ME|EMO

Say It with colors

Application concept for sharing emotions through non-verbal digital communication

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Abstract

ME\EMO provides a method to help users to express, visualize and share emotions through digital nonverbal communication. This application will enable the users to map their emotions to colors and encourage users to paint their feelings. A canvas with uncolored images and a color palette with color coded emotions creates an environment for expressing and visualizing the feelings. The result is an image file in the form of a simple piece of modern art with the possibility of sharing it through social networks, or to record the emotions and save precious moments of life. Technology development, new ways of communication, digital tools, apps, social media, have helped people to have a better life by giving people the opportunity to communicate easier with loved ones and friends. ME\EMO tries to enhance the way of modern communication (digital text-based) such as social networks or modern healthcare systems, by supporting the emotional side of communications.

1. Introduction

Communication has always been playing an essential role in human societies. Face to face communication by natural means (language, facial expression, body movement, eye contact) is the most common form of communication. The need of finding other methods for communications occurred after the birth of long distance communication. With the current rapid change of communication technology, the telegraph and the analog phone seem to be in the same historical category of communication devices as the smoke signals are. Old Hollywood movies are nowadays the only place where you can find lovers who are waiting to receive a handwritten love letter in their physical, metal or wooden, mailboxes. Most of the paper products such as newspapers, journals and books which all were methods for communication are probably going to reach the same destiny as hand written letters have.

Most of these products have been replaced with different kinds of digital products, which have changed or reshaped the users' behavior in terms of how they communicate with each other. When the analog networks were combined with digital communication (modems could transfer digital data through phone lines), many users started to take advantages of technology for covering their communication needs. If mobile phones were the starting point of the revolution in modern communication, networks are the cornerstone of modern communication (Willis and Jones, 2010).

Methods for communication were limited by time and space in the past but with the help of new technology and with the advent of the computer-mediated communication, another revolution happened in the area of communication. Computers and digital devices from one side and networks from the other side made a successful combination and changed the ways of long-distance communication probably forever. Digital diaries, blogs, social network websites, forums, distance education, digital devices, smart mobility products, artificial intelligence and different kinds of networked sensors are just a few examples of the happy marriage between digital devices and networks. What we experience now is the result of the deep impact that technology has had on our daily life. Technology is no longer an isolated
part of our lives or our societies. It seems that “We don’t just use or admire technology; we live with it” (McCarthy and Wright, 2004).

On the other hand, “new networked devices offer us machine-mediated relationships with each other, another kind of substitution...we remake ourselves and our relationships with each other through our new intimacy with machines” (Turkle, 2011, p2).

Today the creators of technology try to combine emotion recognition with other technical abilities to achieve the technology which could provide digital communication more similar to natural communication. Hassenzahl (2008) says: “Adapting technology to human nature is the key concern of Human Factors, Ergonomics, Human-Computer Interaction and Usability Engineering”. One common goal for developers of new communication technology is that they want to solve the issue with sharing emotions while communicating through digital devices. One of the reasons of adding emotion recognition to digital devices is the positive effect on the user engagement factor during the interaction with technology (Willis and Jones, 2010). The idea of this thesis is to design a tool with possibilities for sharing emotions through computer-mediated communication (including digital devices like smart phones and tablets). The goal is to improve the communication in a way that enhance the possibilities to share analog emotions in digital interactions between users, by visualizing the emotions.

1.1 Problem statement

Information technology can increase the quality of our life, on the other hand some research shows information technology can lead to depression and anxiety. In my view, when technology does not work, we focus on improving mechanical details or the performance of the product instead of investigating how that product affects the human who is using it. We tend to put technological perfection before emotional satisfaction for the user. The problem that I recognized is related to the users' experiences during their digital communication. Today the most important aspect of technological development is the focus on faster development cycles. This has given us a culture where we are supposed to consume even faster and more every day. The effect is that the world has less time to reflect on emotions.

The problem I choose to emphasis on is related to those who use technology as a tool for their digital communication. Compared to the natural ways of communication (face to face) using digital tools has in my view some influences on communicators which can cause difficulties for them. On the other hand, technology is really tempting when it comes to cover our needs and weaknesses. Digital connections could be our best choices when we feel lonely. “Digital connections and the sociable robot may offer the illusion of companionship without the demands of friendship. Our networked life allows us to hide from each other, even as we are tethered to each other” (Turkle, 2011, p1). So with keeping the positive influences of technology in our mind the problem related to the transferring of feelings and emotions through digital communication is still not fully resolved. For instance during texting or chatting, letters and ascii codes are the only options for user to transfer their feelings.

1.2 Research questions

Main question is, with focus on emotional factors in communication, what are the needs that humans have in todays digital world and is there any possibility to improve users experiences in their digital communication? There are a few sub questions also, does digital
communication work as a perfect replacement for real face to face communication? Is there any way to encourage users to share their emotions through digital communication? Do users experience any difficulties while communicating digitally?

In the first part of this document I try to find out more about emotional behavior and facts about sharing emotions in the human society, that led to questions such as why, when and how do people share their emotions. The second part is a study of emotions and technology to gain an understanding of current technology (devices, services or products) related to emotion sharing with the aim of finding out the user needs and their expectations. The final part focuses on my idea for improving the possibilities for sharing emotions through non-verbal digital communications. That part contains the concept description, design process, evaluation part and conclusion.

2. Social sharing of emotion

Maslow’s pyramid represent different levels of human needs (figure 1). This pyramid goes from the basic level of physiological needs for survival, all the way to the heights of human intellect through self actualization. In all levels we communicate for covering our needs, which is a vital factor for surviving or a tool for psychological development, and when we communicate we also share emotions. Therefore no matter in which level your needs are, sharing emotions plays an important role.

![Maslow's hierarchy of needs](image)

*Figure 1. Maslow's hierarchy of needs (Huit, 2007, p.1)*
Talking about our feelings is one of our needs, which covers other needs such as finding communication or social support. The first question is, why do people share their emotion? “A widespread belief exists that verbalizing an emotion alleviates the impact of an emotional event” (Zech, Rimé and Nils, 2004). There are different reasons for sharing emotions between people. Life is full of various kinds of emotional events. We experience emotions such as love, joy, anger, sadness and fear. As a human who lives in a society where communication with others plays a vital role, experiencing all these emotional events alone could be difficult and agonizing.

To remain as a member of the society, sharing is our responsibility from early years and we have learned it in different forms depending on various factors such as culture and region. All the way from our kindergarten days, we have been faced with this reality that eating one candy instead of two and giving the other one to a classmate for finding friendship is more valuable than being alone with two candies.

In this journey we also learned about sharing emotions, but because of the intangible nature of emotions, sharing them are much more complex than sharing physical objects. Sharing emotions starts when we are born. We begin to share our emotions with parents, continuing with close friends after that partners and colleagues or even with strangers.

### 2.1 Reasons of sharing emotions

The reasons for sharing emotion can be different depending on personality or culture. I found six reasons for sharing emotions.

#### 2.1.1 Feeling of well-being

There is a common experience which is familiar for many of us, experiencing the good feeling of peace and lightness after talking about emotional stories stored in our chest.”We found that 89% of respondents in a large sample of lay persons (N = 1024) endorsed the view that talking about an emotional experience brings relief” (Zech, Rimé and Nils, 2004). Coping with difficulties of life seems easier by having someone to talk to and revealing real emotions and feelings. Expressing emotions could lead us to emotional relief.

From another view, by recalling past emotional experiences the body starts to react to that event again. “When the memory of an emotional episode is accessed, the components of the associated emotional responses (i.e., physiological, expressive, experiential) are also activated” (Zech, Rimé and Nils, 2004). It means, depending on the type of the experience, which could be positive or negative, reviewing that event, provokes our feelings again. It is actually one kind of re-experiencing the past event. This is a paradoxical situation about sharing the emotion. On the one hand, emotional relief is the result of sharing the emotion which experienced by many people. On the other hand, as I mentioned before, reviewing the emotional events could be painful for teller.

However, it seems the amount of good feelings is enough for tolerating the pain of recalling the emotion from bad events, “People would tolerate re-experiencing because of this final benefit in terms of well-being” (Zech, Rimé and Nils, 2004). It seems, when there is one way to have a better feeling in life, and it is not obviously harmful it does not matter if the scientific evidence can prove it or not.
2.1.2 Social validation
Social rejection could be one of the most painful experiences in a human life. Therefore, trying to be accepted by groups of people or by society in general, is an important goal for humans. Sharing emotions could lead to closeness in social relations, which helps people to trust each other. The result can cause social acceptance. Sharing the emotional experiences with others can help us to receive guidance, which could be the valuable social support for us.

2.1.3 Relationship development
We need to be liked by other people. We also need to find friends, partners, individuals with common background or at least with similar interests as we have in our life. Sharing emotions could be the first step of making relationship or friendship. Sharing emotional events means that the person who is the listener is trustworthy and valuable for us. By finding friends, we can improve our social connections. Having a special group of trustworthy friends could also increase our self-confidence.

2.1.4 Self clarification
Sometimes confusion happens after some emotional events. We need time and help to realize what really happened, what we should do now, was that a disaster or a success. Finding the answers for these kinds of questions could be easier by sharing the emotional experiences with others. The result could be helpful for understanding the situation better by reviewing the event from another perspective.

2.1.5 Misery Loves Company
We have better feeling when we realize that we are not the only one who is in trouble. By sharing the emotion we understand that we are not the only one who has problem, so maybe it is possible to connect to other people with similar experiences to find the solution of a specific problem, or stress relief in general.

2.1.6 Treatment
There are some studies, which shows the benefits of sharing emotion in scientific areas. Illnesses could occur when people do not share their emotions, sharing emotions can also have an effect on life satisfaction. One study shows that, “participants who had the memory of a non-shared emotion reported a higher number of illnesses than those who did not have such a memory. Further, we found that those who had not shared at least one emotion, scored lower on various markers of life satisfaction, including ratings about their love life, physical appearance, financial situation, public self, and current life situation” (Pennebaker, Zech and Rimè, 2001). In another part of this study, it shows that “the more bereaved individuals are able to talk about their spouses death, the healthier they are in the year following the death” (Pennebaker, Zech And Rimè, 2001). Physiological and psychological recovery could be the result of sharing emotions in some cases.

2.1.7 Informing others
By sharing the emotions, we also share information. This information could be about individuals or places. For example, your experiences of communicating with a new colleague could inform others about his or her behavior, which can help them to interact with him or
her. Or your positive or negative feedback about a restaurant could be valuable information for others (Bhatia, 2011).

2.2 Factors in sharing emotion

In general, we share our emotions for different reasons depending on our personality, age, region, situation and culture. Each person has a specific personality, so emotional behaviors of people are different in similar events. This sharing has beneficial effects on our life. Feeling of well being, social validation, finding relations and social support are examples of the practical effects of sharing emotions.

On the other hand, sharing emotions does not seem that simple in all situations. The role of the sharing partner is vital, sometimes people prefer not to share their emotions when they are not sure about the qualities of their sharing partner (Zech, Rimé and Nils, 2004). The number of these qualified listener are usually limited for each of us, and we cannot always be in the same place with them whenever we need them. Long distance communication which is possible with the help of technology has helped us to keep our relations with our qualified sharing partners. However, the imperfect support for sharing emotions during long-distance communication cause limitations for users when they need to share their emotions.

The second question is, when do people share their emotion? “There has been frequent mention in the literature that traumatic situations cause people to talk about their experiences” (Pennebaker, Zech and Rimé, 2001). However, traumatic situations make up only for a fraction of the times where we share emotions. We share all kinds of emotions all the time. But, when we share emotions from a traumatic event we are probably more aware that we are really sharing emotions.

When an emotional event happens, in both positive and negative cases, people need to share their emotions. The result of one study by Pennebaker, Zech and Rimé (2001) about determining of when individuals talk about emotional experiences shows interesting findings. The participants of an experiment had to recall a recent emotional personal episode, the participants answered to questions such as: “did you talk about the episode with others?”, “if yes, with whom?” and “how long after the emotional event?”, they found that participants shares their emotional experiences in 90% of the cases. Sharing happens without any differences between positive and negative emotional events. The result shows that the rate of sharing emotions is high, and it is not related to the type of the experience.

The final result of this study indicates that disruptiveness is an important factor for social sharing. That means: “the more disruptive an event is, the more frequently it was shared”. These laboratory studies showed that those who watched a highly emotional movie wanted to talk about their emotional experiences more than those who watched a low or moderate emotional film. These findings suggest that “emotional intensity needs to exceed a certain threshold in order to elicit social sharing” (Pennebaker, Zech and Rimé, 2001).

For many of us, it is not strange to find ourselves in the middle of a normal conversation listening to or telling an emotional story about something that happened recently. It is obvious that sharing the experience happens after emotional events, whether it is in a typical conversation or in a laboratory study. Most of the time people share their emotions voluntary as part of their social life. They also talk about those emotional experiences that still bother
them “when people fail to recover from an emotional episode, they feel the need to talk about it, and they actually do so to some extent” (Zech, Rimé and Nils, 2004).

The third question is, how do people share their emotions? For expressing emotions, besides verbal communication, non-verbal communication plays an important role which can be represented in different shapes (Segal, Jaff and Smith, 2012):

- Facial expressions
- Body Movements and posture
- Gesture
- Eye contact
- Touch
- Space
- Voice

One of the best known ways for sharing emotions is talking, but writing is another way for sharing emotions which has some benefits. Writing about emotional events is connected to the improvements in psychological well-being (Pennebaker, Zech and Rimé, 2001).

Visualizing the emotions could be one of the possible ways for people to share their emotions. Results related to writing down the emotions, shows that it has positive effects on the mental well being of the writers. In my view by writing down the feelings about a certain event, persons have the opportunity to review emotional events from a new perspective which can help them to understand the situation in a better way. In general, I believe that visualization is an effective way to understand and control the emotions better.

### 3. Emotion & Technology

Communication technology is growing fast and “technology proposes itself as the architect of our intimacies” (Turkle, 2011). Today’s concept of computer-mediated communication has been changed with the growing concept of ubiquitous computing, “ubiquitous computing enhance computer use by making many computers available throughout the physical environment, while making them effectively invisible to the user” (Weiser, 1993).

Various digital components and intelligent devices have created a world where computing takes place everywhere. This wide scope of technology contains both virtual and physical products. In a not so distant future, different kinds of sensors can be attached to your personal belongings, computing devices in all parts of your house and in your vehicles. These computing devices with sensors can be used to detect your physiological states such as blood pressure, temperature or blood-sugar level or even the level of your consciousness, for instance while driving.

On the other hand, the virtual world of internet works completely parallel to our real world which contains various services for communication such as social network websites, weblogs, video and voice softwares, e-mail and chat applications. These services are actually reshaped versions of older types of communication, for instance, Ip telephony through a computer over the internet instead of using a bakelite phone over copper wires. Interacting through the world wide web pushes us to use at least one kind of these communication tools. Social networks for being connected to our friends and have fun, e-mail applications for both formal and
informal connections related to work and friends or chat softwares for “live” communication. We have experienced a new kind of communication through the internet during recent years.

Human needs time for adopting and accepting new things. It can take years or decades for humans to adopt themselves to new technology. Even though world wide web is young yet, the impact it has had on our daily life is enormous.

This new phenomenon of internet has had effects on our communication, undoubtedly it is useful in many cases, but at the same time it is unable to cover all our needs related to social communication. For example, one of these uncovered needs is a need of sharing emotions through social networks. Users started to create different ways to transfer their emotions through the network, with the use of emoticons such as “:)” and word lengthening to express the emotion behind the text, for example “cooooollll!!!” (Brody and Diakopoulos, 2011), and using abbreviations, for instance “LOL” instead writing laughing out loud.

On the other hand, designers and engineers have not been idle, they tried to invent new methods for fulfilling the user’s needs for the social network communication. An emotion network (Willis and Jones, 2010), is an emotional social network, which tries to encourage users to share their emotions through social networks. Emoti-Ring, an emotional interface for interpersonal communication (Kwon, Oh and Yoo, n.d.), this interface tries to connect people emotionally and send their emotional states to the social networks by a ring with a sensor. This ring-interface helps them to be aware of their friend's feelings.

There are also new devices for helping remote couples to stay connected to each other (Lottridge,Masson and Mackay ,2009). Kissenger, a device for long-distance communication based on virtual kissing with real feeling. It is constructed as a pair of robots equipped with sensors that transfer the motions of the lips for kissing (Samani, 2011).

In general, designers try to design technologies to encourage people to share their emotions and their feelings (Kanis and Brinkman, 2007). Interactive spaces are also trying to give a natural feeling to users during interaction with technology.

Another interesting area in current technology is related to the augmented reality. Augmented reality is the result of combining the real world with a virtual world. This will lead to a change of the computer as a device, they will be hidden and work in the background and instead of a traditional form of computer, ubiquitous computing will be the norm (Streitz, 2001). Hiding away the computers or changing the shape of them from desktop computers or digital devices to incorporate them in furniture or clothing or the environment around us is one of the purposes of augmented reality.

One of the other efforts made for improving modern communication is related to the affective computing, which is a field in computer science that focuses on the ability of emotion recognition for computers. “Today we have evidence that emotions are an active part of intelligence, especially perception, rational thinking, decision making, planning, creativity, and so on. They are also critical in social interactions, to the point where psychologists and educators have re-defined intelligence to include emotional and social skills” (Picard, 1997).

Also, “affective computing systems that make use of biosensors (measuring sweat, pulse and other autonomic reactions) typically try to identify users’ emotions as discrete information units”. This “informational view” on emotions, sees the emotions as data units that are measured and transferred. The main focus of interfaces that deals with the “informational view” of emotions are on helping systems to understanding the users
emotions. The “informational view” is about capturing information related to the user and transfer them to the system to give the system the ability of understanding the users’ feelings.

On the other hand the “interactional view” sees emotion as structured in interaction. In this view, the system assists users in understanding and experiencing their own emotions. So the “interactional view” is about providing a better opportunity for users to understand their own emotions and feelings during their interaction with system (Höök, 2008).

There are three examples in this area created by Höök and her colleagues. First one is eMoto (Höök, 2007), colorful and animated text messages through mobile phone communication with the aim of adding emotional expressions to the text message.

Second one is the Affective diary (Höök, 2006) or “affective body memorabilia” that captures some of the physical, bodily aspects of the users' experiences and emotions. The collected data is uploaded to users' mobile phones and are represented as an abstract colorful body shape.

The third one is MobiTip (Höök, 2005) that “allows its users to express their opinions and comment on anything of interest. The system uses collaborative filtering algorithms suited for mobile devices that are not always connected to a central server”.

So it is possible to say affective computing has two aspects, one is directly related to the machines and their emotion recognition abilities and the other one is related to the users and the services that can help them to understand better their feelings and emotions during their interaction with machines (computers, smart phones, digital devices, etc).

Finally, the important combination of technology and the healthcare system, with the goal of providing better treatments and enhancing the life quality of patients. The healthcare system has in many different aspects been influenced by technology.

One of those technologies that has had a big influence on healthcare is internet. Internet is a rapidly growing source for medical information. Patients can use social media for better healthcare facilities. Doctors are reachable easier. Online medical databases are helpful for prediction of medical trends (Krueger, 2010).

Many tools such as websites, devices and applications are available for self-tracking. The main idea of quantifying yourself is that you can receive better knowledge about yourself that can be helpful in many situations. By self-tracking, the process of gathering and organizing data related to health (physiological and psychological) become easier and more accessible for those who need these data. The tracking is possible by devices and sensors for capturing the body conditions (health variables) and also by entering the data manually by individuals (daily writing about your mood in a special application) where the result is visualized in different ways, for instance, as graphs.

Nowadays, users are using apps or devices for monitoring their body conditions (Quantifiedself, 2012). Some of these health trackers encourage users to share the information through social networks, this new trend is helpful both for patients and doctors for making better treatment decisions. Curetogether (2011) is a good example for this kind of social networks, where people can share and follow their health data. Another example is Withings (2006) which can send the result of tracking to Twitter or Facebook. Modern devices can also measure body conditions with the help of different kind of sensors. Some of them are wearable like Fitbit (2011), Rationalizer (Philips and ABN AMRO, 2009) and Bodymedia (2011). They capture physical activities and body conditions, they can also monitor the health
data easily because they are close to the body which is the ideal situation for sensors like accelerometers or galvanic response sensors.

3.1 Emotion & Design

Emphasizing on emotion is one the most essential sides of the design process. The reason is that the experience for the user while interacting with a new product or system is of utmost importance. Paying attention to users' feelings with the aim of providing the best possible experience is one of the keys to a successful design in my view.

Regarding to Norman's (2004) suggestion, “human attributes result from three levels of brain: the automatic, prewired layer, called the visceral levels; the parts that contain the brain processes that control everyday behavior, known as the behavioral level; and the contemplative part of the brain, or the reflective level”. The interesting part is that by this categorization of emotion, Norman suggest different design styles for each level of human attributes. Although there are conflicts among different levels of emotions but “a successful design has to excel at all levels”. The design requirements are diverse in each level. By mapping the three levels to product characteristics, Norman simplified his main idea about the relations between different levels of emotions and design. Visceral design has connection with appearance, behavioral design has connection with pleasure and effectiveness of use, reflective design has connection with self-image, personal satisfaction and memories. It is obvious that “no single product can hope to satisfy everyone”, but designers can have this separate view of emotions in their minds while the real product involve with the mix of these three levels. For instance usability which is related to the behavioral level comes with the importance of appearance which is related to the visceral level. Norman concludes that “The only way to satisfy a wide variety of needs and preferences is to have wide variety of products” (Norman, 2004).

4. Design process

There are many predefined principles for the design process, but each type of design needs a special process for itself. The design process works like a cycle, with many iterative steps. It is impossible to name the steps and start from number one and finish the process in the last step. All steps are connected to each other, moving through these steps, going back and forward is a vital part of the design process. For example, I had an initial development phase for making differentiated concepts and a second development phase for the final design prototype. I also did the evaluation phase two times, one for finding the best choice among my concepts and a second time for evaluating the design prototype. The cyclic behavior during the design process makes the work enjoyable in my view. I got a secure feeling since I was moving forward (or backward) in small incremental steps, so I had the control over the outcome in every step. Figure 2, shows the general outline of the design process that I used. Each phase contains some sub-phases also.
4.1 Problem definition
I have identified the difficulty for users to share their emotions through non-verbal digital communication.

4.2 Data gathering
The process of collecting the data is a necessary part of the design process according to the specific topic. Literature review, interview, questionnaire, making personas and scenarios are some of the methods that I used for gathering data.

4.2.1 Target group
Everyone who is involved in any digital non-verbal communication.
4.2.2 Research
Section one, two and three belong to the exploration of the emotional side of modern communication from different angles such as background of communication, general view on social sharing of emotions and the combination of technology and emotions. Findings from these parts plus the data gathering sections formed the research area which I used as source for the design process.

4.2.3 Persona
Personas and Scenarios are design tools. One of the main purposes of these tools is that it gives the designer tools for designing a product or service aimed for end users, which is an important part in user centric design. Making personas and scenarios could be a key of awareness about reality of end users. Persona making is a great tool for getting inside the users' heads and really understand what they need. In my design process I created two personas. These two personas could tell me: “who the users are, what are the activities they wish to perform, why they might use the product and how this product or service fits into the context of their life” (Hugen, 2009). My personas were present during the whole design process and worked as the key connection to users for me (Appendix 5).

4.2.4 Scenario
I made four scenarios. Scenario works as “description of everyday situation”. Scenario “focuses on activities people do, and the context in which they do them” (Hugen, 2009). I made scenarios with the help of personas. Scenario making is another helpful method to show the challenges that users have to tackle when they encounter the defined problem. It can also show the process of solving the problem that the user encounter with the help of a new concept. I defined two situations with two problems for my personas. Then the scenario helped me to put the personas and their problems into the context. For solving their problems I made two new scenarios, this time I used my new design concept in those special contexts for both showing the idea and suggestions and for finding the solutions with the help of my new design (Appendix 6). In general, scenarios “assist us in thinking about use in context, expose problems and opportunities in current design and flesh out and evaluate a design idea from multiple perspective” (Hugen, 2009).

4.2.5 Questionnaire
Questionnaire was another method that I chose for capturing more data about users' needs, users' expectations and users' viewpoints about expressing feelings and emotions through current technology. The main purpose was to find out the ways that users shares their emotions through text-based digital devices such as smart phones, laptop, tablet or desktop computer. The Second important purpose was to find out if there is any new or special way that they prefer to have as the possibility to express and share their emotions. I asked participants to fill in the online survey.

Nine males and six females participated in this questionnaire. As they defined their personality 62.5% of them were introvert while 25.0% of them were extrovert. 12.5% answered both. They used different types of text-based communication, 26.5% used social networks, 26.5% used Email, 10% used chat, 22.4% used SMS and 4.1% used weblog and postcard. The most popular digital device that they use was laptop with 40.6% and after that
Mobile phone with 31.3%. 18.8% of them used desktop computers while 9.4% of them used tablets. 73.3% of participants shared their emotions through their digital communications while 26.7% of them did not share their emotions through their digital communications. Between different ways for sharing the emotion, 27.3% of them used just normal text, 30.3% used emoticons, 18.2% used abbreviation and 18.2% of them lengthened the words. 40.0% of them thought that the current ways of sharing emotions work for them but 53.3% of them think that current ways do not work for them, and they preferred to have more possibilities to express their emotion through their digital communications. Those who thought that the current ways do not work for them, chose picture (28.66%) and video (28.6%) as preferred ways of sharing their emotions. However, around 14% of them were fine with emoticons (see Appendix 1 for details of questions and participants).

4.3 Initial concept development

4.3.1 Making Concept
I made three concepts for sharing and visualizing emotions. One application, one device and one avatar concept. After that I evaluated them with Harris profile (WikiID, 2011) to pick the right concept. First concept: An application equipped with a color palette and canvases with outlines of predefined empty paintings. Each color on the palette is a symbol for one type of emotion. Users use color language instead of words for expressing their emotions. The result is an image which shows the feelings of the user. This image can be stored, shared or sent to others in a multitude of ways (figure 3).

Second concept: A device. Sensors in a bracelet for capturing the emotional state by measuring body temperature, heart rate and blood pressure. The result is represented as a graph on a mobile phone or a computer screen. It is possible to share this graph with those who are interested to see the shape of emotions. This graph can give better knowledge about the user's body, with the aim of better understanding his or her feelings and emotions. This graph can also be used as an emotional background information for medical treatment (figure 4).

Third concept: An avatar. A camera for facial detection, special software for analyzing the facial expression and also an algorithm for interpreting the collected data for transferring it to the selected avatar. In this concept, instead of expressing the emotions directly, the avatar can work as media between users. The avatars are customizable in terms of appearance and expressions (figure 5).
Figure 3. Application concept
Device

- Sensors in bracelet for capturing emotional states, by measuring body temperature, heart rate, blood pressure, etc.
- The result is represented as a graph.
- It is possible to share the graph or the data of your emotional states with others. You can choose which data to share.

Figure 4. Device concept
Face detection

- Camera for facial detection
- Software analyzes your facial expression
- Algorithm for interpreting the collected data
- Output your emotional status as an avatar of your choice

Figure 5. Avatar concept
4.4 Evaluation of Concepts

The main purpose of this section was to understanding users' needs for finding a suitable solution. Three concepts were the result of brainstorming and design studies. The main method for choosing the best design concept was using Harris profile (WikiD, 2011). But beside that, during the first cycle of interviews I showed and explained the concepts to users for finding out which one is the most popular. This popularity of the concepts were more related to the interviewees expectations about the interaction and emotional representation. In the Harris profile method, I defined important factors which I graded from -2 to +2, where -2 means that specific concept does not fulfill that specific requirement at all while +2 is the opposite. Then I could give my different concepts a score according to those factors.

4.4.1 Interview

I conducted five interviews to gather the data from users about their expectations, and their desires related to sharing emotions through modern communication. The general result showed that the current ways for sharing emotions were not perfect but most of them accepted it. Some of them preferred to use face to face communication when they feel they really need the recipient to get their emotional state without any misinterpretation. When face to face communication is not possible, they choose live video chat like Skype. These two solutions were their only choices. When I asked about the ways of expressing feelings through social networks (four out of five interviewees used social networks), text and sometimes pictures from some events were their method for sharing emotions. Three of them used emoticons also. About their desires related to the modern communication, one of them thought that a holographic projection could be a cool way to communicate with others. At the end, I showed them three concepts. I asked questions from interviewees to figure out which concept was the most popular, which output was more understandable and sharable, also which concept encouraged them to be more creative. All of them agreed on that visualization (pictures or images) is a powerful way of expressing both events and feelings (Appendix 2).

4.4.2 Harris Profile

I also used the “New product profile” or “Harris profile” method, which is a “graphic representation of the strengths and weaknesses of design concepts” (WikiD, 2011). This method is really useful when the designer has more than one concept to evaluate. By grading the important factors, this graphical illustration lets designers to compare all concepts at the same time. The result of the last part of the interviews (concepts questions) helped me to complete the Harris profile. Finally I combined these two methods (interview and Harris profile) for finding out the best concept. As figure 6 shows, concept number one was chosen.
4.5 Initial Data Analysis

The design process led me to the conclusion that non-verbal digital communication needs a tool for sharing emotions through picture but in a more precise way than current methods such as emoticons. There are a few important findings during the initial design process, first, current ways for sharing the emotions are not enough for users. Second, picture and video are desirable ways for sharing and expressing the emotions. Third, users prefer visual tools for expressing emotions rather than text.

The design process also helped me to select the best concept. Concept number one was chosen because of two main reasons. First reason, during the interview, interviewees agreed that concept number one (application) encouraged them to create pieces of art and also the output of concept one seems more sharable than others (for example they preferred to share a simple painting with colors than, for instance, a graph). Second reason, Harris profile is a useful method for choosing the best concept, cause it gives the designer an opportunity to compare the concepts from different perspectives and then select the best one. The result of Harris profile shows that concept one is the best between the others (figure 6) and also the result of the first round of interviews shows that users prefer concept number one.
4.6 Development

4.6.1 Design prototype
With the help of previous steps, concept number one (which was the application concept) was chosen. The users' emotions are represented as one piece of modern art, which is the result of the sampled emotions. This emotional output can be attached to emails or messages and can also be shared in social networks. The application would be multi-platform and would interconnect with social networks. This application encourages its users to share their emotion by mapping their emotions to colors instead of lengthening the words like “coooooool!” or using emoticons like “:)”. The output will be an image (a piece of art) created by colors of the user’s emotions which then can interpret by other users who use this application. It will be a rule-based system, so the colors will create an emotional alphabet and the users will learn how to use, read and interpret the colors. The sharing and recording of emotions will be possible in multiple ways, which will be described later. ME|EMO, Short form of “Me Emotion” is an application, which contains three main sections:

Mapping emotion to color: Each color represents one type of emotion (for instance blue for calm) which is visible by clicking on each color. It is also possible to replace the colors in the palette with other colors by dragging the colors to the outside of the palette for having accesses to the main source of emotional map (figure 7 and figure 8).

Painting the Emotion: The images that the user will colorize to describe their current emotional states based on famous modern art pieces. User can drag the feelings into the main area (figure 9).

Visual representation: The final emotional image (created with colors of emotions) has different options like sharing and storing (figure 10). There is an option to review the images of stored feelings related to past emotional events (figure 11).
Figure 8. The emotion behind each color represents by clicking or touching the colors

Figure 9. Coloring the image by dragging colors to main canvas

Figure 10. An image of emotions is ready, user feels calm, stable and relax

Figure 11. Images of past emotional events
Each scene of the application is designed in Rhino and Photoshop. For representing the process of how these scenes can lead to the result, I made an interactive project in InVision (2013). The prototype is an interactive sample of the application which makes it possible for a user to test the application by clicking on the defined parts. I also made one short video that represent how the application works (ME|EMO, 2012).

During the evaluation of the prototype, users could see the images of each scene together with my verbal explanation about application (Appendix 7). Those who had an interview could also try the active parts of the ME|EMO application (InVision project) and for those who filled in the survey, they had opportunity to watch the video.

4.6.2 Mapping emotions to colors
It is difficult to imagine the world without colors. Colors are powerful. Colors influence many aspects of our lives, such as our mood, our decision making and our feelings. “The relationship between color and emotion is closely tied to color preferences. In particular, color preferences are associated with whether a color elicits positive or negative feelings” (Kaya and Epps, 2004). Our emotions can have color, or we can color our emotions. Several numbers of theories and models have been tried to define which color represents which emotion, but there is not any standard or unique way for linking emotions to colors. Different cultures and personalities make this process even more complicated. Emotions, colors and the relation between them is one of those subjects which is full of twists and turns. When it comes to colors, it is not just about the hue (actual colors like red or green), value (darkness and lightness of color) and chroma (strengths and weaknesses of color) are important too (Munsell color system, 2006).

For modeling or linking emotions to colors, there are several different parameters which all have an impact on the linking. When it comes to emotions, besides their actual name (fear, happiness), other factors such as perceived intensity and if the emotion in question is provoked by a positive or a negative experience are important too. During the design process, I decided to use only one parameter for each (name of color and name of emotion) for linking colors to emotions, with the aim of keeping the prototype simple. Using other parameters for representing colors and emotions are important, even though adding extra parameters increase the complexity but, at the same time it would probably increase the accuracy. This can be part of possible future refinement of this project.

The emotion-color theory for mapping colors to emotions in the ME|EMO application is based on the results of Kaya and Epps (2004) research. Figure 13 shows summary of an emotion-color model (Nijdam, 2009). Kaya and Epps (2004) conducted research about linking colors to emotions. This research based on standard Munsell (Munsell color system, 2006) colors system, which is a universal three-dimensional color system.
<table>
<thead>
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<th>Colors with Munsell notation</th>
<th>Emotion</th>
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<td>Red (5R 5/14)</td>
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<tr>
<td>Yellow (7.5Y 9/10)</td>
<td>happy</td>
</tr>
<tr>
<td>Green (2.5G 5/10)</td>
<td>comfortable, hopeful, peaceful</td>
</tr>
<tr>
<td>Blue (10B 6/10)</td>
<td>calm</td>
</tr>
<tr>
<td>Purple (5P 5/10)</td>
<td>tired</td>
</tr>
<tr>
<td>Yellow-Red (5YR 7/12)</td>
<td>energetic, excited, no-emotion</td>
</tr>
<tr>
<td>Green-Yellow (2.5GY 8/10)</td>
<td>disgust, annoyed</td>
</tr>
<tr>
<td>Blue-Green (5BG 7/8)</td>
<td>annoyed, confused, sick</td>
</tr>
<tr>
<td>Purple-Blue (7.5PB 5/12)</td>
<td>calm, powerful</td>
</tr>
<tr>
<td>Red-Purple (10RP 4/12)</td>
<td>loved, no/emotion</td>
</tr>
<tr>
<td>White (n/9)</td>
<td>empty/void, innocent, lonely, peaceful</td>
</tr>
<tr>
<td>Gray (n/5)</td>
<td>bored, confused, depressed, sad</td>
</tr>
<tr>
<td>Black (n/1)</td>
<td>depressed, fearful, powerful</td>
</tr>
</tbody>
</table>

*Figure 13. Kay color summary, 2004 cited in Nijdam, 2009, p.3.*
4.7 Evaluation of design

The main goal of this section was receiving feedback from the users after designing the prototype. After prototyping the selected concept, I repeated the evaluation phase to receive feed back from users. I conducted four interviews and after that I distributed a questionnaire to twelve participants.

4.7.1 Interview

I chose to interview three males and one female with different backgrounds and experiences of digital communication. I explained the functionality of the application and ask them to try the functional parts, and at the same time I asked them to talk about their experiences. I concluded the interviews by asking them some open-ended questions. Time for each interview was around thirty minutes. The result showed that the main idea was interesting for users but at the same time, the interviewees were arguing about linking emotions to colors “I don’t like to show my love with red”. During the design phase, I tried to find the best way for linking the colors to emotions. I realized that there is not any standard way to link colors to emotions. There are many hypotheses or theories from psychological views to artistic views. On the other hand, connecting the emotions to colors depends on many factors such as culture and personality. For example black color is the sign of funeral and death in many western cultures while white is the symbol of mourning and death in China, Japan and India. Therefore, it is difficult to define one general map for connecting emotions to colors for different users, but these discussions led me to think about the possible solutions for this problem, which I will explain later.

From a socio-geographic view of the users, I realized that they were thinking about the interpretation of the output image of emotions. The idea is that the colors will work like a visual language for emotions. Therefore the user will learn how to interpret other users output over time.

About the effects of using this application, one interviewee was worried that “while I think it is a really good product to save my emotion for myself to get back to them. I am skeptical that it could be considered as an alternative of human communications in the era that, I think, we need to communicate more, talk more and listen more, but it is a fascinating idea, thought”. The aim of designing this application is to provide a tool to enhance the human communication in a digital world. This product is not supposed to be an equivalent to real life face to face human interaction. Another interviewee said, “It’s a good way for those who have problems for expressing their emotions”. At the same time another participant said “I really like the idea, but I would be one of the last persons who will use this application, cause It’s really difficult for me to choose colors for my emotions, and I don’t want to accept the default map”, “I think ME|EMO gives me the opportunity to see my emotions from different angles” (Appendix 3).

4.7.2 Questionary

Seven males and five females participated in the questionnaire related to the feedbacks about ME|EMO. The process contained two tasks, watching the video with the description of application and filling in the questionnaire (Appendix 4).
About their first impression, 53.8% of them thought, it is a cool idea and 46.2% thought it’s pretty ok, no one thought that it is horrible or doesn’t make sense. 75 % of them liked to draw their feelings while 25% of them did not like to draw their feelings. Using colors instead of words for expressing emotion was fun for 58.3% of them, “sometimes it’s difficult to find words to express the emotions so colors should be nice”, while it was not fun for 8% of them, “As far as I know, words and colors belong to two different worlds, therefore they will make two different concepts”. 75% of them think ME|EMO is a good way for expressing emotions, one participant said: “expressing emotions is a complicated thing, maybe for some emotional states I like to use ME|EMO, but for others I may want to go for the traditional way”. And finally, 83% of them like to record their emotions by ME|EMO but just 33.3% of them like to share their emotions through social networks, and one participant suggested that “It should be a function in the application that made it possible to show how deep, severe, strong or weak the painted emotions are”.

4.8 Improvement & Data analysis

The second evaluation part really helped me to improve my concept. Expressing emotions in general even with words is difficult for many of us. At a first glance, it seems more complicated when we try to use colors instead of words. The idea is not replacing the colors with words. The main idea is that when face to face communication is impossible, then maybe colors (visual language) can help users to have another method for expressing their feelings. Feedback showed that it will be difficult for users to accept the predefined emotional map, for example blue for calm. Some of the users said that they wanted to have their own emotional map, but the problem will appear in interpretation of the output. This discussion made me to think about finding a solution for custom color maps. The reason that I defined an emotional map for the application was that I wanted to keep the process as simple as possible (both creating and interpreting the image).

However, after discussing and receiving feedbacks from users, a new solution came into my mind. It is possible to have one main emotional map (as we have it now), and also each person can adjust her/his emotional map. Now we have one source, which linked the colors to emotions and also personal emotional map. By clicking on output, user can see the map that shows which emotions mapped to which colors. This is for those who do not want to accept the main map. The idea is that people with the same emotional map (depends on their culture or personality) can have their private language in their own group and also people with different emotional maps can see their emotional map and adjust themselves with that map. This solution may increase complexity but at the same time it provides a flexible environment for the users. In a real-world situation, it could be something like this: Person A think that happiness is represented by the color white. Person B thinks that happiness is represented by the color yellow. Both persons have customized their color map, so when person B receives a ME|EMO from Person A containing the color white, the person B will see it as the color yellow.

Most of the other feedback were related to the technical part of the interface of the application. For example having more artistic tools like different brushes or having customizable canvases. The possibility of adding music to emotional images was another
suggestion. These technical suggestions could be added to future refinement work of this project.

5. Discussion

We are living in a globally interconnected world in which we are exchanging information with the speed of light. Networks and online lives offering improvement to our friendships, family connections, education and commerce. This claim is partly true but in the world of online lives, people have connections with personas. On social networks, people represent themselves with their profiles. We are talking shortly on our mobile devices and most of the time we prefer to text to each other. “In fact, that we communicate in a new language of abbreviation in which letters stand for words and emoticons for feelings” (Turkle, 2011).

At a first glance, digital communication is similar to the real-world communication, but they have many differences. The major difference is the lack of possibilities to share feelings and emotions. Some negative emotional symptoms such as anxiety, depression and hopelessness could be the result of these hybrid communications. The findings in this document points toward a need of expressing emotions through digital communication. These findings is a good reason for thinking about new concepts for covering the needs of emotional sharing in modern non-verbal digital communication.

Each language is full of complexity. Expressing emotions is full of difficulties. In the middle of this complex situation, the ME|EMO application will work as an emotion translator between users with the help of colors. It is important to state that ME|EMO is not the equivalent of face to face communication. ME|EMO is an extra option for expressing emotions through non-verbal digital communication when other kinds of communication are not available.

Linking emotions to colors was one of the most difficult parts of the project which gave birth to many valuable discussions during the user test part. Difficulty for choosing the best emotional model is one of the negative sides of this area, but it is important to clear that what was the reasons behind the choice of colors as symbols of emotions. Sometimes expressing emotions with words is really difficult, sometimes the feelings are mixed of more than one emotion, which makes the expressing difficult. Many things can have an impact on our feelings when we decide to talk about them, for example, if the listener is not paying full attention of what we are saying. Having another way except words and text can be really helpful, and this situation is not just about communication through digital devices. These kinds of problems can happen in our daily life, so instead of increasing the trouble, with ME|EMO, we have this opportunity to be alone and express our real feelings and then show it to others or send it to them. I also had the idea that representing the emotions in an artistic and simple way can encourage users to use it.

In addition, ME|EMO could be helpful for those patients who have difficulties for describing feelings to other people. Sometimes psychologists suggest patients to write down their emotions instead of talking about them. ME|EMO can be a helpful option in this situation. Patients can draw their feelings, and then doctors can interpret their paintings to recognize their real feelings.
Technology presents itself as a one-way street; we are likely to dismiss discontents about its direction because we read them as growing out of nostalgia or a Luddite impulse or as simply in vain. But when we ask what we “miss,” we may discover what we care about, what we believe to be worth protecting. We prepare ourselves not necessarily to reject technology but to shape it in ways that honor what we hold dear. Winston Churchill said, “We shape our buildings and then they shape us.” We make our technologies, and they, in turn, shape us. So, of every technology we must ask, Does it serve our human purposes? a question that causes us to reconsider what these purposes are. Technologies, in every generation, present opportunities to reflect on our values and direction. (Turkle, 2011, p.19)

6. Conclusion

This study tries to highlight the needs of users during digital non-verbal communication. Findings shows that modern communications play an important role in human societies. The ways of expressing and sharing emotions are different between different cultures, societies and also between individuals with different personalities. The reasons of sharing emotions are also different.

Modern communication tools improve the quality of the life and facilitate communication, but at the same time, interaction with these modern tools has changed our behavior which has some unpleasant influences on our lives. One of the main problems that I found was related to the computer-mediated communication or communication through digital devices. These are communications with some differences in comparison with face to face communication. The disability to transferring the emotions, absence of context cues, anonymity of users, ability to record conversations (Dietrich, Grear and Ruth, 1998) are some of these differences. Misinterpretation is one of the side effects of modern communication, the reason is the lack of possibilities to transfer gestures or facial expressions and other normal unconscious behaviors that we have during a face to face communication. When one natural interaction without any third party intermediate (face to face communication between two people) turns into an interaction with a third party intermediate (technology takes the place as a media between two people to connect them to each other in their communication), then the communicators are affected by that third party intermediate (technology) which changes their behavior, feelings and needs.

One of the most important purposes of this study and also the main research question was to try to find a new way to improve the emotional interaction between users through none-verbal digital communication. During the design process, I studied different possibilities for finding a solution. The final concept for the ME|EMO application was selected as a result of data analysis after the data collection part. The user research part shows that users like to have more options for expressing their emotions or sharing their feelings during their non-verbal communication. Users are using the current ways for sharing their emotions, like emoticons, cause they do not have other choices. So, giving extra choices for sharing emotions during non-verbal digital communication led me to creating one application concept for them.
As always, positive and negative effects must be weight together. There are noticeable advantages communicating with the help of technology. Designers all over the globe try to invent technology that cover our emotional needs when using digital communication. Technology could cover the space and time limitations in long-distance communication.

Digital products have a special place in the modern life, interacting with digital products have an influence on our social life, some people even claim that they love their digital products (mobile phone, laptop, tablet). Turkle (2011) believes “with constant connection comes new anxieties of disconnection, a kind of panic”. Maybe the body makes the emotional connection to the devices, rather than the individuals we communicate with through those devices. That's maybe why we have an emotional connection with these devices. Our connections with our digital products and the emotional consequences from relations between human and machine could be part of further studies in the field of HCI.

When feelings are more powerful than words. When expressing emotions is difficult or even sometimes impossible. Imagine if you had the opportunity to express your emotions with the help of colors, and that you could see your feelings from a different point of view or share them with others. ME|EMO is here for emotional communication with colors instead of Ascii characters. ME|EMO is here to return the heart and soul to your communication.

Prototyping the ME|EMO application was an example of new ways for converting analog feelings into digital representation. Programming and implementing the real application could be part of future work. Investigating other, new, possible ways for improving the interaction during digital communication could be part of further studies also.

Acknowledgment

I would like to express my gratitude to Dr. John Waterworth, my supervisor, for his valuable support, guidance and useful critiques. I would also like to thank Anders Lindström for his advices regarding the design process. I am also grateful to all the participants of my user research.
References


**Electronic references**


Appendix 1: Questionnaire number one

1. Gender:
2. Age:
3. What type of text-based communication do you use? Social networks/ Email / Chat /SMS /Others
5. Which personality do you have? Extrovert/ Introvert/ Non of them
6. Do you share your emotion through text-based digital communication? Yes/ No
7. Which way do you use for expressing your emotion in digital communication? Just normal text/ Emoticons/ Smilies/ Abbreviation (LOL)/ Lengthening the word (Coooll!)/ Non of them/ Other
8. Do you think the present way that you share your emotion through text-based communication is cover all your needs? Yes/ No
9. If you answered “No” to question no.6, which way would you prefer to express your emotion? Picture/ Color/ Sound/ Video/ Smell/ Temperature/ Emoticons/ Abbreviation / Lengthening the word / just normal text/ others

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Table 1: Details of Participants - Questionnaire no.1
Appendix 2: Interview number one

1. Name
2. Age
3. Gender
4. Background
5. Do you use any kind of digital products for non-verbal communication? Name them
6. What are your ways for digital communication? For example any social networks, applications or services?
7. Do you feel any difficulties during your non-verbal communication? How about sharing your emotions? Is there any problem for sending or receiving feelings?
8. Do you have any solution for these kind of problems? What if face to face or phone communication are not possible?
9. Do you have any desires, wishes, fantasies or even any crazy idea that you like to have during non-verbal communication for sharing emotions?
10. Last part of questions: Look at these three concepts, which one do you like or prefer to use? Imagine the output and tell me which output is more understandable for you? Which one encourage you to be more creative? Which one is more fun to use and easier to share?

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<th>Way of non-verbal Communication</th>
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<td>-Forums with his interest's topics</td>
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Table 2: Details of participants – Interview no 1
Appendix 3 : Interview number two

1. First impression about application in one word or in shor sentences
2. What is your opinion about ME|EMO ?
3. Would you like to use ME|EMO ?
4. Which one is better in your view? Drawing the emotions or talking about emotions?
5. Do you think ME|EMO is useful?

<table>
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<th>Age</th>
<th>Sex</th>
<th>Background</th>
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Table 3: Details of Participants- Interview no 2

Appendix 4 : Questionnaire number two

1. Gender
2. Age
3. What is your first expression about ME|EMO concept?
4. Would you like to draw/Paint your emotions?
5. Do you think it fun to use colors instead of words to express emotions?
6. Do you think ME|EMO is a good way for sharing emotion?
7. Do you think ME|EMO is useful?
8. Would you like to record your emotion with ME|EMO after one emotional event and save it for yourself?
9. Would you like to share your emotions through social networks with ME|EMO?
10. What would you like to add or eliminate in the ME|EMO concept?

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Table 4: Details of Participants- Questionnaire no 2
Appendix 5: Persona number one

MARY

Age: 26
Personality: Extrovert
Occupation: Student
Digital devices: Laptop - Smartphone
Application for Communication: Gmail & hotmail - Facebook - Yahoo messenger

“I wish I didn’t have to explain so much about my feelings.”

* She is connected to facebook 24/7/365. Even when she is sleeping.

* Mary writes about 15 emails per day and about 30 posts on facebook per day.

* She thinks that the feeling of excitement is the most difficult one to explain to people.

Goal: She would like to share more events from her life but at the same time have to explain less about her feelings during that event.

She used to share her emotion through digital communication (Email, chat, post in Facebook) in different ways, such as emoticons, lengthening the words (WooooooW!) and abbreviation (LOL). One reason for using smileys is that sometimes when she just uses only text, her friends don’t understand her exact mean (she is kidding but they think she is angry). This situation force her to explain more and more. But if she add one happy emoticon at the end of the sentences her emotional status is clear (the happy emoticon is the only emoticon that her friends understands completely).

With emoticons misunderstanding happens and of course the only time that she can use emoticons is when she communicates with her close friends. It is not possible to use emoticons for formal conversations. Sometimes she really likes to share her feelings with her close friends, specially those who are far from her, but the current ways for sharing emotions cannot help her to express her emotions. So she always try to share pictures and explain her feelings with help of that picture, (picture of one party with text under it, “I feel great, it was a wonderful night!!!”).
Appendix 5: Persona number two

MAX
Age: 42
Occupation: Designer
Digital devices: Desktop computer - Tablet
Application for Communication: Hotmail - Facebook - Tweeter
Personality: Introvert

"People often misunderstand me, or maybe I misunderstand them?"

* He spend 3 hours per day in different chatrooms.
* Although he is a designer, he has a bachelor in English.
* He uses his tablet in public spaces to look busy so people won’t talk to him.

Goal: He wants to overcome his shyness and find a manual for interpreting humans feelings.

Max thinks he is not like everybody else. In his real life he is a quiet person but he has a completely different personality in his digital life, like in forums and chat rooms, where people don’t know him. He really likes to talk with people online. He hates emoticons cause he believes emoticons make people stupid. The only way that he communicate online is with text. This is also the only way for him to explain his feelings. As bad as he is in communicating his emotions verbally, as good is he in communicating his emotions in writing. The only problem is that he uses a too complicated language, so many readers cannot understand him and his exact mean easily.
Appendix 6: Scenario number one

Scenario: Mary

1. Mary is upset, she is texting to her best friend to say that she broke up with her boyfriend. Her friend has lecture all day so she cannot talk with Mary. The only way is SmS.

2. Mary's message contains emoticons and text.

3. Jenny receives that SmS full of emoticons and bad news. It is difficult for her to understand if Mary is angry and a little bit upset, or if she is just really upset! There is no accepted way of interpreting the emotion by counting the number of emoticons. Jenny therefore just guess the situation and answers and ask Mary to explain more about her feelings in that special moment.

Appendix 6. Scenario number two

Scenario: Mary with MEEMO

1. Mary is upset, she is texting to her best friend to say that she broke up with her boyfriend. Her friend has lecture all day so she cannot talk with Mary. The only way is SmS.

2. Mary's message contains image of her feelings and text. She uses MEEMO application. So her feelings and the amount of those feelings are obvious for receiver.

3. Jenny receives that SmS. Text and image! She realizes that Mary is really upset, a little bit angry and also disappointed. Jenny answers that she understand Mary's feelings and she will join her ASAP for emotional support.
Appendix 6: Scenario number three

Scenario: Max

1. Max goes to his friends party. He is really enjoying it. He is always silent and alone, he talks when someone starts conversation with him. This night he is lucky cause the number of people who start a conversation with him are more than usual.

2. He takes many photos and when he comes back home, he wants to share his great feelings with others on facebook.

3. He upload some of those pictures on facebook. He also add "I HAD A GREAT TIME". But he receives strange comments like "What happened to u?", "You don't look happy man!". He checks all the photos and he realize that his face is neutral in all pictures and the description couldn’t help him to explain his feelings. He is not happy about this so he just revokes all pictures from facebook.

Appendix 6: Scenario number four

Scenario: Max with MEEMO

1. Max goes to his friends party. He is really enjoying it. He is always silent and alone, he talks when someone starts conversation with him. This night he is lucky cause the number of people who start a conversation with him are more than usual.

2. He takes many photos and when he comes back home, he wants to share his great feelings with others on facebook.

3. He upload some of those pictures on facebook. This time he add an image of his feelings which he created with MEEMO. He choose colors of happiness, excitement and joy. His friends understand his feelings this time even with his neutral face in the pictures.
Appendix 7. Scenes and explanations of ME|EMO

Figure 1 & 2. Different canvases from paintings of “Piet Mondrian” just as an example of predefined artistic area

Figure 3. Emotion behind each color is represented by touch or mouse click
Appendix 7: Scenes of application

Figure 4: Dragging the color for changing it with another color (emotion)

Figure 5: Umbrella of colors & emotions appears after dragging color

Figure 6: Color of anger (dark red) replaced with color of happiness (yellow)

Figure 7: Process of changing color can repeat simply
Appendix 7: Scenes of application

Figure 8 & 9. Drawing feelings by choosing colors as their symbols. Green, comfortable and peaceful and blue for calm

Figure 10. After painting user has different choices

Figure 11. It's possible to share the feelings through social networks
Appendix 7 : Scenes of application

Figure 12. Example of shared feelings through Facebook

Figure 13. It's possible to record and review the past images of feelings

Figure 14. Example of image of feelings after Anders party