Live Video Exploration
Exploring environments using live video, mobile devices and unacquainted users

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Abstract

The live video streaming market is, as some research suggests, a difficult one to develop. Comparing it to other media it has the disadvantage of being available during a limited period of time. This thesis explores how mobile devices can be used as an explorative tool through live video streaming. The opportunity of control in the moment is studied and examined in this report. This research will suggest a mobile device platform in which people can assist other people exploring new environments around the globe. It also tries to evaluate whether this exploring interaction can occur between unacquainted people and at the same time not be hindered by any language barriers. The motivation behind this subject is the human need and curiosity of exploring new environments and places.

The foundation of the research approach was based on interaction design principles and methods. This created a chain of methods used with the intent of better understanding what is to be considered when designing for live video experiences focusing on environments. The process lead to important understandings and key aspects to be considered when designing live experiences focusing on environments. The results that emerged, showed that the most important encouragement is; to be presented with an environment that includes novel elements. Furthermore, the results could also conclude that by giving access to directional controls, and some means of expressing appreciation, can help to influence and shape exploration with live video.

Keywords: live video, user generated content (UGC), live broadcast, webcast, mobile, social media, webcasting, streaming media, live streaming, webRTC.
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Introduction

Traditional cameras and video equipment are gradually losing ground against the more versatile mobile devices that allow the making of instant video-, photo-, and audio capturing. Smartphone owners are capable of quickly creating movies and taking photos whenever and wherever they go, particularly at concerts and live events. Video has slowly been gaining popularity as a social medium. Today users are able to capture live broadcasts beyond the constraints of their desktop computers. Recording moments in the wild is gaining popularity and becoming easier to achieve for end-users, and even professionals alike (De Sá, Shamma & Churchill 2014).

The intent of this research is to explore a possible scenario of a user collaboration that lies ahead in the mobile video streaming market. And how mobile devices can be used as an exploratory tool through live video streaming. It will demonstrate collaboration between users where emphasis lies in sharing; controlling and requesting live streams from one another in a live setting.

By exploiting the live setting there is room for play and control and a chance to let the users decide what is interesting to them on the screen. The experienced interaction may divert the user’s attention beyond the blogging personalities, and move the focus of interest to the surrounding environments.
Background

People are spread out over the entire world. In 2014 the expected Smartphone users worldwide was a total of 1.75 billion (eMarketer 2014). This gives rise to the possibility to interact with an enormous amount of different users, places and situations.

Live video broadcasting in social media is expanding but studies points out the challenges that discourage many users. These are mostly caused by the user’s inability to find interesting topics to broadcast (Juhlin, Reponen, Bentley & Kirk 2011). This research wants to approach the aforementioned audience of potential users around the globe and connect them. Thus, it will examine how communication of control between unacquainted people can take place. And a collaboration that traverse between cultures, and transcends language barriers might be possible.

The upcoming testing scenarios are not relying on people's language skills, instead the users should be able to connect and express themselves on equal terms. The authors suggest that the human drive of curiosity and exploration can act as the common goal and bridge the gap between the users. With the use of mobile devices this study will suggest a solution for discovering new places instantly, by collaboration and by the assistance of others.

The outcome of the video interaction depends on how well the system is adapted for the intended user context. In contrast, a broadcasting system that is used for collaborating in a crisis situation might need to include other features than a system meant for exploring environments. Research points out many issues such as video literacy, privacy, hybridity, utility and collaboration that needs to be addressed in order to make live video useful for large user groups (Juhlin et al. 2011). From an interaction designer's perspective the authors are intrigued to respond to some of these issues, furthermore making the exploration feel interactive and engaging.
Research question

- How can exploration be encouraged between unacquainted users using live video and mobile devices?

Purpose

The authors hope to contribute to the according to Juhlin (2011) much unexplored field of user generated live feed content. While doing the research, the authors hope to gain knowledge and deal with upcoming challenges and issues involved in live video streaming. Based on Juhlin (2011) the following questions are believed to help answering the main research question:

1. Consumption and utility: Is there an interest for exploring other peoples environments live? Are there values?
2. Designing for variability: What adaptations are needed for the context? What kinds of functions are needed for the purpose of exploring environments?
3. Interactivity: What kind of interactive implementations can further immerge the exploration?

Scope and limitations

- The work will not be limited or adapted by the Internet capabilities or costs that a live stream could require.
- What the Sharer chooses to video-stream is a question of privacy and law that lies in each individual’s own responsibility.
- The definition “unacquainted” was used for its positive and inviting meaning. The related word stranger was not used to avoid the misconception that it implies something negative or odd.
- This thesis will not discuss matters as personal information or network security.
Theory

The chosen literature studies aims to dissect the thesis question in relevant subjects and further give answers to them. The theoretical framework will give a deeper understanding regarding the urge of sharing our experiences and underlying motives. It relates research of sharing and participation to the work of the Interaction designer Yosuke Ushigome. His work serves as one of the initial conceptual inspirations for this study. The theoretical chapter will further examine research discussing the human nature of exploration. Research of control by collaboration observes users doing collaborative work on a live screen. They try to find applicable graphical technologies to enhance the teamwork, such as augmented reality. Related works brings up studies and concepts that address many of the more playful sides of a live video collaboration. Further they also demand a platform that involves unacquainted (or friends) collaborating and creating UGC. Bambuser is a mobile application with a mature history of live video streaming, the others; Meerkat and Periscope, were born during the time of writing. Twitch.tv is an example that evidently shows there is a market for watching self-produced live video content and not only professionally produced content.

Technological development

It could be fair to say that the experience of exploring through live video streaming will be greater achieved with a higher quality of video. Users will be able to comprehend more detail and the environments will be perceived as more lifelike. However, as mentioned before, this research must stand above the notion that today’s technological standards or economical aspects might not fulfill the needs that a final concept or vision may require. From a global standpoint, the mobile broadband speeds or availability of today are fairly restricted and only available in concentrated areas. But in the near future technologies like Long Term Evolution Advanced (LTE-advanced) and WiMAX will be more widely spread and make it possible to create better user experience, and at the same time also allow for lower transmission costs (Oyman, Foerster, Tcha & Lee 2010).

UGC - sharing, participation and motivation

The first Usenet news-sharing program was introduced in the late 70’s. Since the beginning, online communities have coevolved together with computer networking. It led to new ways of communicating and today sharing takes place in thousands of online Internet communities across a variety of platforms (Arguello, Butler, Joyce, Kraut, Ling, Rosé & Wang 2006). News can be shared and go viral instantly. Twitter for example,
became the first to release the news of Bin Laden’s death, even before it was officially confirmed (Hu, Liu, Wei, Wu, Stasko & Ma 2012). The development has changed the way people look at products or services. Today people are more willing to participate and share information. In the process, they have gained new abilities to contribute and create value with other users. The ease of sharing on the Internet has both transformed people’s sharing habits and groomed the act of sharing to become a synergistic phenomenon. (Mu, Yao, Cao & Zheng 2012). Sharing content can take many forms such as commenting in a discussion, writing articles on Wikipedia, posting pictures, uploading videos etc. Motivating users to share content is a theoretical and practical challenge in the design of socio-technical systems but of utmost necessity for running the community (Nielsen 2006; Lampe, Wash, Velasquez & Ozkaya 2010).

Lampe et al. (2010) discuss that online communities rely on the insistent contributions of diverse types of users with different motivations and ways of participating. Studies of user generated content on Wikipedia conclude that the majority of the content is produced by a small percentage of the network community (Kittur & Kraut 2008; Priedhorsky, Chen, Lam, Panciera, Terveen & Riedl; Ingawale, Dutta, Roy & Seetharaman 2013). According to Jacob Nielsen (2006) designers must accept that inequality participation amongst its users will always exist. He states that although participation will be unequal, implementations such as achievements or other technical measures can better balance the inequality. Further research by Lampe et al. (2010) highlights the importance of a social structure that encourages social and cognitive aspects of users. This was especially important for the high contributing population of a site. Results also showed evidence that users continued to participate in a site for different reasons than those that initially led them there (Lampe et al. 2010).

Much of the research of today emphasizes the importance of social factors as motivation for participating and sharing. Brandtzæg and Heim (2008) points out that not only technical factors are relevant but also social and psychological factors are as equally important. Lampe et al. (2010) who states that site features connected to usability played a small role in explaining users intentions to participate in a community, also highlights these finding. Meaning that designing technical and social systems that provide social and personal gratifications is essential. Several factors influences users to share UGC in social media. Wang and Li (2014) define four types of motivations: utilitarian, knowledge, ego-defensive and value-expressive. The utilitarian factor refers to the users entertainment needs while the knowledge factor is about gaining information and reach a better understanding of a site. The ego-defensive motivator on the other hand is about the sense
of belonging and social interaction between users. The last motivator is the value-expressive factor, which brings up the users motive to express themselves, to feel good about themselves and their identity. In regards to the psychology of sharing, a study conducted by The New York Times, Customer Insight Group (2011) finds five perspectives of sharing that solely has to do with relationships. The results show that users’ motivations can either be to bring entertainment, to define themselves to others, to grow relationships, self-fulfillment and to get the word out about causes. In relation to Wang and Li, the later definition overlaps to great extent their four factors of motivation. It becomes clear that social factors play a central aspect for participating in social media that online communities are able to provide its members. Interesting is though that findings indicates that the strongest motive to share is to support a cause and secondly to nourish relationships closely followed by the motive of self-fulfillment. In contradiction Mu et al. (2012) talks about the self-serving aspect as being the biggest driver behind participation and sharing. They emphasize the users’ selfish goals and describes it as a growing behavior towards the concern and love for their own happiness and fulfillment as well as for those close to them.

Wang and Li (2014) also discuss the motivation of self-expression and draw parallels to self-actualization. Self-actualization in the sense as a motivator to reach recognition and aspiration for fame. By doing so users create their own identity that reflects on their personality. This sort of activity can be seen on YouTube where users produce UGC to reach a higher level of fame. Wang and Li (2014) make further distinction between social networking and other social media in regards to how users create content. In contrast to other media, social networks are characterized by how users carefully process their material in order to build identity-profiles.

It is necessary to point out that the aforementioned motivations seldom operate in isolation, but in fact often overlap. For example when a user shares her support for a cause, it is not only to spread the word out but also self-defining (The New York Times 2011).

It is as equally interesting to know motivators behind participation and sharing as to be aware of the reasons why users lose their interest and stop being active on a specific online community. Brandtzæg and Heim (2008) identified ten categories of frequent reasons behind users’ lack of loyalty that makes them less active or stop using the service. These implicate the lack of interesting people/friends attending, low quality content, low usability, harassment and bullying, time-consuming/isolating, low trust,
over-commercialized, dissatisfaction with moderators and unspecified boring. Findings show how crucial it is to vary the quality content in order to maintain successful online communities, to draw users to visit the site but also to actively participating over time.

Professional sharing

Interaction designer Yosuke Ushigome’s work the Professional sharer, PS explores the idea of transforming a person into a living tool by utilizing another person. An experimental study that examines sharing from a critical design perspective. Ushigome (2015) writes about his latest speculative design work:

At the center of the project is a Professional Sharer, a person who lives by the means of sharing. He inhabits the hypothetical world of a perfect Sharing Economy. Dreaming to live off sharing, Professional Sharers can only sacrifice their meager resources to earn just enough to sustain their daily lives. (Ushigome 2015)

Yosuke Ushigome vision involves a number of user scenarios with different types of resources being shared (See Fig. 1). The Energy Sharing, Screen Sharing, Processor Sharing, Image Sharing etc. A possible Screen Sharing scenario happens when a PS receives a request from a corporation to share a screen. After the PS accepts the request, a commercial message from the client is displayed on the sharers portable tablet. At that point, passing pedestrians on street may take part in the commercial advertisement shown and receive a digital coupon. The PS becomes a walking advertisement.

Fig. 1: Showing Yosuke Ushigome's vision and wearable for professional sharing (Ushigome 2015).
Professional Sharing aims to encourage audiences to look at the true nature of a sharing economy and discuss the possible future of this hype. It describes a profession or a role, which not all people would be comfortable signing up for, since it includes routines like snapping photographs of crowds. As there are few restrictions by law, and the profession fills a gap in the economy, the rather intrusive behavior becomes just another disturbing menace in the city environment (Ushigome 2015).

Curiosity and exploring
Exploring the environment without being physically present is of course a different experience. When traveling through digital worlds, instinctual thoughts such as how to successfully find your way back home safely, might not be lingering in the back of your head. The act of exploration could mean a lot of different things but curiosity is usually the driving force when exploring an environment (Berlyne 1960 cited in Wu & Miao 2013). Kashdan, Fincham and Rose (2004) refer to curiosity as the major motivator related to the explorative behavior individuals can undertake. An exploratory behavior with the purpose to explore, investigate and learn. In addition (Deci 1975 cited in Loewenstein 1994) talks about curiosity as the driver for seeking personally meaningful interests and desires.

The process of curiosity that according to Kashdan et al. (2004) leads to positive subjective experiences involves four stages: (1) increased attention allocation to scan and orient oneself toward novel and challenging stimuli, (2) cognitive and behavioral exploration of rewarding stimuli, (3) flow-like engagement with rewarding stimuli and activities and (4) the integration of novel experiences. Kashdan et al. (2004) further discusses how individuals regulate the amount of attention themselves throughout the process. Moreover, Individuals with high curiosity characteristics show stronger tendency towards an exploratory behavior and pursue actively such experiences.

Berlyne (1954 cited in Loewenstein 1994) proposed to distinguish between two dimensions of curiosity, on one hand the span between perceptual and epistemic curiosity and on the other hand the span between specific and diverse curiosity. The perceptual curiosity refers to a novelty drive caused by a certain exposure to stimuli which also later declines the longer the exposure is. Epistemic curiosity is about the desire of seeking knowledge. Specific and diverse curiosity covers the desire for finding specific information such as solving a puzzle and the latter covers the more general behavior caused by boredom. These two dimensions create a four-way categorization, which is,
according to the authors understanding, illustrated below (See Fig. 2). Berlyne concluded that our desire for change and novelty is a form of curiosity (Loewenstein 1994).

![Fig. 2: Berlyne’s four-way categorization of curiosity.](image)

Significant research has lately been done within the area of neuroscience in regards to understanding the width of curiosity. MRI experiments show that curiosity follows a u-shape curve. This indicates that high level of curiosity can be identified when we know little about something, when we are still intrigued, uncertain about the answer and want to find out more (Kang, Hsu, Krajbich, Loewenstein, McClure, Wang & Camerer 2009). This state of mind can be explained by the information gap theory. The feeling of curiosity arises within the gap between what we know and what we don’t know yet (Loewenstein 1994). In correspondence Berlyne (Berlyne 1960 cited in Wu & Miao 2013), explains that curiosity is externally encouraged by many factors, such as novelty, conflict, uncertainty and complexity. He further states that these various triggers of curiosity work simultaneously but at different levels. In that sense Loewenstein’s gap theory could imply, that in a situation where a user is actively investigating a country on Google street view for example, the new attained details of the perceived environment activates the curiosity and forms the information gap. If the environment is a completely novel experience, the user might become more curious and if the user has built some kind of expectation where a gap could exist it might trigger curiosity even further. Since this
thesis is about exploring environments, novelty becomes therefore the major aspect to investigate.

Berlyne (Berlyne 1960 cited in Wu & Miao 2013) introduced three criteria to measure novelty: (1) how often the stimuli have been experienced before, (2) how recently the stimuli have been experienced, and (3) how similar the stimuli are to previously experienced ones. In other words novelty is both time dependent and implicates the difference between the new stimuli and the previous attained experiences. In that sense curiosity is related to an individual’s extent of recognition, pursuit, self-regulation, challenging and novel openings.

Kashdan (2004) made a study on curiosity and social bonds, which explains that curiosity benefits humans at an individual and social level. The individual level is about the experience associated with individual growth. At the social level, curiosity works as an ingredient used for enhancing social relationships. This sort of social bonding can only be achieved if time and energy is devoted. Kashdan, McKnight, Fincham and Rose (2011) further studied the role of curiosity in conversations. Findings suggested that curiosity can build social bonds by stimulating behavior such as engagement, responsiveness and flexibility. It is desirable that the social interaction includes these behaviors to develop personal relationships and building intimacy. Their work points out that curiosity is related to the development of social bonding with unfamiliar people.

Control by collaboration using live video

The research of Huang and Alem (2013) shows how video conferencing can be used in collaboration between users to solve common goals and tasks. They suggest that the medium video conferencing is thriving and is used beyond communication and expanding for further use as a tool. Recently the technology has begun to move beyond face-to-face “talking head” conversation to be a way of sharing real world experiences (Kim, Lee, Sakata & Billinghurst 2014).

In Kim et al. (2014) user study comparing three live video-conferencing conditions with different combination of communication cues: (1) voice only, (2) voice + pointer, and (3) voice + annotation. The collaborating participants were given a puzzle to solve and they found that adding elements such as augmented reality significantly improved the sense of being together. The pointer was the most preferred additional cue by users for a parallel experience.
According to Huang's study most of these systems aim to support collaborations in which individuals play similar roles. Relatively less attention has been given to collaborative activities in which partners have distinct roles, particularly with one partner playing the role of helper and the other the role of doer/worker (Huang & Alem 2013).

Related works

Bambuser: global broadcasting anywhere
Bambuser could be viewed as the first mobile application capable of live video streaming user-generated content. This was a revolution which was not bound by the reliance of laptop webcams, making it possible to create live user experiences beyond the usual static blogging environments found online (Löwgren & Reimer 2013).

Early adopters of Bambuser broadcasting highlighted new user needs. Users would use Twitter to communicate with the broadcaster, providing feedback and asking questions as well as requesting camera pans. Users wanted a more dynamic broadcasting-viewing environment and a live chat room was quickly added to the Bambuser service. (Löwgren & Reimer 2013)

The Bambuser platform got global attention in 2011 during the events of the Arab Spring, which was a revolutionary wave of demonstrations and protests (both non-violent and violent). Local Egyptians broadcasted and feed news outlets with live coverage from Tahrir Square. When news agencies filtered and compared the material from other sources such as YouTube clips and Flickr images, the Bambuser material was considered strongly credible because of the masses of people documenting the same event live. (Löwgren & Reimer 2013)

In a promoting stunt showcasing the power of social media, Hans Eriksson executive chairman of Bambuser, received advice and tips from his internet viewers about where to go and what to see. The chairman spent 24 hours exploring, broadcasting all he encountered live on the web from his iPhone. (PR Newswire 2011)

Bambuser’s global success and history shows that live video streaming from mobile devices works well. Bambuser have been used to share video in different contexts, as earlier described for example the demonstrations in Egypt but also from more casual situations like press conferences, interviews and concerts or even things as trivial as cats
sleeping in a cat cafe in Japan. Bambuser contributed to pioneer the live streaming from mobile devices and in that sense they are very interesting service to learn from.

Bambuser as a service confirms that live video from mobile devices works regardless of what country and nationality it is used in. Sharing is an integrated part of the service today. Some of the major social media services, Facebook and Twitter are for example integrated and can be used to share a video with other people. Bambuser also has a function for live commenting/chatting on an ongoing video stream. This is an interesting feature as it helps to engage viewers by giving them the possibility to discuss the content as it is being produced. The commenting function is available both for the person producing the live stream and the viewers of the live stream. Showing appreciation for the content can be done either by using Bambuser’s like-function in the form of pressing a heart, and a connection with Facebook’s like system. There is also a function for flagging the content as inappropriate.

Meerkat and Periscope: 2015, year of live apps trending?

During the time of writing, the Meerkat application for iPhone was released. Shortly after a similar application named Periscope was bought and released by Twitter. The two applications resemble each other and lets you broadcast live video to the world, instantly and without costs. Users can stream for an unlimited time but once the streaming is done, the video is gone. However it is possible for the person who launched the stream, to download a copy of the video. Going live will instantly notify your followers on Twitter who can join and comment and send you hearts or likes. The services both produce interesting amount of tweets for such a short lifetime (See Fig. 3).

![Fig. 3: The graph shows the amount of exposure each application Meerkat, Periscope and Bambuser attained on Twitter per day (Topsy 2015).](image-url)
The trends of live streaming have not passed the marketers unnoticed. Companies like Spotify and Starbucks are, at the moment of writing, experimenting with the use of the media. Also celebrities like Madonna premiered her most recent music video using Meerkat (Why Meerkat and Periscope 2015).

These two, and at the time of writing, new services and apps utilize mobile live video stream functionality and have rapidly gained recognition in the live streaming community. For this study it was interesting to know that the subject and area is current and becoming increasingly more popular. The both services are truly live, and there are no scans for copyrighted material as there is with Google’s YouTube (Gibbs, Powles & Thielman 2015). And the same goes for Bambuser. Meerkat and Periscope can at the time of writing only be viewed on an iOS mobile device.

Since both services have quickly gained popularity seems to confirm that there is a large interest for sharing live video content from mobile devices with other people. And that could possibly also confirm live streaming via mobile devices as working well between different countries and viewers. When it comes to functionality the two services are quite similar. Announcing a person’s live stream automatically happens when the person starts streaming. In the Periscope case, appreciation for another person’s live stream can be done by continuously tapping the screen as hearts start flowing upwards on the screen. Hearts from generated from users are shown to other users as well. A total count of hearts given to the person streaming is saved to that user’s profile. Making it possible for other users to so how many hearts that person has received. This could possibly be connected to Wang and Li’s (2014) discussion about the motivation of self-expression and self-actualization, where the total amount of hearts generated could be argued to be an expression of how famous and recognized that user is. In Meerkat’s case hearts are more used as a like and is only added one time, in difference to Periscope where there is no limit to how many hearts can be sent. Both services are heavily relying on the live commenting part of the stream. The person streaming usually makes comments live by voice on other peoples written comments and in Periscope’s case sometimes on the amount of hearts they receive. Viewers also quite often make requests when commenting on the live stream. The live comments from viewers sometimes fill up the screen, which makes it hard to see what is actually being streamed (See Fig. 4). At the time of writing, both applications are forced into portrait/vertical -mode, which in difference to landscape/horizontal -mode, make it more difficult to produce scenic images and capture wide objects.
Twitch: Live gaming

Twitch is a platform for live streaming content produced on the fly, while at the same time getting paid for it. This platform is mostly for people playing video games. Every month approximately 1 million people are broadcasting their gaming experiences via Twitch. 45 million unique viewers are using Twitch every month (The Economist 2014).

In a three days advertising stunt on Twitch by Old Spice, the main character has been placed in the bounteous grandeur of nature, whom is contractually obligated to do everything the millions of other Internet users tell him to do. Using the chat feature to send whatever commands you want the man to perform. For example: eat that cake, build a sundial out of those snack cakes or eat those strange berries could be commands you decide to use (Twitch 2015).

Twitch is an important platform to look at because of its large number of viewers and streamers. Compared to the previously named services Twitch sports some features that are different and some that are similar. In difference to the other services Twitch has a built in functionality for getting paid. This can be done either by subscribing and or donating to the streaming user and by that showing appreciation and helping the person streaming to continue to do so. Another big difference is that Twitch can be viewed on a computer and a mobile device whereas Periscope and Meerkat, at the time of writing this, can only be viewed on a mobile IOS device.
Once again, the large amount of viewers and streamers on Twitch, both on mobile and desktop/laptops, confirms the interest for user generated live video content. It also shows that getting paid for the type of content that the Twitch platform is streaming is possible and works. In the case of viewing Twitch on a Desktop or Laptop device, the comment field does not obstruct the content. And while viewing Twitch on a Mobile device the comments have been separated from the video, they never overlay or disrupt the video content. Appreciation is once again done by the use of a like with a heart. But the other alternative that Twitch has, is the ability to send donations, which can be done continuously and made to be shown in the video content. A viewer’s name and comment can be shown in the video content if it is sent as a donation. The same goes for viewers that decide to sign up for a subscription during the live stream. These way viewers can be made part of the video content if they pay. This could be argued to drive more people to be willing to pay. Usually the person streaming mentions the name and reads the comment of a person paying, which probably also drives more subscribers and donators. Viewers sometimes ask the person streaming to do something while live streaming. This can be connected to the actual stream and in-game action or simply by saying or doing something in front of the camera. There is most likely a higher probability for a person streaming to do something described in a comment if it is done with a donation or subscription.

Summary
In conclusion, reasons behind why individuals actively produce UGC and share information, is a combination of different factors. Most of the research mentioned points out to the direction of social factors as the main incentive for sharing UGC even though other factors play a significant role. A community should meet users’ specific needs and demands. To tackle the complicated needs of the heterogeneous users of online communities and to make them share, it is paramount to stay ahead and understand its members (Brandtzæg & Heim 2008; Lampe et al. 2010). Meaning that the need for heterogeneous types of members leads to a versatile UGC material, which is fundamental for an online community to flourish. Ushigome’s idea of transforming a person into a living tool, utilized in the hands of someone else, is one of the links to this thesis research. It led the authors to discuss the different roles of the Sharer and Explorer. It is also relevant because of the controversies that can arise when the public environments becomes an arena for other people's gain.
Reflections on the beneficial effect and opportunities of live experiences, suggests that experiences should become controllable and shaped by users, in order to make the shared environments more curiously intriguing. If one compares two video streams with the same content out of which one is live and the other is not, the theory of Wu and Miao’s (2013) could support that the live video content may trigger curiosity in a more effective way than the recorded content. Furthermore, if the exploring user has the opportunity to some extent shape and influence the outcome of the experience, curiosity could be triggered further. By giving some control to the hands of the exploring user, the anticipated effect is an immergence in the moment and situation, a chance to experience something with novelty, something out of the ordinary.

Within Berlyne’s curiosity model the category perceptual-specific curiosity, confronts people with specific gaps in their knowledge when stimulated with a novel fashion or situation. If one further seeks to make users curious, one may conclude that the answer is to make them aware and highlight something they don’t fully know. To basically use pieces of information that could inspire users to seek answers and complete the puzzle. Designers have a choice to withhold all the info, to give it all away or give users a taste for more.

It becomes clear that elements of curiosity may be an approach of encouraging users to explore an environment. If a user looks at an environment through a screen on a mobile device and believes the location is novel, the reaction may lead to an urge to further explore the environment. In those conditions the user would lean towards a perceptive-diversive behavior to avoid boredom according to Berlyne’s theory model. If the user later have and strong idea of where she is, she might try to find clues in the environment to confirm her perceptions are right. In that case she leans towards the perceptive-specific curiosity behavior. The more the user experience the environment, the novelty aspect will be affected to the point that the user finds out the missing piece of the knowledge gap.

To reach an engagement and a sort of closeness between the users, Kashdan’s et al. research on social bonding between unfamiliar people suggests a foundations with responsive and flexible qualities. From a technical standpoint this may be achieved by having a responsive communication between the mobile devices. To gain flexible features, other elements may be considered to give the users tools to communicate. During a video conferencing phone call the communication between users is very advanced. The users are capable to communicate to each other by verbal or visual communication and use additional texting chat functions. But if the communication
between the unfamiliar users is restricted and works under certain conditions, theoretically it could work as the informational gap between the unfamiliar users and trigger a perceptual-specific curiousness between them.

According to Huang and Alem (2013) there is a huge potential to collaborate using video streaming between the helper and doer/worker in order to solve a task or a puzzle. During a live streaming collaboration it is shown that augmented reality make better interaction possible with the experience of being closer together. To implement augmented reality into a live video mobile device could therefore enhance the sense of experiencing of being present where the actual exploration of the environment takes place.

In an effort to trying to get a better understanding of which of the chosen related services that drives curiosity and control a comparison table was created (See Tab. 1). This is merely to help the authors to see. It has been based on what was found during the theory studies. Three believed key aspects were chosen: Sharing, Curiosity and Control. Where Sharing looks upon if the service have technical and social systems that encourage social and personal gratification. And Curiosity will try to verify if there is novel content being presented. The feeling of Control is one of the parts that drive Curiosity, for that to happen some way of influencing and shaping the content is needed. For example, a chat/commenting –function, or other means of communicating with the streamer. And the streamer has to be willing to change the content in the moment. Where the personal gratification of for example receiving a like will be considered as yes. The answers are rated from 0 to 3, where 0 means no possibility and 3 means it is automatic, very good or very simple.

Sharing
  a. Are there technical possibilities to share the content with other people?
  b. Are there heterogeneous types of members?
  c. Are there ways of receiving personal gratification likes?

Curiosity
  d. Is the content only live?
  e. Can it be expected to see something new every time?

Control
  f. Are there chat or commenting functions?
  g. Are there any incentives for the producer to accept to be controlled?
At the time of writing this there was not much research done on Periscope or Meerkat. Meerkat was released in February 2015 and Twitter owned Periscope was released in March 2015 (Pullen 2015). Both Meerkat and Periscope rely on Twitter and features integrated with it. At least two important things sets these apps apart while considering the previous in this theory chapter. Twitter decided to block some of the features for Meerkat which made it a little bit more difficult for a Meerkat users when it comes to sharing and seeing which other Twitter followers use Meerkat (Pullen 2015). This made it harder for Meerkat to share and to find other users. Periscope feature a little bit different way for *Personal gratification* when it comes to giving and gaining *likes*. This might give Periscope an advantage for people who are looking for a more visual gratification e.g. seeing all the hearts flowing up on the screen generated by the viewing users. Considering these two, it might be easier to understand why Periscope have more users than Meerkat and is ranked higher (Warren 2015). And these might be important things to consider while designing for this thesis. The related services does however differ quite much from this thesis prototypes e.g. Meerkat and Periscope are one to many live stream and not one to one. But it's still believed to be important lessons to keep in mind.

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*Tab. 1: Comparison table where Periscope and Twitch sticks out as better.*

23
Methods

During this study a set of methods and principles for Interaction design were used. The choice of methods have been based on factors like: context of the imagined prototype, putting the user in focus, User centered design UCD, the amount of economic resources, and the time frame for doing the study. In some cases there are more than one reference presented for a method, this is to give a better understanding and a broader perspective of the method.

The following methods are the ones chosen for the study of this thesis. Each method chapter gives an outline of why it was chosen, how it was contextualized and how it was adapted for the conditions in the research. Details of how the methods were applied are more thoroughly described in the design process chapter.

**Sketching**

Buxton (2007) recommends finding the basis for further studies by sketching and to continuously refine them. And so sketching was chosen as the main technique for finding the subject at hand. By moving through the design funnel it is intended to be elaborative as a starting point and moving towards reduction where the design narrows down to its essence. Preparations were done with sketching to better streamline a basic concept, minimizing time-consuming sidetracks. Sketches continuously interpreted the concept. Sketches were produced rigorously in the beginning, and slowly becoming less used in the prototyping phase. Buxton (2007) asserts that a sketch is not a prototype and they are to be used for different purposes. (Buxton 2007)

Initially in the project the authors resided on different continents. The finished works of illustrations were discussed over Skype making it possible to exhibit the concepts to each other, the sketches helped the authors to visually and more clearly describe their ideas.

**Brainstorming**

This method was chosen because of its potential to generate new thoughts and solutions (Saffer 2010). Brainstorming can also be performed without advanced preparations and tools. In the beginning of the project, both parties were continents apart. So it seemed fitting and convenient to use this method. And since this method can be performed by one or several participants (Isaksen 1998), made the choice even more logical, considering the
preconditions. The method has some pros and cons, for example, most people know the term Brainstorming, and have some idea of how it works (Wilson 2013), this of course helped when suggesting a brainstorming session. Because of previously mentioned circumstances the authors had to have some sessions apart when conducting brainstorming. This was unfortunate. But the early discussions were meant to constantly push the project forward with all kinds of suggestions. Saving critique of ideas and functions for later sessions. The award winning product design firm IDEO, also forbids criticism and debate during brainstorming and goes as far as suggesting having a sign that says *no critiquing and debating* (Kelley 2001). So the authors either prepared ideas and sketches beforehand (or during) the sessions as means to visually or verbally influence each other. The discussions the authors had were mostly, as Wilson (2013) highlights, a means of generating ideas or requirements. No matter if they sound irrational. Dawson (2009) mentions ‘throwing’ all the ideas you have down onto a piece of paper, in any order and as quickly as possible.

**Bodystorming**

According to Brian Smith (2014), the idea of Bodystorming is to imagine what it would be like if the product existed and act as though it exists. Bodystorming assists to give responsive and realistic feedback while exploring ideas and evaluating designs. As mentioned in: Understanding contexts by being there: case studies in Bodystorming (Oulasvirta, Kurvinen & Kankainen 2003), *being there* is an important part of Bodystorming. The method can be looked upon as a helpful technique to test and understand how context crucial digital objects and ubiquitous computing can work and interact with users in the intended environment. This User Experience Design (UXD) technique is ideal to design physical spaces (e.g. the interior design of a shop) but can also be used to design physical products or software (Smith 2014).

For this study an imagined scenario where testing participants had specific roles as either; Sharer or Explorer. The Sharer streams the video to the Explorer, and the Explorer decides what is to be streamed by sending commands to invoke a directional with the Sharer. It was crucial that the roles could act with the same premise as if the application existed. In order to make the scenario plausible, a video chat tool e.g. Skype, had to be used to put each role in its rightful context, enabling them to play their roles and communicate in the same way as in the suggested concept. The communication between the two sides was never scripted, instead the performers were instructed to imagine their roles and motivations in the scenarios. Motivations such as *why am I here on this street at*
this very moment? Some acting revolved around not knowing the other person. In order to get the actors in that difficult mindset, the actors were held separated to help them behave like unacquainted.

Wireframes

Since Wireframes can be expressed as simple representations of structural information, this was a of logical method to use. This study would at some point face the fact that elements and content areas of an interface needed to come together in the confinements of the limited screen size on a mobile device. And at the same time it was important to decide on what is to be included in the different prototypes, and where it should be placed.

Wireframes are used to describe products, features and interfaces without being distracted by the visual and graphical details (Saffer 2010). And by using Wireframes as a method it became easier to focus on answering how something can be used, rather than on details of how it should look aesthetic. When the prototypes went from Lo-fi to Hi-fi, it became obvious that there were limitations in how many objects it is physically possible to interact with, without blocking the view for the explorer. The more advanced the prototypes became, the more objects needed to be implemented into the interface. Saffer explains that Wireframes are supposed to contain a collection of all the parts meant to be part of an interface. And this was also the goal that was aimed for in the final prototype. Wireframes can be digital and show how intended functionality and flows should work (Saffer 2010). However, the transition from paper Wireframes to the actual digital prototypes was in this case quick, and the need for creating digital and interactive Wireframes seemed redundant.

Prototypes

For this thesis the need for a working digital prototype was thought to be very important. And prototypes are the ultimate way to explore and express results and ideas that have emerged throughout our previous tests. Prototyping will used as an iterative and evolving process, the knowledge gained after testing a prototype will be implemented into the next prototype. The prototyping part of the design process is very important and should not be taken lightly (Saffer 2010). In this case the prototypes will be based on ideas, theories and facts which at one point need to come together in an artifact, an artifact that will help express, embody and answer this theses’ final vision of the idea.
Usually a project will go through different stages in the quality of prototypes. To begin with Lo-fidelity prototypes that are created rapidly and maybe bit crude. They can be made out of paper, so called paper prototypes. However the authors decided to move quickly from sketched prototypes that were meant to show the characteristics of the projects idea (Rubin 2008), to a digital prototype in forms of using something similar, as Skype in combination with Bodystorming, which was earlier mentioned. This was simply to test some of the early hypothesis and to be used to answer questions about how users expected reaction corresponded to the reality. In order to test live video stream in combination with the communication that was envisioned, a more complicated prototype was thought to be needed. Even if paper prototypes might be cost effective for evaluation, and early knowledge about crucial information, and the fact that user response can be gathered before a single line of code is written (Rubin 2008). Still the decision to move forward towards Hi-Fi prototypes more quickly was necessary.

For the final tests, and to help answering the question for this thesis, a Hi-Fi prototype which is: digital, looks and feels almost like the real thing, stream live video, and can send commands, was thought to be needed. The higher the fidelity of a prototype gets, the more it should resemble and gain the characteristics of a final idea (Saffer 2010). So by iterating with less functions from start, and still with the basic functions thought to be the least for a testable prototype, we could move forward, making it gain more and more functions to be able to do user tests.

Prototypes should not be left to speak for themselves, and their visual appearance could be misunderstood and misinterpreted to be the final vision (Houde & Hill 1997). For this project the actual prototype is not solely what we expect to be the answer for the research question. The prototype is more like a tool that is needed to answer which question. It is therefore important to explain which parts represents the vision and functions as intended. And also what parts that do not. Otherwise the prototype might communicate the wrong vision and give distorted expectations (Houde & Hill 1997).

Heuristic evaluation

Heuristic evaluation is a “simple” form of evaluation, it does not demand as much resources as large user tests do. And that is one of the reasons this method was chosen. If it is difficult to perform large user tests, the least this study can do is to use Heuristic evaluation. But the main reason for choosing this method is the need for identifying usability problems in the user interface. If there are problems in the user interface of a
prototype, it could risk disrupting the experience during a live video stream. Heuristic evaluation is about having an objective view of a prototype. During heuristic evaluation it is important to act as if there were no previous knowledge about what is being tested (Saffer 2010). This might of course be a problem when the same people who programmed and designed them are testing the prototypes. However according to both Dan Saffer (2010) and Jakob Nielsen (1995) this is should not be a problem if done by using recognized usability principles Heuristics. Both Dan Saffer (2010) and Jakob Nielsen (1995) have their versions of Heuristic to look for during Heuristic Evaluation. For this study some might not fully apply.

Jakob Nilesen’s (1995) 10 general principles for interaction design are some of the most well known heuristics for interface design. Jakob Nielsen (1995) looks upon these principles as “heuristics" and rule of thumb, rather than strict rules (Nielsen 1995). For this study it has been decided to use these heuristics as guidelines throughout the iterative process of prototyping. They have also served as a way of finding usability problems during testing and evaluation.

Expert evaluation
An expert evaluation is done with a specialist in the area of expertise that is to be evaluated. That person should also have no or as little as possible involvement in the project. Due to an expected fairly small amount of users to test with this way of evaluation could help give to give suggestions and insights on produced prototypes. The evaluation of the system or product should be based on heuristics that are known and accepted usability principles. Since the study has already chosen to work with Heuristic evaluation and Jakob Nielsen’s principles, it could be argued that the expert evaluation also did so. If the specialist also has specific knowledge in the area of the subject of which the product or system is to implement in, this expert can also be considered a “double specialist" (Rubin 2008). Contacting the companies Bambuser and Ustwo made a request for double experts.

Usability testing
Usability testing takes use of techniques for collecting empirical data, while at the same time as observing the intended user group use the product or system in a realistic manner (Rubin 2008).
This way of testing can for example be done by doing formal tests but in an experimental approach. An expected behavior or reaction can be confirmed or dismissed. For this thesis this might have been the case in the beginning. But as it moved more towards working prototypes it was decided to go for the second approach of Usability testing. This is a less restrictive way of testing and is done by testing alongside the iterative process of the prototyping cycle (Rubin 2008). After every prototype cycle a user test can be conducted. This way the project's usability problems can be realized and the prototype’s next iteration will include fixes for these errors. This way the study can make the prototype constantly become more and more towards the final goal.
Design Process

Meeting up strangers that are supposed to communicate with one another over large distances is of course challenging. Nonetheless the need for testing this will be important for our study. And relying on research done by others will be done with a moderate and considerate amount. Anthropologist Rick E. Robinson recommends talking to the people of interest and let them tell their own story (Saffer 2010).

Rick E. Robinson also considers memories of an situation might become distorted, and documentation done with help of audio/video/photo can be difficult handle because of the share amount of media it creates (Saffer 2010). Another important guide is to take notes of the situation to gather what is happening as it happens, or as soon as possible (Saffer 2010).

Considering the above, this thesis has tried to act from a standpoint based on the above, and also decide on 3 guidelines:

- Going to the users in their natural environment is to be preferred.
- Don’t rely solely on research done by others about users, talk to the users.
- Take notes!

Sketching

The beginning of a design project should for example be exploratory and ask questions (Buxton 2007), which were important considerations for finding a fruitful research area and for the formation of the project. Also the method was used as it provides a better resource for authors to evaluate their ideas from various perspectives, to create a coherent and consistent message, and to avoid communication mishaps (Da Silva, Aureliano, Barbosa 2006). Since the authors resided in different continents and time zones the effective communication residing in sketches became clearer.

Results

Sketched imaginative scenarios resulted in the basis research area of live streaming between unfamiliar people. It envisioned a user interaction between two participants using mobile phones, almost as looking through a window to another user environment, giving the users the ability to glance at a chosen person's surroundings in real time. The
accessible people to choose from were illustrated on an overview map. These people had similar roles as Yosuke Ushigome (2015) refers to as Sharers. Hence, the authors named the two participating roles as Sharers and the observing person as Explorers.

Also the idea of giving a person a sense of physical control in a distant environment intrigued the authors. By using sketching a mimicking interaction was found (See Fig. 5). It suggested that, during the live video streaming, the Sharer would mimic the pointing direction of the Exploring users mobile device. This was thought to bring a playful act with another person. Technically this would require sending the compass or gyro information between the devices. However, this concept was abandoned due to its physical and time-consuming way of mimicking an action.

Fig. 5: A mimicking interaction between users. The Explorer’s device sends the compass and gyro information to the sharing user in real-time.

Sketching resulted in the research basis area of live streaming between unacquainted people. It envisioned Sharers on a world map overview, accessible on a screen by pressing them, and in this manner able to receive requests by Explorers to share their environments. The sketching also suggested a control of the Shares mobile camera, an interaction relying on collaboration, to controlling by either tilting the device, or by the use of a mimicking interaction.

Suggestions

- Research a first concept of instant live streaming between people.
- Requesting camera pans.
Brainstorming

Session 1
Session 1 was adapted by the separated locations of the two authors. One of which was residing in Tokyo, Japan, and the other Berlin, Germany. Consequently the session was held via video conferencing.

Session 1 divided the important aspects of the concept and highlighted it's essence. In this regard session 1 was used, as Wilson (2013) recommends, to generate social cohesion within product team.

Both authors were familiar with the method of brainstorming, which made it a simple activity to engage in.

Summary
The session had vivid discussions of imaginative sort, portraying how and when the users attains initial contact. Looking more closely at what the unacquainted users motivations are and how they communicate in the context. Taking considerations for privacy.

Results
An imagined scenario of either professional or nonprofessional video streamers, wide spread around the globe, influenced the session. Their local environment at a specific moment could be of interest for other users to explore or study. The team looked into the scenarios and sketches to sort out what was plausible.

The following scenario was formed:

In a user scenario the explorer (The initiating viewer of the live video stream) would send a request to a sharer (Sharer of video stream) of interest anywhere in the world. When the local user accepts the request, the mobile camera streams live and the requesting user could for example communicate to the sharer where to point the camera. Using a communication that focuses on being effective for camera pans but also to express appreciation for whatever the sharer is presenting. The scenario will convey with a one to one user communication, however the authors recognize this could also be played out with an audience.
Session 2
The second session was held in Malmö, Limhamn. This time the plan was to explore the possibilities and different directions for a service based on the activity of exploring environments. Here the point was to find what could be done with a solution that gave an answer to the research question. What are the possible functions and areas to explore? Post-it notes were main tool during this brainstorming (See Attachment 2) for post-its.

In the second stage of this session a sort and grouping activity will was performed to see what parts belong to each other, and where in a service they could “live”. (See Attachment 1).

The last stage was about choosing a focus for the study and to see which parts were believed to help answer the research question. In order to do those Post-it notes of all possible ideas were posted on a wall. No matter how weird they might have seemed. After this is part was exhausted and no more ideas could be added. The second part of the session was initiated. Post-it notes were rearranged and moved to under a related category this is called categorizing during brainstorm activity (Dawson 2009). The wall with its post-it notes was photographed and notes were saved for later analyzing.

Results
It broadened the concept further of controlling not only the Explorers camera, but the body as well. It highlighted important aspects in the explorative experience. The act of explorations should involve control of the body and move the Sharers by walking, turning and so on.

Brainstorming also suggested simplifying the controller to save time, this meant putting the mimicking interaction on the shelf for the first Prototype.

Suggestions

- Skype can help us explore the basic concept.
- The body movement needs forward/back command.
- Rewarding feedback to the sharer ex a heart symbol.
- Ways for the Sharer to communicate not wanting to follow a command or things not possible do.
Bodystorming

Skype as Bodystorming tool

By using Skype without any strict rules or script, the authors could test different means of communication and find accidental design suggestions or flaws.

The Skype software turned out to be an essential tool during the initial Bodystorming tests. The phone's “main camera” was used instead of the “selfie camera”. As emphasized by Smith (2014) and Oulasvirta, Kurvinen & Kankainen (2003) the use of a prototype in its intended context is to be preferred. And by using Skype the tests could be appropriately conducted in a more plausible scene in various environments. Also the testing participants can act in separated spaces and maintain the role as strangers. When receiving Skype messages (walk forward, pan left etc) they are displayed in the center of the screen with a notification-sound. The messages are displayed only for a brief moment and subsequently vanish. This makes the software ideal for the intended purpose compared to other software tested.

Bodystorming 1

In order to reach out to more potential users in other countries the imagined communication is thought between users who does not necessarily know each other, however during initial tests this will not be considered. Because of practical issues the research had to be conducted on locations that did not involve unfamiliar environments. And the authors themselves had to act as Explorer and Sharer. In the planned testing scenarios one helpful user had the opportunity to help the other curious user to explore an environment, using a live video feed (Attachment 3, Appendix).

The Sharer strolled around in different local places in the Malmö harbors, while the exploring user was comfortably seated in front of the home computer. The exploring user simulated the contact requests by calling the Sharer by Skype. When answering the call, the camera was be directed forward simulating the eye view of the Sharer to the viewer. At this moment the controlling phase of the test was started, and the Sharer watched the display for movement indicators from the Explorer.

All the live video streaming and communication between the users was recorded and saved as material for further discussions and analysis. The test evaluated 4 different ways of sending and receiving directions and information (See Attachment 3)
Test 1.0 Scene using Free text

This scene was set to test free text commands. This could be of use if you wanted a more specific communication ex. “-Camera follow that bird in the sky”.

Test 2 Scene using Symbols

This scene was set to test basic semiotics, the use of signs and symbols for communication. The goal was to get an idea of how symbols for communicating movement could work. And at the same time get a better understanding of how basic symbols could be used to control movement of person and camera (See Fig. 6). The symbols consisted default Skype emoticons such as hearts, smileys and pointing arrows etc.

Fig. 6: Some of the symbols used during the Bodystorming tests.

Test 3 Scene using Voice

This scene was set to test basic voice commands. The goal was to learn how sending voice for communicating movement or tasks could work. And with result from the test hopefully be able to see some signs on what commands could work best for communicating movement of user and camera.

Test 4 Scene using translated synthetic voice

Testing of basic text commands translated with Google translate and replayed with Google's synthetic voice. The goal was to learn how this way communication could work when sending movement commands.

Summary

The environment that was explored was familiar to the explorer, but was enlightened in some unpredictable situations. The role as the sharing user was occupied with holding the camera steady, which made the one-way audio communication feeling natural. But the sharer could in some situations be forced to verbally inform the Explorer why the given command was not possible at the moment. This was mostly caused by unusual hinders in the environment such as pools of water. Each scene lasted about 5 minutes and the exploring user always stopped the communication. However both users lacked some sort of time boundary for the interaction.
Test 1.0 Scene using free text

Sending text commands caused waiting time for the sharer. For the explorer it involved repetitive writing. The Bodystorm test suggested that a one way text communication could not stand on its own. However the free text communication accidentally led to a “Move around freely” control function, which might be implemented in a prototype.

Test 1 Scene using Symbols

When using symbols waiting times were greatly reduced, requests for moving or panning the camera were responsive and easy to understand for the Sharer.

On account of the Explorer the controllers were far from convenient, they involved tasks of copy then pasting the symbol icons in the chat window, and finally send by pressing Enter. A potential means of communication was found, but a less cumbersome symbol controller will be used in the next test.

Test 1.2 Scene using Voice

The audible voice commands from the Explorer were overheard by bystanders, which drew uncomfortable attention during the communication.

Note: But during the tests the sharing user started to sing slightly to dramatize the situation. This was the sharer's strategy of making the environment more playful and entertaining.

Test 1.3 Scene using translated synthetic voice

This was less of an enjoyable communication since the synthetic voice had a bit of attitude problem. The synthetic voice had a demeaning undertone and would have to be replaced if it was to be taken into consideration for the project.

Acting on the assessments from the previous Bodystorming results and discussions of video clips, notes and literature studies, the Bodystorming 2 test was developed. The test strives to verify the chosen communication of using Symbols, and to find other needed functions of controlling another person.

Results

By using Skype without any strict rules or script, the authors wanted to find the most effective way of controlling another person's camera and body, and to find other accidental designs suggestions or flaws.
On account of the participating authors, the most responsive and simple way of communicating was by sending Symbols. A “Move around freely” control function was found by accident. Each scene lasted about 5 minutes and the exploring user always stopped the communication. However both users lacked some sort of time boundary for the interaction.

Suggestions

- “Move freely” explorer command.
- A visual time limit of the interaction for both users ex. 1, 3, 5 min.
- A less cumbersome symbol controller will be used in the next test.
- The voice test results suggest continuing to work on a nonverbal communication.

Bodystorming 2

To verify functions a low-fi prototype will be given to the Exploring user. Comparing it to the previous test the Exploring user's controller will be less cumbersome to handle. Simply put the Mac keyboard used in Bodystorming 1 will be upgraded. Controller symbols have been pasted on the keys and the original keyboard layout has been reconfigured to correspond to fitting Skype Emoticons. This solution reduces the amount of steps for the explorer to send commands with Skype. The Explorer can press different arrow keys to communicate movement of either camera or body (See Fig. 7). The authors hope that the basic look and feel will make room for criticism and suggestions from the testers.

Symbol commands tested

- Movement for camera: Pan up/down
- Movement for body: Rotate, Direction
- Other keys: Heart, Stop
Fig. 7: Keyboard layout, Skype Bodystorm.

A total of three testers will participate. The role as the Explorers is given to a male and a female, in their young twenties. They are friends but have never met the other user, a 28-year-old male, acting as the role of the Sharer.

To help the authors dig deeper in where the design is going, a role-playing scenario will be played. This will require the participants to accept playing the roles and acting out (Eriksen & Linde 2006) while reflecting on the interactions at hand by sending movement commands via Skype.

Both sides will be debriefed separately to explain the vision of concept and the controllers to be used. Also the research method to be used will be briefly explained.

The two explorers are allowed to act in the same room, to share and to discuss the experiences on the screen. The authors will split up and join the two sides to assist in case of any technical difficulties. Before each test the explorers will be verbally informed about the current location of the Sharer (See Fig. 8) and the time limit for the interaction. Each scene will last for five min, three minutes and one minute. The participants will also be instructed to send a Skype message to simulate the request, joined with a short description of themselves and duration of the communication.
Location is considered an important part of Bodystorming, which is confirmed by Oulasvirta, Kurvinen & Kankainen (2003). And so before doing the second Bodystorm session, finding similar or identical environments to where the imagined artifact is or could be used was important. This also means that the participants can observe and act in a realistic environment, which is to be preferred (Oulasvirta, Kurvinen & Kankainen 2003).

Summary
The test immediately hit failure due to the unexpected behavior of Skype on the iPhone device. The test had to replace the iPhone and regroup. Due to the technical difficulties and the limited time schedule, the upcoming tests were moved to the nearby parking lot at Malmö University. After a playful test run with the controls the atmosphere in the room was high and immediately the Explorers discussed how to make the familiar environment they saw on the screen more entertaining. They discussed every move on the screen, and made comparisons with video games in the ongoing activity. They started to test the boundaries of the Sharer by making him do physically challenging tasks. One tried to make him run instead of walk; since they lacked that function they pressed the walking button multiple times. When small obstacles appeared on the screen they wanted to jump on top of them, they suggested a jump button should be in place to get the message
through. The neighboring doors were investigated, so was the local entrance to the supermarket.

The pan down/up camera function was seldom used, instead the users focused more on the body commands than on the camera commands. Using commands for rotating the camera was seldom used and was expressed as being confusing. The heart button was rarely used, in the words of the testers ”-the Sharer lacked in performance to really deserve them”.

According to the testing explorer the environment was not interesting enough to become intriguing to explore. Unfortunately the test was abruptly ended because of a battery issue with the Sharers smartphone.

With the new data and input from the testing participants, the various needs and priorities for the next test became clearer.

The previous test failed at presenting a reasonable context. On account of the participants, the parking lot was too familiar and was not regarded as an environment with novelty. According to the literature studies, the environment had low chances of triggering curiosity because its lack of novelty. The upcoming high end prototype had to be capable of presenting unfamiliar environments to the respective participants and to do this in an effective manner. The authors could, in theory, stage their environments and build their knowledge based in controlled environments. However the research question had to be pursued and it involved exploring environments. Environments are defined as the natural world (Merriam-Webster. 2015), which should not be confused with controlled spaces. It was recognized that this demanded the prototype to become more independent, without relying on the physical presence nor the constant assistance from the authors.

Results

The test strived to verify the chosen communication of using Symbols, and to find other needed functions of controlling another person.

None of the participants questioned the fact that they only communicated by using symbols.

Using both camera and person direction was found redundant, because they basically have the same effect.
All the explorers were, to some extent, annoyed by the communication when the Sharer did not follow the given commands.

Eventually the exploring users started to focus on controlling the person, instead of exploring the environments. They all claimed this was because of the mundane environment.

None of the participants aborted the communication earlier than after 5 minutes. Concerning the time limit function a suggested pattern is starting to emerge. This and previous tests has had an interaction lasting no less than 5 minutes.

From the researcher's perspective, the prototype was relying on the users assistance to function.

Suggestions

- If the prototype needs a time limit function, it should be longer than 5 minutes.
- Make the prototype less relying on the authors assistance.
- It is desirable to make a prototype that can be shared to other users.
- Using symbols was an effective way to communicate movement requests.
Wireframes

Paper Wireframes

The first Wireframes served as help during discussions about functions and ergonomics (See Fig. 9). The ergonomic discussions revolved around where to place buttons so a user could easily reach them. The user interface of Android mobile devices and Apple's iPhone also served as a foundation for discussions.

![Paper Wireframes](image)

Fig. 9: Early "Paper Wireframes" produced for creating discussions regarding the prototype.

Digital Wireframes 1

The first digital Wireframe was made to get an idea of where to place controls and buttons. Furthermore, since there is limited screen area on a mobile device it was also a way of getting a better idea of how large buttons could function without covering too much of the live video (See Fig. 10 and Fig. 11). The main focus in the prototype is still the video but for the Explorer it is also about easily reaching the controls when exploring. For the Sharer it is also much about seeing the video, and what is actually being filmed. But at the same time it was important to clearly see what instructions are being sent from the Explorer. An overlay of transparent animations was tested at this stage.
Fig. 10: Explorer view approximate space taken up by buttons.

Fig. 11: Sharer view, placement of buttons and space for information animation area
Digital Wireframe 2

The final Wireframe had the characteristics of a design sketch, rather than a Wireframe. This was due to the need for faster completion of a working prototype (See Fig. 12).

Fig. 12: Detailed Wireframe, which was used for the prototype interface.

Prototyping

An early decision to stay away from native Android apps was made. There was neither time nor the necessity for going with native Android apps. It has previously been discussed how important a testable prototype with certain capabilities would be. To be able to test with users in their natural environment an early working prototype was necessary.

As previously stated one of the first rules of this design process: 1. Going to the users in their natural environment is to be preferred. This could of course be difficult considering the context of the study. But instead of bringing the user to the test, give the user the possibility to act in their natural environment and test it there. It could be argued that it is more or less the same thing. And considering that this also fits very well with the whole context of the thesis, namely: Exploration over live video. It seems reasonable to also do the test this way.
Considered preconditions for a testable prototype:

- Live video.
- Live data communication.
- Be able to run on a mobile device.
- Can be tested with people in remote locations.

With these four prerequisites for a testable prototype, a search for available and possible techniques was made.

The cheapest, most promising, most open, and with no restrictions to bandwidth or upload/download limitations was eventually found. A quite new technique called WebRTC (Web Real-Time Communication), which was first released in 2011 and is an open framework from Google. It’s free and it gives mobile applications and browsers Real-Time Communications capabilities accessible through a JavaScript API. With this framework it's possible to leverage high quality video, audio and data communication to mobile devices through a mobile browser (WebRTC 2014).

However, there were some limitations and problems discovered, specific to the demands set for this study. In the beginning most of the development was tested through Google Chrome’s mobile browser. But for some reason it was not possible to switch to the back facing camera (The camera that is directed away from the person holding the mobile phone). Many hours were wasted on trying to understand why the JavaScript code to change what camera to use, did not work. It was finally discovered that this was due to a bug related to Chrome. Luckily this bug was not present in with Mozilla Firefox.

To be able to build a responsive and mobile friendly interface quickly, the choice of html framework was Twitter Bootstrap 3. Bootstrap has been around since 2011 and is one of the most well used front-end frameworks. Bootstrap was created to serve the whole spectra of web, from mobile to desktop, a responsive mobile first HTML framework, which has grown to be the most popular in the world (Bootstrap 2015).

Prototype 1

The first prototypes had no graphical aspects added to it, it was used purely for testing functionality. In the first prototype an idea of using the compass direction as a way of showing what direction the Sharer is facing was discussed. In the picture below it might be possible to see this information. This was however not implemented fully (See Fig. 13). At this stage the live audio, video and data stream was working. It made it possible
for the Explorer to send text commands with buttons, experience live audio and video. This prototype was never field tested by users, only by the authors.

Fig. 13: First functional prototype, buttons in the bottom. Walk forward, compass direction early idea.

Prototype 2 - Explorer interface
In the first iteration of the prototype a full screen video was taking form. Also buttons were given a larger focus on. Still no actual graphic design of the interface has been implemented. Only the default Bootstrap elements were used. The compass direction was left in the prototype on the Explorer side, even though it did not actually serve any purpose than giving the idea of that it was working (See Fig. 14).

Fig. 14: Second prototype, explorer screen with compass direction.
In the beginning the prototype was working well enough to be tested. Unfortunately the prototype later showed connectivity issues, which also made it difficult to conduct the tests. The connection stability needed to be improved for the next tests. This was mainly a programming issue and would be addressed until Prototype 3. At this time the priority was trying out functions. In the picture below (See Fig. 15) a user is seen holding a Google Nexus 4 mobile phone. This is Prototype 2 being tested in Usability Test (See Test 1, Chapter Usability Test). The image quality of the stream was generally quite good.

![Prototype 2, user testing a working prototype.](image)

**Prototype 2 - Sharer interface**

The interface for the Sharer was still very simple and minimalist. No controls or buttons are being shown during Sharing (See Fig. 16). The Sharer gets instructional animations as feedback from the Explorer. During the tests the Sharer did not register some of the instructional animations. This was simply because the Sharer needed to look away from the screen while checking the surroundings for obstacles or traffic. An idea of adding vibrations or sounds was discussed at this time, but left for implementation into the next iteration.
Prototype 2 - First iteration Explorer interface
The second iteration was conducted shortly after the first test. The results from the first iteration showed a couple of usability problems that were thought to be quickly implemented and tested. A button for ending the session (Quit) was implemented (See Fig. 17). In the connection start screen for the Explorer it was previously not possible to see whether the Sharer was ready to share the video stream. In this version the connection button was disabled and transparent if a connection was not possible, and then became enabled with no transparency, if it was possible to make a connection.
Prototype 2 – First iteration Sharer interface
Just as the Explorer’s interface needed a way of ending the session so did the Sharer’s interface. In this version a notification message appeared if the Explorer wanted to terminate the session (See Fig. 18). As previously mentioned for this iteration, vibrations or sound would be tested as a way of informing the Sharer that a new instruction has been received. In an article on: Smartphone haptic feedback for non-visual wayfinding (Azenkot, Ladner & Wobbrock 2011), researched on this subject was found to be helpful. This article showed a similar scenario and how it could be solved with vibrations as haptic feedback for communication. In the first version of haptic feedback a vibration pattern was played before instructional animations. The previously mentioned article also suggests an approach with vibration patterns for different commands. In this case that could possibly help the Sharer to spend less time watching the screen. Which might lower the risk even further for colliding with obstacles or vehicles. This could have been an interesting path to follow, but has been left for further research due to time constraints.

![Fig. 18: The Sharer gets a notification from the explorer who wants to end the stream.](image)

Prototype 3 - Explorer interface
At this stage the prototype could be utilized without the assistance of the authors. The prototype was also working well enough for being tested outside the Campus area only relying on connectivity from cellular network operators. Prototype 3 had most of the thoughts and ideas from previous tests results implemented (See Fig. 19).
Prototype 3 - Sharer interface
The sharer interface have gained new elements such as a hearts counter and photo counter, a way of seeing the total amounts of hearts the Explorer have chosen send. And how many pictures the Explorer has taken (See Fig. 20).

Online prototypes
The links below leads to a web server for testing the latest online prototypes.

The sharer page needs to be run on an Android OS in a Mozilla Firefox browser.

Sharer: http://www.pounderboy.com/livetest/share.html
Explorer: http://www.pounderboy.com/livetest/explore.html
Expert evaluative discussion

May 12 2015 - An interview with Måns Adler tech-director at digital design bureau Ustwo, Malmö. He is also co-founder and active board member of the company Bambuser (See literature studies), which makes him an expert in the live streaming market. Måns Adler will be referred to as expert.

Summary

The intent was to have the expert utilize the prototype, and to explore a distant country through collaboration with an unacquainted person. Unfortunately these planned requirements could not be presented because of unexpected misfortunes. Consequently, the form of the meeting was changed, and was instead directed to have the expert evaluate the functionality of the prototype.

A fitting user scenario was explained briefly, and the prototype’s intended interaction in the setting. The expert used the prototype and explored the local office environments with one of the authors as Sharer.

Result

According to the expert:

- The prototypes controlling interaction had promising responsive functionality.
- The symbols and animations were easy to comprehend. The same commands could be communicated by text messaging but lack the same call to action.

Suggestions:

- A text messaging implementation was suggested. Not only for communication but it could also cater as a bonding functionality between users.

Other thoughts/comments:

- With this system I do not get interested in the person that I’m collaborating with, which is confirming an interest for the environments.
- The expert questions how long the system can keep up his interest. When will users give up? When does the streaming end?
- If imagining the prototype in a larger collaboration, the functionality may become difficult to maintain. Many users result in many requests. A discussion on whether a time restricted controller as a solution, thus involving a passive audience.
Future testing suggestions:
Måns Adler suggested conducting future research of users using other live streaming software, such as Bambuser or Periscope, and comparing the functionality of exploration when using text messaging versus the symbol prototype. To ask the users how they perceive their own actions between the different platforms.

He also noted that the icons and animations were an interesting quality that hasn’t been properly or thoroughly tested in other systems. And the fact that one of the animations, moving forward, felt like they were moving into the image, almost like Augmented reality, was expressed as being very positive. It was noted that small things like this could make the difference.

Usability testing
At the end of two of the prototyping cycles usability tests were made. Both tests were meant to bring viable information about how the prototypes interface and functions were perceived. The facilitators also choose to conduct video documentation and observations when it was found suitable for the situation.

Setup of tests
Test 1 - Prototype 2
Including the facilitators a total of 7 users participated. On an average each participant spend approximately 20 minutes with the facilitators. Each session included filling out questionnaires (See Attachment 4, Appendix) and explaining the prototypes intended user scenario and context.

Test 2 - Prototype 3
The facilitators did not participate as test subjects, 14 users took part of the test. On an average each participant spent approximately 20 minutes with the facilitators. Each occasion also included filling out questionnaires (See Attachment 5, Appendix, Attachment 6, Appendix) and explaining the prototypes intended user scenario and context.
Scenarios

Test 1
The day suffered from harsh weather with rain.
The scenario was set up at Malmö University. The facilitators gave each participant the roles as either Sharer or Explorer. The Sharers were advised to locate themselves outside of the University campus, and to choose their own environment. One facilitator, in case of any technical issues, always accompanied them. The explorers were always situated at Malmö University campus Lab. Except on one occasion when the Explorer performed acted from home residence.

Test 2
The day suffered from harsh weather with rain.
The scenario was set at Malmö University. The facilitators gave each participant the roles as either Sharer or Explorer. The Sharers were advised to locate themselves outside of the University campus, except on one occasion when the sharer was situated in Berlin, Friedrichshain, and to choose their own environment. This time there was no need for a facilitator to accompany the users, due to a more stable prototype.

Data collected

Test 1 – Data collected

Data collected in test included, functional data, perceived emotions:
Spontaneous thoughts, Time taken, Response time, Response impact on experience, Redundant functions, Expression of appreciation, Missing functions, Overall experience rating, Fun moments, Boring moments.

Test 2 Explorer - Data collected

Data collected in test included, functional data, perceived emotions:
Spontaneous thoughts, Time taken, Response time, Response impact on experience, Redundant functions, Expression of appreciation, Missing functions, Overall experience rating, Fun moments, Boring moments

Test 2 Sharer - Data collected

Data collected in test included, functional data, perceived emotions, and interpenetration of information: Time taken, Response time, Response impact on experience, Unnecessary feedback, Vibrations usefulness, Difficulty to understand animations, Encouragement
from heart counter, Encouragement from photo counter, Missing functions, Rating of sharing, Experience rating of being "controlled" by another person, Fun moments, Boring moments, Overall experience rating.

Summary

Summary, Test 1 - Prototype 2
April 24 2015 - The first test failed to involve a satisfying amount of testing users. And due to technical problems it was also difficult to produce reliable data. However, spontaneous discussions resulted in some insights to help prepare for Test 2. It became clear that an additional questionnaire was needed to evaluate the Share's experience. Somewhat useful information were gained from the questionnaire.

Summary, Test 2 - Prototype 3
May 14 2015 - The second test managed to bring a larger amount of test users. As explained in the prototyping cycle, the prototype's stability was immensely improved at this stage. This resulted in a much more enjoyable experience for users as well as facilitators. More focus on testing and collecting data was accomplished.

Observations and video documentations

Test 1 - Prototype 2
April 24 2015 - During the observations of the tests a number of issues were noticed.
- Some test users expressed a wish for a more visible feedback after pressing a button.
- There was no way of ending the session for the Sharer.
- There was no way of ending the session for the Explorer.
- Sometimes the Sharer did not register the instructions/animations from the Explorer, this was due to the need for looking away from the screen in order to look for obstacles or traffic.

Test 2 - Prototype 3
May 14 2015 - During the observations of the tests a number of issues were noticed.
- When the explorer lost connection to the session, the Share was left unaware and continued to wait for the next command, leading to an uncomfortable situation for the Sharer.
Results

Questionnaires

- Animations and symbols were verified to be functional enough. The respondents had little or no problem understanding the interface.
- Several of the participants expressed the need for a function or a way to be able to communicate via text.
- A need for expressing things the Sharer does not feel comfortable in doing or things not possible.
- Results from the questionnaire showed clear indications of the importance of unfamiliar environments while exploring through another person. Respondents imagined the prototype being utilized in a more interesting environment. They were interested to learn what would happen if the testing was done in environments such as New York.
- A generally positive expression for exploration through another person could be interpreted from the answers in all the questionnaires.
- The average time taken for the live tests were approximately 4.30 minutes.

Major findings and recommendations Test 1 Prototype 2

List major issues

- Sometimes the Sharer did not register the given command.

Identify solutions

- Adding vibrations before every instruction

Major findings and recommendations Test 2 Prototype 3

List major issues

- When the explorer lost connection to the session, the Sharer was left unaware and confused when not getting any new commands, frozen in last position.

Identify solutions

- Implement a notification that notifies the Sharer that the Explorer has lost connection.
Conclusion

With the research conducting during this research, the authors hoped to gain knowledge and insights to help answering the research question.

Research question

*How can exploration be encouraged between unacquainted individuals using live video and mobile devices?*

**Answer:** The most crucial encouragement for the explorer is to be presented with an environment that includes novel elements. This conclusion is confirmed in our user tests and literature studies (See Theory, Curiosity and exploring). To further shape and influence the exploration, the use of directional controls, has shown promising results.

Purpose

During the process of finding a reasonable answer to the research question an attempt to also address following challenges in live video streaming.

*Consumption and utility:*

Based on aggregated data from testers, questionnaires and discussions, the authors have found that there seems to be a clear pattern of interest to explore other user's environments.

*Designing for variability:*

Simple and direct commands, communicated with fast response have shown effective in the context of exploring live through another person. This includes functions as moving forward, stopping and changing directions. Fast response might not be considered a function but is nonetheless a very important aspect for achieving a fluid and direct experience.

*Interactivity:*

Interviews and discussions suggest that animations with aspects of augmented reality might be helpful for further immersion.
Discussion

It could be argued that it can be difficult for the Sharer to know what the Explorer perceives as a new experience. Particularly when the communication is held between two unacquainted individuals. By giving the explorer the ability to have some sort of control to shape the situation. The chance for experiencing something with novelty and something out of the ordinary could possibly be easier achieved (See Curiosity and exploring, Chapter Theory).

The authors assessed different psychological effects that could be anticipated when exploring a distant environment. Research stated that the drive for exploration was closely related to curiosity. Curiosity became an important psychological effect to consider in the discussions and potentially act as the key motivational drive in the users. The authors gained an important understanding of curiosity, and an ambition to trigger the psychological effect as much as possible.

The Sharing participants lacked a practical way of responding to the Explorer when a received command was not possible to perform. This can possibly be solved by either a button or text input. They suggested the communication would benefit by this, since it would lead to less uncertainty between the commands. Interestingly enough, the Sharer was always able to communicate verbally, or by hand gestures with the Explorer. However none of the participants chose to do so. This finding could suggest that the Sharer did not want to disrupt the experience or either out of respect or possibly because of a will to communicate with same means as the explorer.
Recommendations for further research

1. Results from the Expert interview and user tests suggested that additional functions such as: feedback communication from the Sharer, and a way of communicating via text could be interesting additions to explore.

2. How might using devices like Google glass or Epson moverio change the experience for the Sharer and Explorer?

3. Further explore the use of vibration patterns, how could these work for directional guidance.

4. Guiding blind or visually impaired people; is fast response and good video quality enough.

Critical reflection

During evaluation of test results from questionnaires new questions sometimes emerged. These questions might have been interesting to answer. More tests might have been one way to solve this.

If more time was spent on literature studies it would probably have been helpful to look further into semiotics, and how different cultures perceive symbols and how they were used in the interface.

Another way of embodying the aspects tested could have been using Google cardboard. This could possibly have been a more complicated approach but might have lead to other interesting results.
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Appendix

Attachment 1 - Brainstorming Session 2

Stream initiated
Viewer functions (Explorer)
- take picture
- walk directions
- record video
- predefined movements, combinations/activity request
- camera pan
- custom request
- end stream
- donate
- show appreciation
- Rate
- Show face, start own camera

Sharer functions (Explorer)
- Share current activity (Social media connections (twitter, face.. etc))
- end stream
- Kick viewer
- block viewer
- Pause stream
- Share heart rate
- see viewer reaction
- show donation messages
- show total donation amount

Pree stream
Map overview of shares
- Users located on a searchable world map
- Show sharers state, is online or offline, open for share etc
- A sharers planned event, share to many.
- Viewers request an event
- Sharers and Explorers profile on the map, show avatar, picture, preferences, hobbies-
- Profile activities, snowboarding, skating, hiking.
- Profile mood, happy sad, etc.
- Planned event fund request, will do this event if funded, 130€ / 2000€ (not funded yet.)
  (Donate, fund)
- Geo fence, an explorer sets a geo fence on an area he/she is interested in. If a sharer enters this area get notification so the Explorer can request stream.
- See history of previous shares/streams
- Exclusive share, offer to get buy the exclusivity of an particular share. News agency wants to buy the exclusive rights to something of value that they want to publish on their online news site live.
Attachment 3 – Communication test

Communication test with Bodystorm 1

Test 1. Free text.
This test will be set to test free text commands. The goal is to learn how sending text for communication movement or tasks can work.

Test 2 Symbols
This test will be set to test basic symbology. The goal is to learn how sending symbols for communication movement or tasks can work. And with the result from this be able to design symbols to that would work best for controlling movement of person and camera.

Test 2.1 Symbols
Body movement

Test 2.2 Symbols
Camera movement

Test 2.3 Symbols
Camera and body movement combined

Test 2.3.1 Symbols
Camera and Body movement combined

Test 3 Voice
This test will be set to test basic voice commands. The goal is to learn how sending voice for communication movement or tasks can work. And with the result from this be able to define what words would work best for controlling movement of person and camera.

Test 4 Synthetic voice, translated
This test will be set to test basic voice commands that are translated with google translate. The goal is to learn how sending translated voice for communication movement or tasks can work. And with the result from this be able to define what words would work best for controlling movement of person and camera.

Test 1. Free text.
This test will be set to test free text commands. The goal is to learn how sending text for communication movement or tasks can work.

Test 2.1 Symbols - Body movement
Description:
Using symbols to guide the person in various directions.

Basic symbols tested
Symbol for saying its about the person:
Directional arrows:

Test 2.2 Symbols - Camera movement
Description:
Using symbols to guide the camera in various directions.

Basic symbols tested
Symbol for saying its about the camera:

Directional arrows:

Test 2.3 Symbols - Camera and body movement
Description:
Using symbols to guide the person and camera in various directions.
Added free play:
Show what you want.

**Test 3.1 Voice**
Description:
This test will be set to test basic voice commands. The goal is to learn how sending voice for communication movement or tasks can work. And with the result from this be able to define what words would work best for controlling movement of person and camera.

**Directional movement:**
Camera
Person

Forward
Backwards

Left
Right

Crab Left
Crab Right

Strafe Left
Strafe Right

Rotate Right
Rotate Left

Pan up
Pan down
Pan Left
Pan Right

Stop

**Test 4.1 Synthetic voice, translated**
Description:
This test will be set to test basic voice commands that are translated with google translate from Swedish to English. The goal is to learn how sending translated voice for communication movement or tasks can work. And with the result from this be able to define what words would work best for controlling movement of person and camera.

**Directional movement:**
Kamera
Person
Basic symbols tested

Symbol for saying its about the person:

Directional arrows:

Test 2.3.1 Symbols - Camera and body movement
Description:
Using symbols to guide the person and camera in various directions.

Basic symbols tested

Symbol for saying its about the person:

Directional arrows:
Framåt
Bakånges

Vänster
Höger

Crabb vänster
Crabb höger

Gå åt sidan vänster
Gå åt sidan höger

Rotera höger
Rotera vänster

Pannorera upp
Pannorera ner
Pannorera vänster
Pannorera höger

Stanna
Summary

What were your spontaneous thoughts about the this experience?

Interesting
det är absolut en rolig grej, kanske inget jag hade gjort en hel kväll men hade delaren varit på en annan plats som känns mer spännande än hundra meter ifrån mig hade det varit roligare en längre stund.

It was fun being in control. Curiosity. Unusual to control someone else in this way, but fun

Fun, like guiding a blindfolded person :)

Did you experience any problems with respns, i.e. lagg?

No problems with respns: 1 0 0%
2 3 75%
3 0 0%
4 0 0%
A lot of problems with respns: 5 1 25%

How did the respons effect your experience?
Which functions did you find redundant?

- Walk forward
- Turn left
- Turn right
- Pan down
- Pan up
- Take photo
- Love / Heart
- Stop

<table>
<thead>
<tr>
<th>Function</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk forward</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Turn left</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Turn right</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Pan down</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>Pan up</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Take photo</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>Love / Heart</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Stop</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Out of these functions, which do you think express appreciation best?
No not I don't think so
nej, inget jag kan komma på.

Some form of messaging function, chat.
need to know what the heart button stands for and a reaction when pressing it. Same reaction is missing when pressing the camera button, as a user I need to know to have a sort of confirmation.

What did you think about exploring through another person?

Pointless:  1  0  0%
          2  0  0%
          3  0  0%
          4  1  25%

Very fun: 5  3  75%

At what point did it become boring?

At the end when it was the same place
Not understanding for when a photo was taken and pressing the heart button, när jag testat alla funktioner och fått delaren att göra ett par knäppa saker.
Didn't really see any interesting stuff happening in the area, but it was fun commanding a person.

At what point was it fun?
One is always curious about what's behind the next corner and by giving the other person instructions for when to turn and such you could explore that in a fun way...even the mistakes the other user did (not following the instructions correctly or being too slow) made it fun...

When the sharer dropped the phone

det var roligt att se sig omkring någon annan stans och att styra en annan människa.

When commanding the "receiver" to investigate a specific building (the church) or when I as the viewer happened to command him to pan his camera, following the kids walking by in the street (which was unintentionally done

**Time taken**

4 Minutes 35 Seconds

**Number of daily responses**

![Graph showing number of daily responses](image)
4 responses

View all responses

Summary

Did you experience any problems with respons, i.e. lagg?

No problems with respons:
1 0 0%
2 3 75%
3 1 25%
4 0 0%
A lot of problems with respons:
5 0 0%

How did the respons effect your experience?

Completely destroyed the experience:
1 0 0%
2 0 0%
3 0 0%
4 3 75%
Which feedback did you find unnecessary?

- Hearts counter: 1 (25%)
- Timer: 1 (25%)
- Photo counter: 3 (75%)

Did the vibrations help you not to focus on the screen all the time?

- Not at all: 1 (0%)
- 2 (0%)
- 3 (0%)
- 4 (0%)
- 5 (0%)
- 6 (0%)
- 7: 1 (25%)
- 8: 1 (25%)
- 9: 1 (25%)
- Super helpful: 10: 1 (25%)

Which animations did you find unclear to understand?
Heart animation:
- Pan up: 0%
- Pan down: 0%
- Left: 0%
- Right: 0%
- Forward: 0%

How encouraging did you find the Heart counter feedback?

Not at all: 1 0%
2 0%
3 2 50%
4 1 25%
Very much: 5 1 25%

How encouraging did you find the Photo counter feedback?
Did you miss any functions?

no

A way to tell the explorer "This is not something I will do.", a way to "freestyle" - like: "I know something cool here, let me show you."

Different vibrations for stop/walk etc. would make me look less at the screen.

No not really

What did you think about Sharing your environment to another person?

<table>
<thead>
<tr>
<th>Pointless</th>
<th>1</th>
<th>0</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0%</td>
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<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>0%</td>
</tr>
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<td>5</td>
<td>0</td>
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<td>6</td>
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<td>7</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td>8</td>
<td>3</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Very fun: 10 1 25%

How do you rate the experience of being "controlled" by another person?
At what point did it become boring?

Didn't

At times where the commands didn't come from the explorer, when just walking "forever" and waiting for commands that is

When I feel wierd filming or when I feel that what I'm showing is not interesting

10 min

At what point was it fun?

When I can show something nice about my town, when they liked what I was showing

The entire session

When being commanded to enter Netto for example. That was kind of exciting

Att komma på varit man är på väg

What were your spontaneous thoughts, comments about the this experience?

This is cool. I can see a niche for this.

I would like faster feedback when connection to explorer is lost.

fun but abit odd

Didn't think my environment was that interesting, but had I been somewhere else where I'm equally interested in exploring the place that would probably make it even more fun. It was still fun sharing my current location anyway, because I saw it as "fun for the other guy" exploring it through me
Time taken
7:12
8:00

Number of daily responses

4
3
2
1
0
9 responses

View all responses

Summary

Did you experience any problems with response, i.e. lagg?

![Bar chart showing response frequency with lagg]

- No problems with response: 1 2 22.2%
- 2 6 66.7%
- 3 1 11.1%
- 4 0 0%
- A lot of problems with response: 5 0 0%

How did the response time effect your experience?

![Bar chart showing response time impact]

- Completely destroyed the experience: 1 0 0%
- 2 0 0%
- 3 0 0%
- 4 3 33.3%
Which functions did you find redundant?

<table>
<thead>
<tr>
<th>Function</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk forward</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Turn left</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Turn right</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Pan down</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Pan up</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Take photo</td>
<td>2</td>
<td>22.2%</td>
</tr>
<tr>
<td>Send Heart</td>
<td>3</td>
<td>33.3%</td>
</tr>
<tr>
<td>Stop</td>
<td>1</td>
<td>11.1%</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

Did you miss any function / functions

- no

- interacting with humans
  
  Some form of chat function or something... A further means of communicating with the sharer. The hearts are ok to verify liking of something, but I would like to have the option to talk or message the sharer

- none

- Some kind of message function and perhaps a way for the the other person to say no.

- Chat window to have a dialog

- Thank the sharer, rate sharers performance
Out of these functions, which do you think express appreciation best?

- Send Heart: 5 (55.6%)
- Take photo: 4 (44.4%)

Did you find it hard to make sense of any of the following symbol(s)?

- Walk forward: 0 (0%)
- Turn left: 0 (0%)
- Turn right: 0 (0%)
- Pan down: 1 (11.1%)
- Pan up: 1 (11.1%)
- Take photo: 1 (11.1%)
- Send Heart: 2 (22.2%)
- Stop: 0 (0%)
- Other: 5 (55.6%)

What did you think about exploring through another person?
At what point did it become boring?

The sharer's location was boring in itself. However if the sharer would be in New York or in a war the chance of it being boring might disappear.

When I recognised the environment
Did not become boring for me during the test.
When we lost connection and had to wait.
when I realized I had stuff to do
When the scenery was dull

15 min
It was all a fun experience, 5 mins of exploring

At what point was it fun?

Fun to hear the sharer's comments when given directions

all the time
It was fun in general. A lot of the fun was derived from messiing a bit with the person with the camera.
When I was trying to make the share person go over obstacles
Walking, having control, explore, all was fun
It was a lot of fun just to go into Netto. I can imagine seeing views from tall towers, go in to a famous museum... see a city through someone who knows what might be interesting. A lot of fun ideas!
When the scenery was beautiful/interesting
when I almost made the sharer stop in the middle of a road

What were your spontaneous thoughts about the this experience?
I would like to communicate more with the sharer. Through mic or chat or something.
interesting and has potential
Very fun and could be amazing to explore a city like new york
Surprisingly responsive, exciting when on unfamiliar territory
fun but abit odd
It would be good if we could communicate in some way. What would happen if I want
to go somewhere that's not allowed? The person on the other end could press
something to say no, but I would not know why. I would like to know why.
It was fun to lead an actual person around. Because of frustrations that may arise
from non-serious users it might be useful to have a mode where the cameraman is
free to walk around as he pleases.
Quite fun, but I would like to see a more interesting place, in another country.

Time taken
3,30
tba
5
4 min
4:15
check christian

Number of daily responses