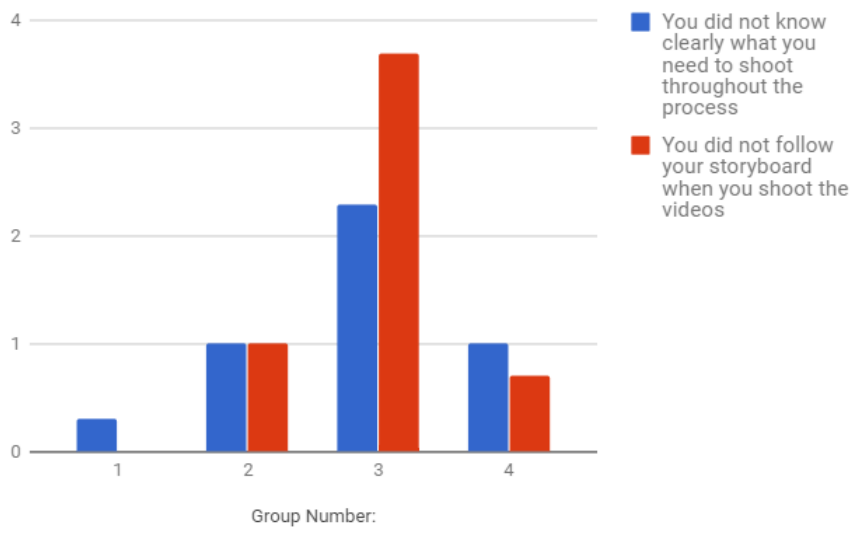


Figure 5.4: Group feedback on their video shooting session

features throughout the whole process. Group3 spent much time into learning and using the subtitle feature. They commented in the end that the subtitle feature was very difficult to use because there were so many styles to choose and typing subtitles was inconvenient. On the other hand, participants spent less time to learn and use the voice-over feature according to my observation. There is just one button to start recording and the users could either use the recording or discard it afterwards. When i reviewed their videos, i noticed that the groups using voice-over had an easier time shooting their videos because they could communicate freely without the concern of recording unwanted dialogues. In terms of other editing features, I observed little usage of video trimming and video duplication(Figure 5.6). During the discussions with participants after the creative sessions, many groups commented that it was not so handy to trim the videos but the automatic transitions effects between videos smooths the transitions between different video clips, making it unnecessary to trim individual video clips. Apart from the observation on editing features, the result of questionnaire shown in A.7 provided little insights on navigation and video manipulation during. The result showed neutral opinion on the difficulties of navigation through iMovie, reusing videos and moving videos. However the observation suggested interesting findings about the usage of general features such as retaking video and playing videos for review. Firstly, group1 occasionally reviews their videos to see if they could communicate their idea clearly when they were shooting videos. Through constant reviews in the group, they improve and refine their video prototype. As for the other groups, they only reviewed their video when they were about to finish. Another key observation is about video retaking. After

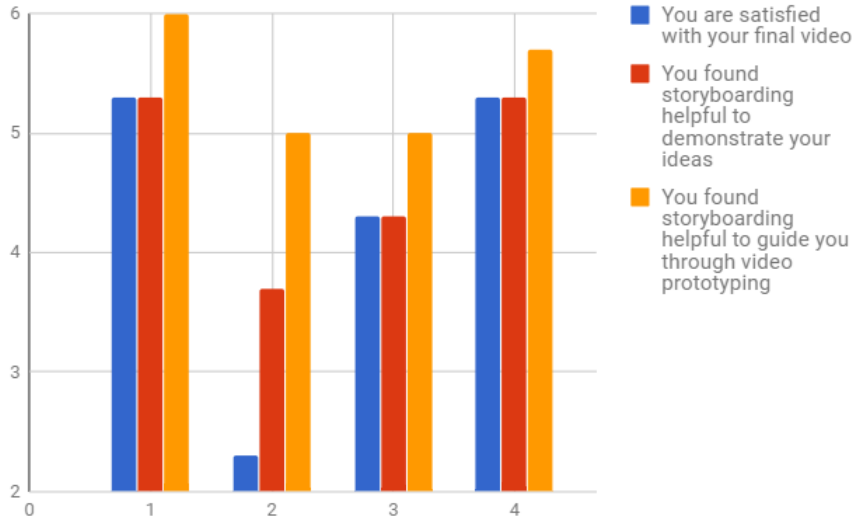


Figure 5.5: Group feedback on their storyboard sessions

Group Number:	1	2	3	4
Editing:				
voice over	yes	Yes	No	No
Putting substitles	1	0	8	0
video trimming	2	1	1	0
copy videos	2	0	0	0
General:				
Delete video	2	0	1	1
review video	4	2	1	1
retake video	5	7	2	0
Video Time	47	74	55	106

Figure 5.6: Number of different features usaged by different groups

capturing a video using the camera, iMovie does not go back to the main interface but a "Retake" Window where user could select either to use the video or retake the video. When group1 and group2 were shooting their videos, they made use of this feature frequently review the video that is just captured. Although it benefited group1 and group2, it was troublesome for group3 when they encountered this feature. Since group3 used the stop-motion technique to illustrate their design, they were constantly stopped by this "retake" window from shooting the next stop-motion video clip right away. Therefore, i think it is reasonable to leave out this "retake"

window so that users who want to shoot videos continuously would not be hindered. After all, users may still check their videos or delete them in the main interface.

Discussion

The result of this structured observation study confirmed the importance of storyboard for design and showed its powerful to assist video prototyping. Participants with explanatory storyboards tend to perform better during video prototyping. During video prototyping, participants tend to rely on either speech or texts to better present their idea. The voice-over feature in iMovie was preferred over the subtitle features because it was easier and simpler. While the use of texts are less favored during my experiment, they may stand out when users perform longer video prototyping process. Further experiments could be done to evaluate whether voice over feature or text addition feature should be used in a more realistic setting. As for the other editing features, the auto transition effect in iMovie seems to play a critical role in smoothing the videos transitions. Yet participants with previous experience with VideoClipper mentioned that ghost images help to produce smoother transitions between user interactions and interfaces. Ghost image is a feature in VideoClipper which creates a vague image of previous video ending in order to help positioning the camera for subsequent shoot. Without the auto transitions effect, it may be worthwhile to include video trimming feature so that the users will not be bothered by noncontinuous video opening and ending. Last but not least, I decided to not include the "retake" interface because in my opinion it is more important to not disturb users during video capturing.

CHAPTER 6

Final Design

Based on the feedback gathered from the first iteration and the result of the structured observation, I suggested a new design. In addition to the new features that are inspired by previous design iteration, it also inherits some satisfying features from VideoClipper .

New features include a grid layout to store large number of videos and the ability to create branching storylines as design alternatives. Firstly, as previous observation showed cumbersome navigation with linear video layout when the number of videos increase, I decided to try the grid layout shown in Figure 6.1 in order to replace the linear layout(Figure 4.1). While previous design shows only four videos under one titlecard, the new design can show more videos under one storyline in a single window. One storyline in VideoBoard is similiar to one titlecard in VideoClipper, which is basically one interaction point that describes a particular user interaction and its context. This design aims to encourage users to create more storylines based on the interactions points, annotating each of them using the title of storyline and the notepad inside it. I want to provide users a better overview of each storyline by showing all the videos within it.

To be more specific, inspired by the split view controller(A split view contains a master view on the left and a detail view on the right. The detail view displays the content of the selected master view item) in XCode, the new design improved the envelop concept mentioned in early design. As shown in Figure 6.2, each storyline on the left refers to one envelop in the previous design. What is different is that one storyline cannot be put under other storyline anymore, and it only provides a line of text to label itself. On the detail view to the right, users could use the notepad on the top. The notepad can be used to keep notes for personal use or group collaboration. Below the notepad lies the videos within the corresponding storyline. In order to support design alternatives, branching storylines can be created under other regular storylines. In the detail view of branching storyline, users will see not only its own content, but also the contents from the parent storyline. By default, the application will play the first branching storyline under a regular storyline. Users could swap the positions of the alternatives to determine which alternative should be played in the final video. If users want to create either a titlecard or capture a video, they could simply taps on the buttons on the bottom right corner. Meanwhile, they could also drag those buttons to insert a specific item(titlecard or video) in a designated position. We included this design to allow users insert videos at the desired position so that they do not have to move their videos afterwards.

By the time my internship finishes, Germán and I barely finished programming these new features to a functional level. The branching storylines and the grid layout

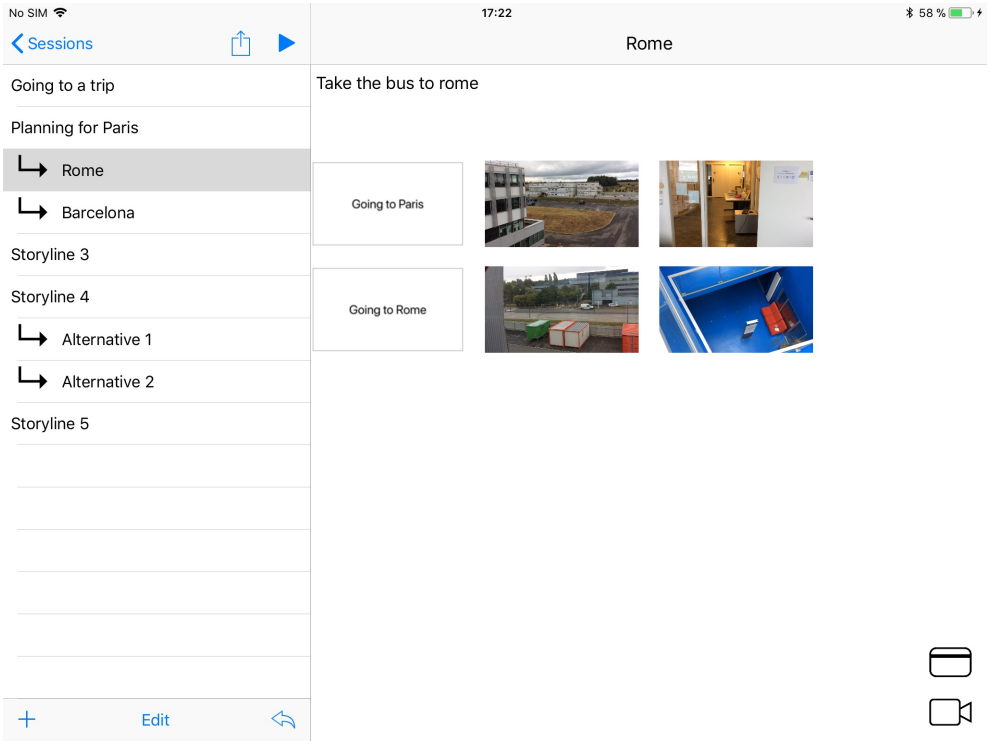


Figure 6.1: VideoBoard interface, the window shows the videos of main storyline on top with videos in alternatives in the bottom.

for videos management are fully functional but they rely on other features to fully discover their potentials. These are the technical contributions so far and further studies should be carried out to validate them in a complete application. Currently, The application still needs many crucial features to support rapid video prototyping. Firstly, the drag and drop feature from latest iOS 11 should be implemented because it allows users to move multiple videos. Besides, it also allows users to import external video source by simple drag and drop interactions. I have implemented this feature when i started to program this application but the codes that are added later conflicted with the earlier implementation. As a result, we decided to postpone the drag and drop feature. Secondly, based on the feedback from structured observation, it will be promising to include ghost image for video shooting. Besides, it would be interesting to implement the voice-over feature and compare the efficiency between voice-over and titlecards during rapid video prototyping. Thirdly, in order produce VideoBoard rapidly, we copied the titlecard design in VideoClipper. Yet the structured observation showed little preference for text editing. Although the use of titlecard might be crucial in long term use, it is important to carry out long term study in order to improve the design of Titlecard from VideoClipper.

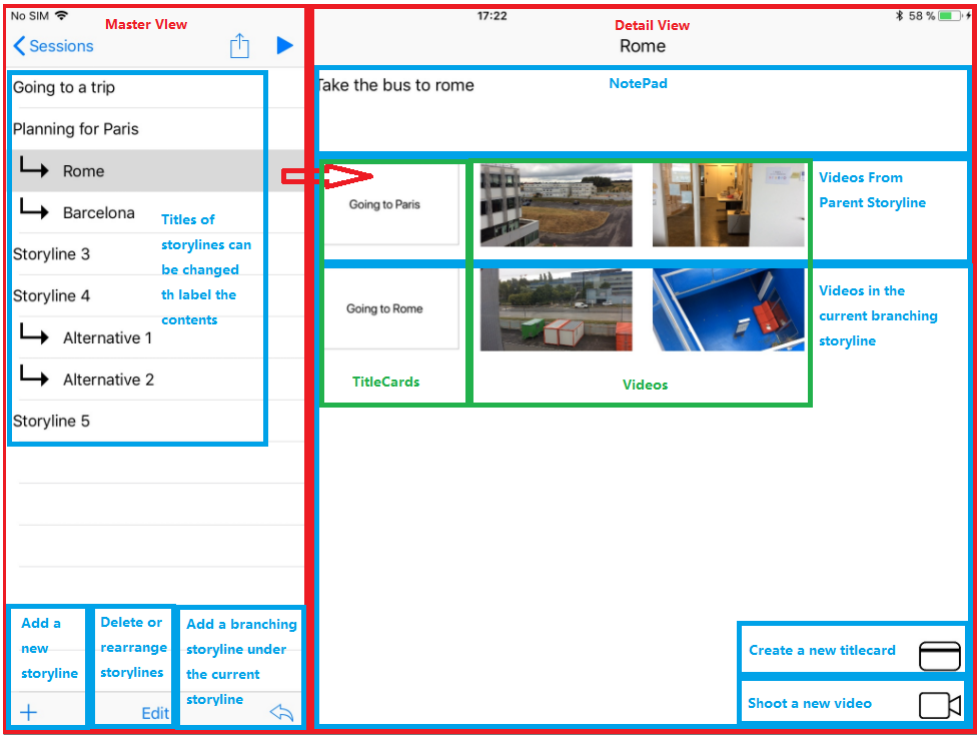


Figure 6.2: Explanations of the VideoBoard main interface

CHAPTER 7

Conclusion and perspectives

According to preliminary studies, the amounts of effort required for video capturing and editing are the main reasons which keeps people away from video prototyping. Later formal observation suggested the same where participants sometimes invest highly on post-hoc editing because they think imperfect video presentation might fail to convey their ideas, leading to confusion and misconception. As a result, most participants tended to make use of either speech or texts to help to explain the use scenario and interactions. In addition, people like the automatic transition effects in iMovie because it smooths the transitions between interfaces, clarifying the interaction design. Moreover, video trimming and transitions effects are occasionally used because the difficulties of coordination between actors and cameramen usually lead to noncontinuous video openings and endings. By using voice over during post-hoc editing, cameraman and actor were able to communicate freely during video shooting without the concern to record unnecessary dialogues.

Based on my structured observation study, it is promising to adopt the storyboard layout because it guides the users through video prototyping and allows them to elaborate the storyboards with video illustrations. In addition, it is suggested to draw explanatory storyboards with description on user interactions and use scenario to assist video prototyping. Besides, it is worthwhile to adopt the voice over feature and experiment further because it eases the communication during video shooting. It also helps to narrate the use scenario and user interactions when the videos are shared to others. According to participants with prior experience with VideoClipper, the ghost image helps to produce smoother video transitions than iMovie. Therefore, it is highly recommended to include ghost image during video shooting in video prototyping tool to save effort from editing video transitions.

Although long strips of video was an emerging issue during preliminary study, my experiment did not confirm the necessity to improve the video layout for short video prototyping. However, given the short length of my experiment, participants do not have sufficient time to produce video clips that summed up to more than 2 minutes. In general, videos prototypes produced during regular early development process should exceed that amounts. Due to the same reason, the usefulness of video labeling and text annotation is impossible to be investigated thoroughly in this short experiment as participants maintained their fresh short-term memory.

Due the the limited time span, my study was only able to cover the short term usage of rapid video prototyping. It was unable to tell whether the new features i designed are useful or not in the long run. For further studies, it is worthwhile to run long-term experiment consisting of multiple creative sessions to compare the efficiency of a grid layout for video to the linear layout and see how branching

storylines and search-able text annotations may assist iterative design process.

Acknowledgments

I would like to thank Germán for his guidance and patience; I would like to thank Wendy for her enlightening insights and experience; I would also like to thank all the colleagues in Ex-Situ who provided me timely feedback and suggestions throughout my internship.

Appendix

A.1 Brainstorm session ideas

1. Translating storyboard into presentation slides, use video prototypes to replace static storyboard images and use the texts along storyboard to help demonstrating the design concept. In this way we could reuse the storyboard during presentation and save time from merging videos into one piece. (Inspired by PreZi and PowerPoint.)

2. Providing commonly used video prototyping material digitally to save from time hand-crafting. Such as frames of mobile phones, dialogue windows, etc. Users could make use of these contents to help shooting video prototyping so that they could be less concerned about the available material and spend less time crafting their paper prototypes. (Inspired by SketchCam)

3. Providing framework/place holders for video to make interactive videos where users could make options to direct the story of video, actively involve user participation to help presenting concepts to users of collaborators.

4. Allowing users to add text along video clips as subtitles, transitions or developer-only annotations. Users may also search with text in the application to locate the videos with these texts. This may help users to remember and track videos when the number of videos reach certain amounts. Besides, users may benefit from this if they are running a long term project.

5. Allowing users to reuse some of the physical artifacts that they previously created so that they could rearrange their position in the video to provide smoother demonstration of interaction or create movement based on user interactions.

6. Allowing users to take pictures and extract different items out of pictures to be used in video prototyping. Such as setting up the scene with Eiffel Tower or involving inaccessible technologies or devices.

7. Allowing the creation of digital objects to help illustrations, such as drawing shapes or lines to highlight necessary information

8. Allowing the trimming of video clips as well as stretching a video by extending a certain frame.

9. Assigning names of personas as name tag to different actors in the video. It may allows collaboration of different persons without the concern of inconsistency.

10. Allowing the creation of cartoon characters and movement to replace real users involvement to solve cases where there is no actor available or nobody wants to be involved into the capturing of video prototypes.

A.2 Brainstorm directions

1. Using video to illustrate user behaviors, mainly their persona and user interactions with old tools and new tools.

2. Using video to record discussion, which is how designers generate ideas and improve ideas. While final ideas are usually saved by paper or digital documents, the process of idea generation are usually forgotten. By using videos, researchers may keep track the whole process of idea generation, allowing them to track back to in and perhaps go into a different directions for more ideas.

3. Using video for brainstorming, to try out different ways of interactions without technical implementation.

4. Using video to demonstrate context of use, such as showing the use scenario and design scenario.

5. Using video to feature interaction points where users interact with the system. Video recording these would address dynamic interactions between the system and the users, vividly presents not only interfaces but also interactions and feedback.

6. Using video to demonstrate user experience, such as emotions.

7. Using video to demonstrate prototype, mainly features of the application and its user interactions.

A.3 Preliminary Questionnaire

Video to support interaction design

Thank you for answering this questionnaire!
If you are a professional, researcher or student in Interaction Design, your answers will help us develop a new video-based design tool.

*Required

Background

1. **Age**
   Mark only one oval.
   - ◯ <17
   - ◯ 18-25
   - ◯ 26-35
   - ◯ 36-45
   - ◯ 46-55
   - ◯ 56-65
   - ◯ >65

2. **Gender**
   Mark only one oval.
   - ◯ Female
   - ◯ Male
   - ◯ Other: _____

3. **Highest degree**

   _____

4. **Design experience**
   Mark only one oval.
   - ◯ <1 year
   - ◯ 1-3 years
   - ◯ 4-8 years
   - ◯ 9-12 years
   - ◯ >12 years

5. **Current job**
Tick all that apply.

- [ ] Student
- [ ] Professional designer
- [ ] Part-time/Freelance designer
- [ ] Design researcher
- [ ] Other: _____

6. **Job environment**
Tick all that apply.

- [ ] Academic research
- [ ] Corporate research
- [ ] Design firm
- [ ] Freelance
- [ ] Large company
- [ ] Unemployed
- [ ] Start-up

7. **Country that you work in:**

_____

8. **Please answer the following questions based on either your：**
Mark only one oval.

- ◯ Current project
- ◯ Most recent completed project

9. **How many design artefacts did you create to explore and express your design?**
Mark only one oval per row.

	None	1-3	4-10	>10
Hand-drawn sketches	◯	◯	◯	◯
Hand-made physical mock-ups	◯	◯	◯	◯
Computer-drawn sketches	◯	◯	◯	◯
Computer animations	◯	◯	◯	◯
Video illustrations	◯	◯	◯	◯
Other tools	◯	◯	◯	◯

10. **Any other artefacts?**

_____

_____

_____

_____

_____

11. **How much time did you spend to create these artefacts?**
Mark only one oval per row.

	0%	0-20%	20-40%	40-60%	60-80%	80-100%
Hand-drawn sketches						
Handmade physical mock-ups						
Computer-drawn sketches						
Computer animations						
Video illustrations						
Other tools						

12. **Please tell us how you used the above artefacts to explore your design:**

13. **Was this typical?** *
Mark only one oval.

- Yes *Skip to question 14.*
- No *Skip to question 15.*

If typical

14. **then please describe an unusual example:**
for example, you only did coding or drawing for a specific project while you generally go through many ideation process.

Skip to question 16.

If not typical

15. **then please describe a typical example:**

Skip to question 16.

16. **In general, I use video to:**
Tick all that apply.

- [ ] to illustrate the step-by-step details of the interaction
- [ ] to compare alternative types of interaction
- [ ] to figure out how a user moves from one state to another
- [ ] I do not use video
- [ ] Other: _____

17. **I use video to communicate specific user interactions to ...**
Tick all that apply.

- [ ] other designers
- [ ] software developers
- [ ] clients or potential funders
- [ ] users
- [ ] management
- [ ] I do not use video to communicate to others
- [ ] Other: _____

18. **I use video to document:**
Tick all that apply.

- [ ] I do not use video to document my design
- [ ] intermediate design stages
- [ ] alternative design possibilities
- [ ] final design
- [ ] Other: _____

19. **Comments or explanations?**

_____

_____

_____

_____

_____

20. **What are the barriers to using video?**
Tick all that apply.

- [ ] Video is not useful for exploring or expressing the design
- [ ] Lack of access to video equipment
- [ ] Lack of time or resources to prepare for and record video
- [ ] Lack of time or resources to edit video
- [ ] Too hard to find relevant video clips
- [ ] Video quality is not sufficient
- [ ] Other: _____

21. **Which computer tools do you use?**
Tick all that apply.

	for this project	in general
I do not use computer tools	☐	☐
Adobe XD	☐	☐
Axure	☐	☐
BALSAMIQ	☐	☐
Framer	☐	☐
Flinto	☐	☐
HTML/CSS	☐	☐
InVision	☐	☐
Illustrator	☐	☐
Indesign	☐	☐
Pixate	☐	☐
Photoshop	☐	☐

22. **List any other computer tools you use.**

_____

_____

_____

_____

_____

23. **How much do you normally pay for interaction design tools?**
Tick all that apply.

	I only use free tools	I only use cracked software	Less than 50€	From 50€ to 100€	From 100€ to 200 €	From 200€ to 500€	More than 500€
Annual payment	☐	☐	☐	☐	☐	☐	☐
One-time payment	☐	☐	☐	☐	☐	☐	☐

24. **Who usually pays for your design tools?**
Tick all that apply.

- ☐ Company
- ☐ University
- ☐ Yourself
- ☐ Other institution
- ☐ Other: _____

25. **We are interested in any suggestions you have to improve your design tools.**

_____

_____

_____

_____

_____

26. **Other comments?**

27. **Please provide your email if you would like to hear more about our video-based design tool:**

A.4 Preliminary Questionnaire Result

QUESTIONS RESPONSES 33

33 responses

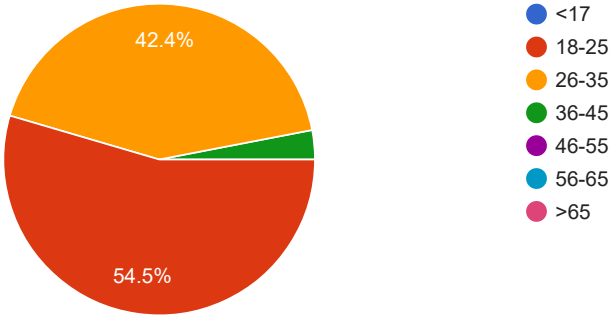
SUMMARY INDIVIDUAL

Accepting responses

Background

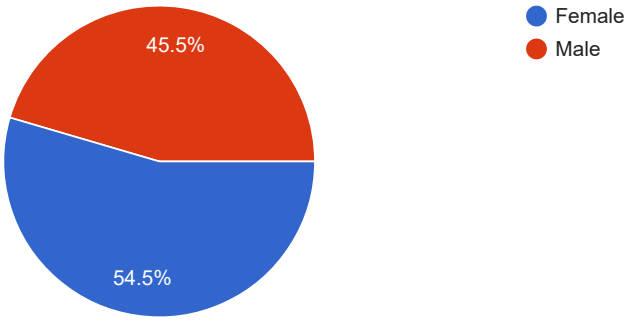
Age

33 responses

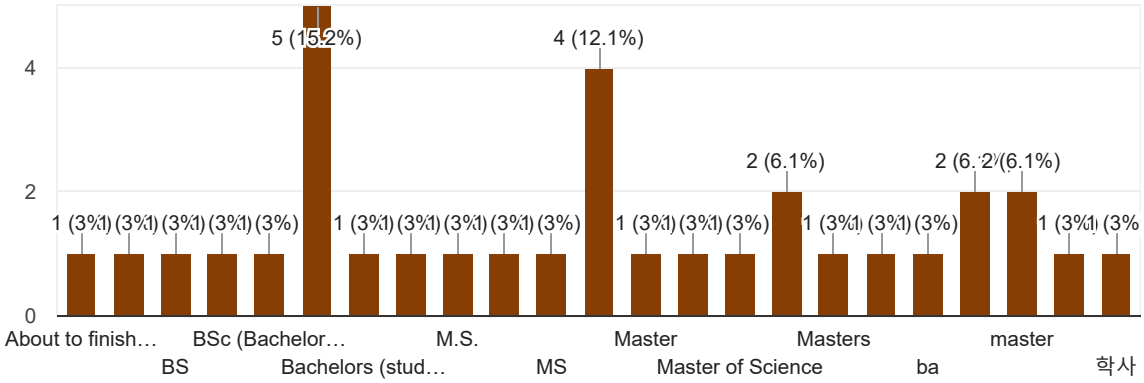


Gender

33 responses

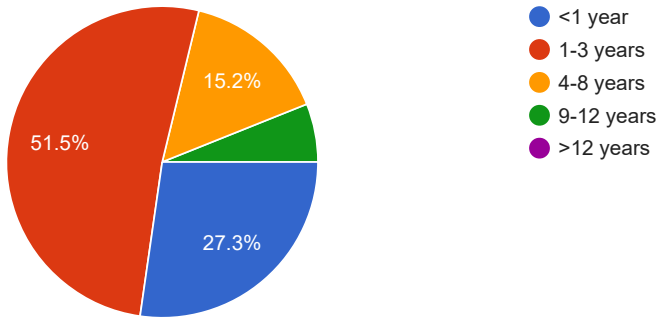


Highest degree



Design experience

33 responses

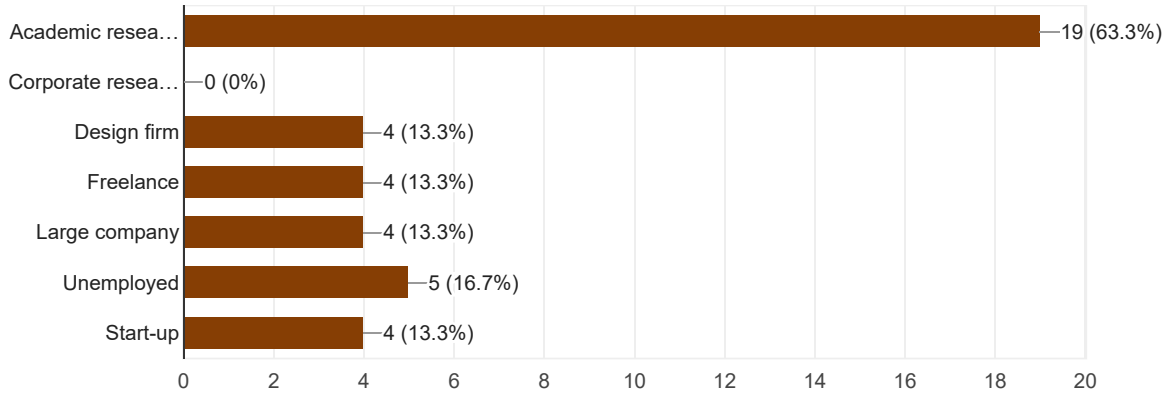


Current job

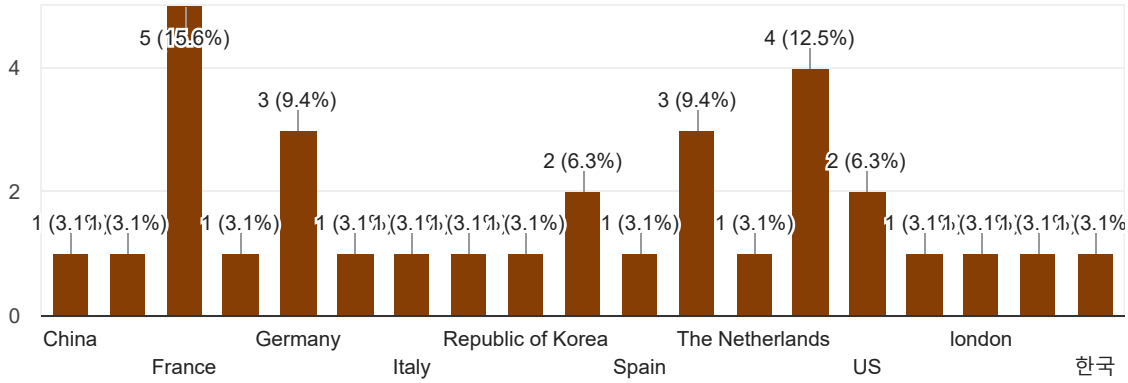
33 responses

Job environment

30 responses



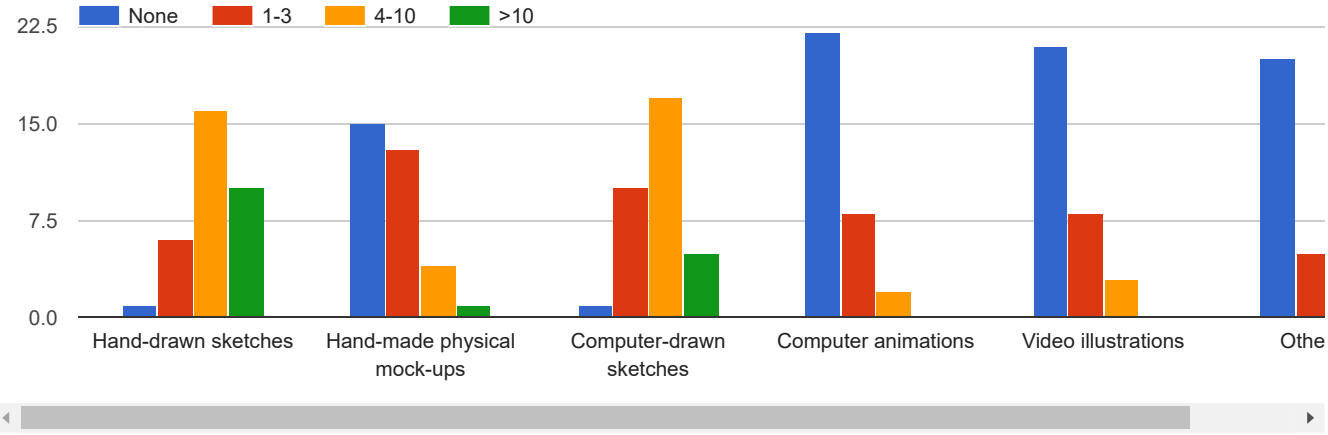
Country that you work in:



Please answer the following questions based on either your：

33 responses

How many design artefacts did you create to explore and express your design?



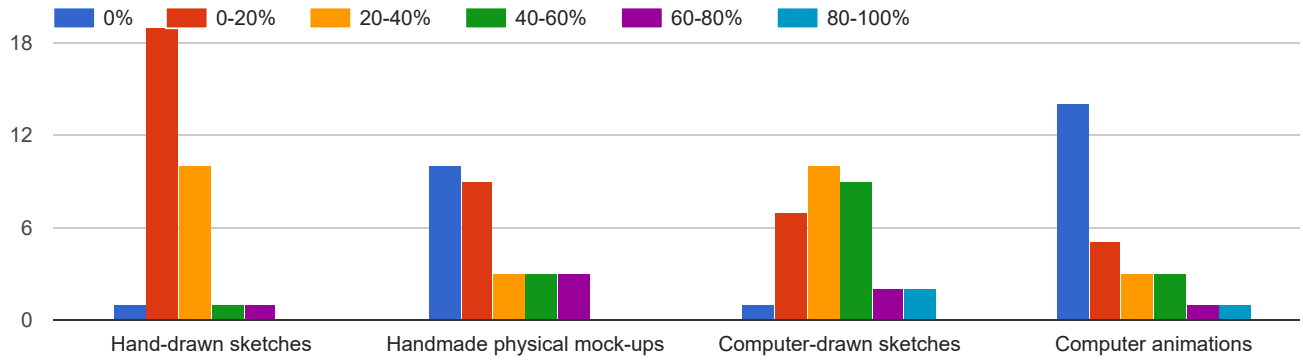
Any other artefacts?

13 responses

Android app prototype
Code
Requirements specification, 3D prints
N/A
no
Boilerplate code
High definition dynamically linked prototypes
-
Digital Clickable Prototypes in Invision (3) User journey maps Design Reference Collection in Pinterest and the best one were then put into a google slides (as a presentation).
No
Concepts derived from post-its
Dummy code

Web-based design mockups

How much time did you spend to create these artefacts?



Please tell us how you used the above artefacts to explore your design:

25 responses

In the beginning, when brainstorming about the idea, I used papers and pen. And then we wanted to make a paper prototype (video-taped) so we needed to make the physical mock-ups. I needed to make the computer-drawn and animations when I had to present the idea to other people in a semi-formal presentation. That took quite long to make. And finally, I started coding the application prototype, from which I could already make the video illustration. That took the longest, of course, but once I had it it's easier for me to keep working on it so it evolved into the real implementation rather than just a prototype.

Hand made for test and evaluation, computer based for detailed design and hi-fi prototype, video or animation for end users to explain how it works

All in combination

Just presented to the customer, instant go

user testing

To convey a concept to users and highlight specific design functions

User studies, questionnairs and interviews

Sketches to quickly establish ideas and logics, digital sketches to finalize the idea

Hand-drawn sketches and mockups as initial developing tools, most promising designs are then tested with potential users

I used the hand drawn sketches to initially sketch out my thoughts and various ideas, and then used computer drawn sketches to present a medium fidelity prototype.

/

turn sketches into digital sketches and then final prototype (physical or digital)

iterations, user testing

show ui features

I start with hand drawn sketches, to quickly ideate what the prototype will look like and how it will act. Then I usually translate that directly to the high definition prototype. I rarely do computer drawn sketches - mostly when I'm not sure about the interaction, I would prototype 3-10 iterations of the same module, until I get it right. This is either in computer drawn sketches and wire frames or in high definition prototypes.

Quick and dirty prototypes and some visual exploration to see what it looks like on a screen

sketches - ideation process /physical mock-ups - checking sizes and grips / computer sketches - to design interfaces / animation - to express interactions and scenarios / video illustractions - to visualize final design concepts and scenarios

브레인스토밍을 핸드드로잉으로 한 후, 최근 했던 인터랙션 디자인은 빛으로 하는 작업이어서 일러에서 네온효과 써서 빛 나는 모습을 표현함. 그러고나서 나머지는 하드웨어랑 소프트웨어(아두이노)팀으로 나눠서 작업함

Hand sketches for conceptual Ideas and for communication in the team. Often these included only smaller aspects of the design (e.g. focus on navigation/sitemap other sketches on a specific part of the digital product).
They were influenced by research into how other systems solved a particular problem (e.g. Landing Page, Navigation Concept).
These physical sketches were then translated to digital sketches if they worked on paper and incorporated into the overall design.
If it was unclear whether it would actually work, we created a physical mockup (in this case to illustrate the navigation concept).
There was no video illustration, because there was limited time. Instead, user journey maps took over the role of the video.
Finally, the digital sketches were uploaded into invision and a clickable prototype was created. We reaped this process several times.

To see how it'd actually turn up visually. To do a quick check with collab to see if we are at the same page with the design. For example, even though one said "lets put a navigator on the left" I am not sure if I should put it under or above a profile/logo image which is also going to be placed on the left.

Derive concepts via grounded theory (affinity diagram included), sketches to confirm with collaborating teams, and computer drawn sketches to share with GUI team and dev team.

Quick iterations with clients and within the team

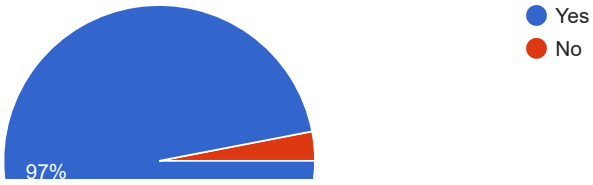
Share sketches with team members for feedback

Hand drawn sketches first for exploring ideas, then we iterate the sketchers and make moke ups based on it. Then we evaluate the moke up again, iterate it, and make computer-based high fidelity prototype based on it

주로 손으로 작업하는 경우는 어떤 기능들이 들어갈 지 정할 때와 어떤 흐름으로 사용자가 인터페이스를 사용하게 될 지에 대해 고민할 때입니다. Balsamiq 처럼 플로우를 그릴 수 있는 여러 툴들이 존재하지만, 아직까지 손이 더 빠르고 자유도가 높아서 더 먼저 그리게 되는 거 같다. 그 후에 UI를 씌운다고 Photoshop과 Illustrator를 주로 사용하고 web을 통해 mouseover나 애니메이션 효과를 더하고 수정해서 마무리를 한다.

Was this typical?

33 responses



If typical

then please describe an unusual example:

19 responses

Sometimes I coded directly because I already had something implemented and it was easier to just continue with it.
Un.... nope
Don't understand the question.
Design the function and process flow without the feedbacks from users
?
I am usually much quicker at hand drawing things, thus why most of the time the computer sketch takes more of the time. In one project the main focus was a video presentation about the project, thus I spent most of my time editing the video (to illustrate the actions of the participant) and on the sketches and low-fi prototype.
?
not doing any sketches
no video
Specific interactions that are more complex and domain specific
Can't think of one in this project. But I know I'd need to prototype with animation soon, in order to express my ideas, and I don't know yet how to do it, or what tools to use.
Jumping straight to visual interface design without any paper or quick low-fi prototypes
When I designed some visualization, I had to write some codes to communicate with developers. Without the code and working prototype, it becomes more difficult to communicate with them.
In one project that was pressured on time, I skipped the digital sketches and went from the paper sketches directly to the implementation. This was possible since it was quite simple.
Coding is rare.
Startups require speed. Sometimes, computer driven sketches are ommitted for a lean process.
Usually in professional work the specifications (problem) are quite clear and you are mostly iterating on solutions. In research, often you're even iterating on the problem and don't have clear specifications which makes the design process harder, in my opinion.

only did coding

너무 기간이 급박할 때는, 그냥 비슷한 사이트 가져와서 디자인보다 웹으로 비슷하게 만들고 그 상태에서 디자인을 수정한 경우도 있었다.

If not typical

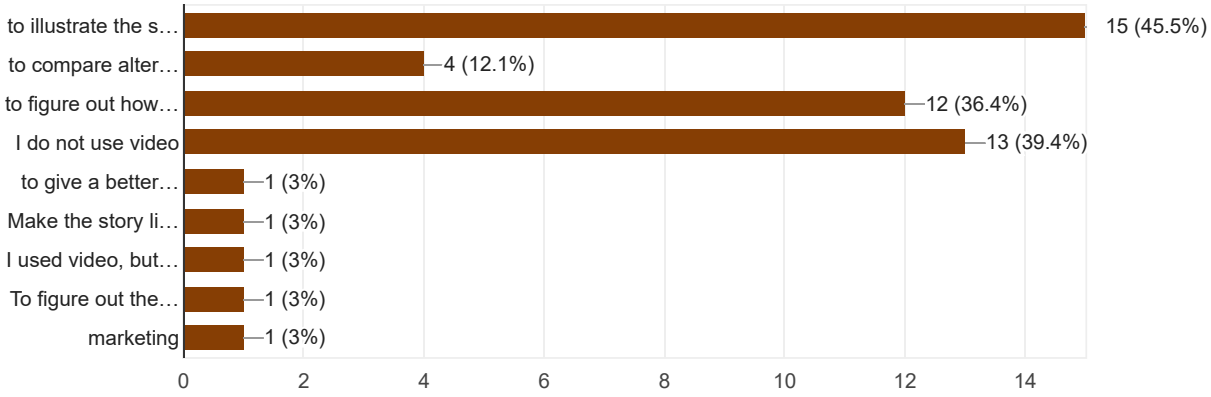
then please describe a typical example:

1 response

I have only done two simple interaction designs up to now. The first one I have used an online website to draw a storyboard and Balsamique Mockups to draw a sketch of the app; the second one I have used OmniGraffle to draw a simple sketch

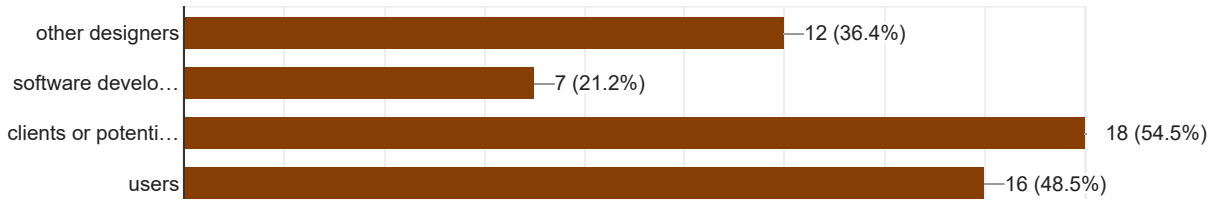
In general, I use video to:

33 responses



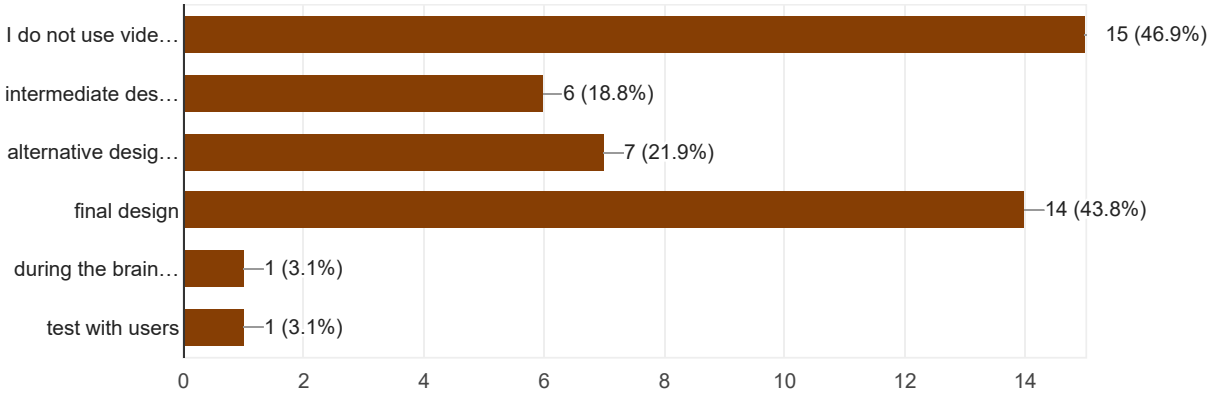
I use video to communicate specific user interactions to ...

33 responses



I use video to document:

32 responses



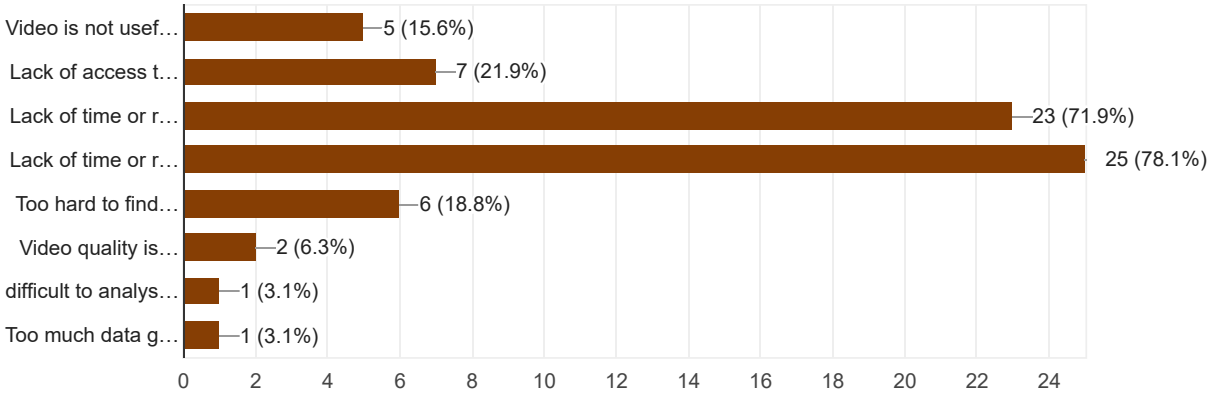
Comments or explanations?

10 responses

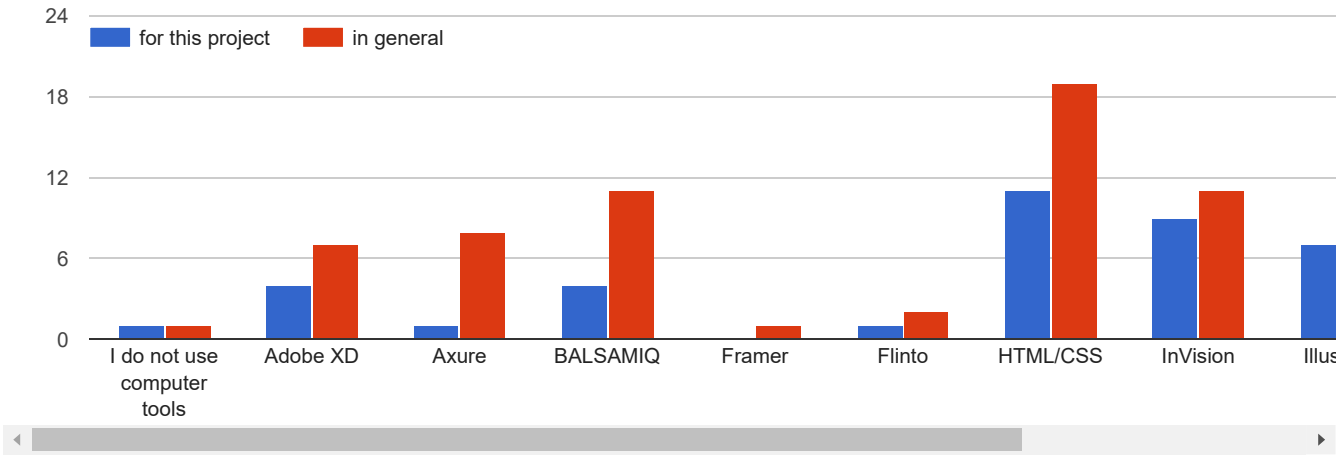
In the early phase, I think it is a good idea to make a video prototype because it helps me remember of all the things we have thought about in the past.
Video is used as a alternative to test and adjust the design
Takes too long
I'd like to use videos but don't know how to and don't have opportunity yet.
Making a high quality video is too cumbersome.
Because video editing is really time consuming, I prefer to use it at the last stage.
프로토타입을 만들거라면 굳이 컴퓨터 그래픽으로 작업하는 영상물을 만들지 않는다. 프로토타입이 만들지 않는 경우라면 영상물을 만들겠지만. 보통 다 구현하고 촬영해서 영상을 만듦.
In recent projects I have not made use of video. However, I think that in future projects I will get back to it because it provides a helpful tool to think of the product in its real future environment.
Motion prototypes, or video, is especially important to client, management team, and dev team.
비디오를 만드는 것 자체가 하나의 큰 로드를 차지 하기 때문에, 그리고 비디오와 실제 개발 상태는 또 차이가 나기 때문에, 차라리 발로라도 개발을 해서 보는게 낫지 비디오는 마케팅이나 광고 이외의 목적으로는 잘 안 만드는 경향이 생긴 것 같다.

What are the barriers to using video?

32 responses



Which computer tools do you use?



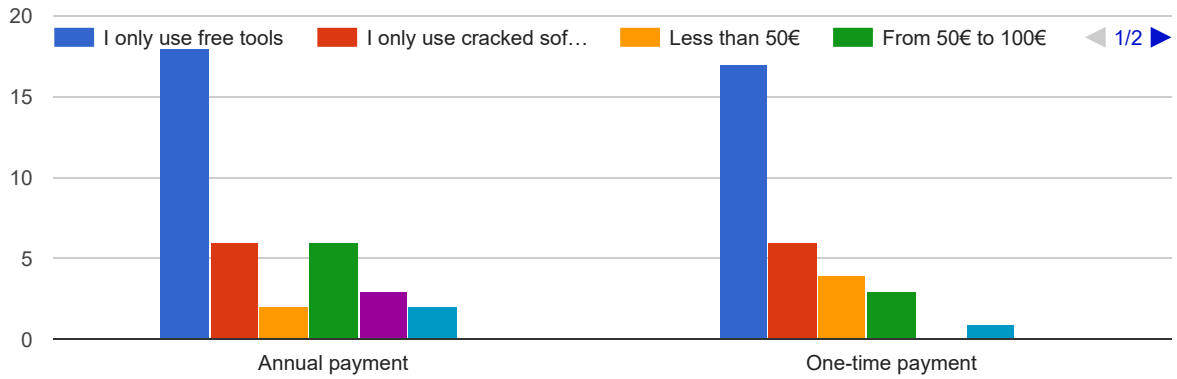
List any other computer tools you use.

23 responses

Sketch (6)
I used Keynote
Adobe Dreamweaver

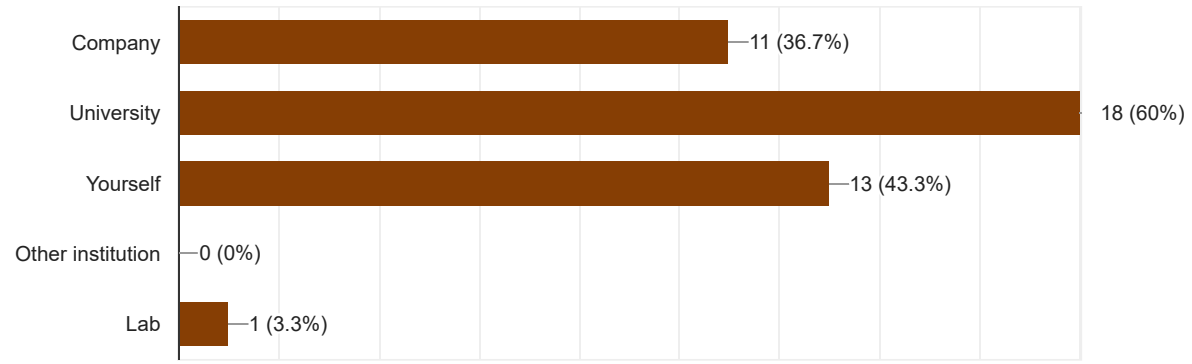
Sketch, Adobe AE
Unity, Blender
Android Studio mockups in XML
PowerPoint
Unity
sketch
Adobe Fuse, OmniGraffle, Blender
Keynote
Sketch
파워포인트, 아두이노
Sketch, Google Slides
MS Power Point
Powerpoint- best, multiple degrees of freedom way to express design.
Sketches
Sketch app

How much do you normally pay for interaction design tools?



Who usually pays for your design tools?

30 responses



We are interested in any suggestions you have to improve your design tools.

10 responses

it will be nice to have a collaborative platform to allow multiple tools work simultaneously.
I wish the industry standard wasn't Adobe, as it is expensive and not very intuitive, but have accepted it as an evil I cannot avoid!
make them fast and versatile
I have not been systematically trained in interactive design courses. I have only tried BALSAMIQ and OmniGraffle to show the sketch of my application. And I found it difficult to show the logical relations of the page switching.
I really love Keynote since it is so easy to move around certain elements and since I can easily export the slides to PDF and PNG.
I wish cheap and dirty low-fi were easy to make using conpiter tools... paper prototypes are hard to track and store.
UI 인터랙션을 위한 툴은 많은 것 같은데 미디어아트 같은 작업을 하기 위한 툴은 별로 없는 것 같다.
Make Collaboration easier, e.g. for Sketch files.
No suggestions for myself. But a tool tha can complete the GUI and also code xml for strings and/or interactions for developers would be super useful.
디바이스에 따라서 애니메이션 구현율과 가능성을 볼 수 있으면 좋겠다. 프레임이 끊기는 디바이스도 꽤나 있고 이를 더 부드럽게 만드는 방법을 찾기가 너무 힘들다.

Other comments?

5 responses

I never pay for the tools so I dont know how much they cost
no
I'm very interested in your thoughts and essay of the software and hope to try it when you finished.
I used video a lot in university projects and it proved to be a helpful communication tool. In a company setting (digital design agency) video was only used in terms of screen recordings of interactions with flinto or Invision Prototypes.

비디오 자체에 대한 부담감이 있어서, 인터페이스 디자인 과정에서 비디오 자체를 어떻게 활용할까에 대해 고민이 적었는데, 가볍게 구간 별 (인터랙션 애니메이션) 비교가 쉬우면 좋겠다는 생각이 추상적으로 든다.

Please provide your email if you would like to hear more about our video-based design tool:

7 responses

ye.xiang@outlook.com

tong.xue@u-psud.fr

Diana.lipcanu@gmail.com

minsuk.cs@gmail.com

mikecsy@gmail.com

paul@h4h.de

jonghyuk101@kaist.ac.kr

A.5 Structured Observation Questionnaire

1 Name

2 Group Number

3 Feedback on this experiment in general.

What do you think of the statements below:

You are satisfied with your final video prototype.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You found storyboarding helpful to demonstrate your idea.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You found the storyboard helpful to guide you through video prototyping.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

7 Feedback on video prototyping in general.

You did **not** follow your storyboard when you shoot the videos.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You did **not** know clearly what you need to shoot throughout the process.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You do **not** think the video prototype illustrate your idea clearly.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

---

11 Which software did you use for video prototyping? *

- [ ] VideoBoard
- [x] iMovie

12 FeedBack on iMovie.

You found it easy to navigate through the application.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You found it hard to reuse the video that you captured.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You found it easy to move the videos to another designated position.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You found the editing features **insufficient** to support your story telling.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You found it easy to recognise the content of each video clips.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

You would like to prototype again with iMovie.

0 1 2 3 4 5 6

Strongly Disagree no opinion Strongly Agree

a. What is your favorite feature iniMovie, and why?

b. Did you encounter any inconvenience during the use of iMovie? Please describe:

19 Would you like to share any additional comments with us?

20 Leave your email address here if you want to hear more about this research.

Submit

A.6 Structured Observation Coding

Experimental Protocol for Observation

Observation Coding:
I need to keep track of how many times each group performed the following specified actions.

1. Ideation
    a. Generating Idea
2. Confusion
    a. Asking in the team what to do next
    b. Looking at the storyboard after the storyboard session is done
3. Technology Present
    a. Complaining about the tool
    b. Praising the tool
    c. Asking for tech-support
4. iMovie editing feature usage
    a. Putting subtitle
    b. Adding transition
    c. Retake Video
    d. Deleting a video clip
    e. Copying a video clip
    f. Splitting a video clip
    g. Trimming video

A.7 Structured Observation Questionnaire Result

You are satisfied with your final video prototype.

15 out of 15 people answered this question

Average: 4.47

Strongly Disagree no opinion Strongly Agree

5	6 / **40%**
6	4 / **27%**
2	2 / **13%**
4	2 / **13%**
1	1 / **7%**

You found storyboarding helpful to demonstrate your idea.

15 out of 15 people answered this question

Average: 4.87

Strongly Disagree no opinion Strongly Agree

5	7 / **47%**
6	4 / **27%**
4	3 / **20%**
2	1 / **7%**

You found the storyboard helpful to guide you through video prototyping.

15 out of 15 people answered this question

Average: 5.00

Strongly Disagree no opinion Strongly Agree

6	6 / **40%**
4	4 / **27%**
5	4 / **27%**
3	1 / **7%**

You did **not** follow your storyboard when you shoot the videos.

15 out of 15 people answered this question

Average: 1.07

Strongly Disagree no opinion Strongly Agree

0	7 / **47%**
1	3 / **20%**
2	3 / **20%**
3	1 / **7%**
4	1 / **7%**

You did **not** know clearly what you need to shoot throughout the process.

15 out of 15 people answered this question

Average: 0.80

Strongly Disagree no opinion Strongly Agree

0	7 / **47%**
1	4 / **27%**
2	4 / **27%**

You do **not** think the video prototype illustrate your idea clearly.

15 out of 15 people answered this question

Average: 1.33

Strongly Disagree no opinion Strongly Agree

0	6 / **40%**
1	4 / **27%**
3	2 / **13%**
4	2 / **13%**
2	1 / **7%**

Which software did you use for video prototyping?

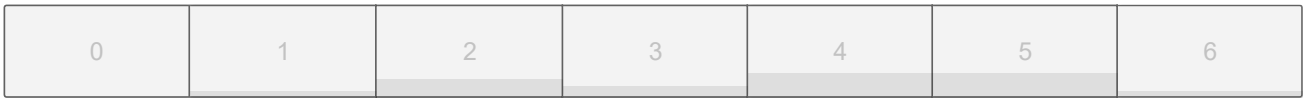
15 out of 15 people answered this question

1	iMovie	15 / **100%**
2	VideoBoard	0 / **0%**

You found it easy to navigate through the application.

15 out of 15 people answered this question

Average: 3.67



Strongly Disagree no opinion Strongly Agree

4	4 / **27%**
5	4 / **27%**
2	3 / **20%**
3	2 / **13%**
1	1 / **7%**
6	1 / **7%**

You found it hard to reuse the video that you captured.

15 out of 15 people answered this question

Average: 2.93

Strongly Disagree no opinion Strongly Agree

4	5 / **33%**
1	3 / **20%**
3	3 / **20%**
5	2 / **13%**
0	1 / **7%**
2	1 / **7%**

You found it easy to move the videos to another designated position.

15 out of 15 people answered this question

Average: 3.33

Strongly Disagree no opinion Strongly Agree

3	6 / **40%**
2	3 / **20%**
4	2 / **13%**
6	2 / **13%**
1	1 / **7%**
5	1 / **7%**

You found the editing features **insufficient** to support your story telling.

15 out of 15 people answered this question

Average: 3.40

Strongly Disagree no opinion Strongly Agree

You found it easy to recognise the content of each video clips.

15 out of 15 people answered this question

Average: 3.67

Strongly Disagree no opinion Strongly Agree

You would like to prototype again with {{answer_55093418}}.

15 out of 15 people answered this question

Average: 4.27

Strongly Disagree no opinion Strongly Agree

5		4 / **27%**
6		2 / **13%**

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