

The Sunshine Necklace: A design inquiry study about digital jewellery and wearable technology for empowerment in sexual harassment situations

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ABSTRACT

This paper addresses a design exploration focusing on interactive jewellery and wearable computing that could affect sexual harassment in social contexts in everyday life. Drawing on a design inquiry study that lead to the creation of an interactive and digital necklace named *Sunshine*, which is a personal alarm connected to an emergency center, this paper focuses on how a piece of digital jewellery can contribute to women's empowerment in relation to sexual harassment. The functionality of Sunshine is based on a device that will be activated when the user presses a button on the necklace and an alert with the location of the user will be sent to an alarm center. The users press the button when in danger or exposed to violence and/or abuse. This study so forth addresses a design exploration of a piece of jewellery that can be seen as a symbol for women's safety, unity and equality. The combination of digital technology and fashion design demonstrate that people can be brought together and especially be empowering in social contexts where sexual harassment might be a part of women's everyday life.

AUTHOR KEYWORDS

Digital jewellery, wearable technology, empowerment in design, participatory design, aesthetic values.

INTRODUCTION

In many cultures and societies men believe that commenting on women's look is a compliment and they do not hurt or assault a woman with their behaviors. Someone said that "No, it is not a compliment, it is a harassment", this quotation describes street harassment and unwanted touching very well. Unwanted touching in social contexts is

an under-researched topic, but it is clear from the previous studies that it is a significant and prevalent problem (Graham et al., 2017). According to United Nation, it is estimated that 84 percent of women worldwide have experienced street harassment at some point in their lives (UN women, 2017). World Health Organization (WHO) also presents that one in three women throughout the world will experience physical and/or sexual violence by a partner, or sexual violence by a non- partner within their lifetime (WHO, 2015). In this research project, I have explored how an interactive, modern, digital jewellery and wearable computing for everyday life could affect the experience of safety, power, sisterhood as being exposed to sexual harassment as a woman. I have also examined how a piece of digital jewellery can contribute to women's empowerment in relation to sexual harassment and abuse.

Jewellery has been used by people for thousand years and has provided many insights about how ancient cutlers worked and how jewellery can be understood as a status symbol (Rosén, 2017). Humans have used jewellery to express themselves, expressing moods and emotions in a socially acceptable way or even make statements through their accessories (Versteeg & Kint, 2017). Jewellery is a term that often refers to form of personal adornment, they worn on the body, may be attached to the clothes or hair or directory to the body (Versteeg & Kint, 2017). Jewellery, so forth, can be categorized such as brooches, rings, necklaces, bracelets, earrings, body piercing, cufflinks, that can be made from a several of materials such as metal, stones, shells corals. Nowadays, interactive or digital jewellery has become far more popular than traditional jewellery in terms of usage because we live in a digital era and technology is

an important part of life especially in developed countries (Silina, 2015). Digital jewellery has been gaining a strong interest among potential users and market researchers. Previous study shows that “Wearable technology will be increasingly hidden behind stylish designs, that will have a wider appeal than the technology forward gadgetry devices in the market today” (Ledger, 2014). The reasons that wearable computing becomes more popular are that they are “constant and always ready, unrestrictive, not monopolizing of user attention, observable and controllable by the user, attentive to the environment, useful as a communication tool, and personal” (Starner, 2001). A huge variety of wearable sensors are available for different purposes, they have already proven their potential to support personal fitness and health (Kritzler et al., 2015). Contemporary jewellery is a rich craft discipline that seeks to extend concepts of jewellery by embracing new, and reinterpreting old, materials, processes and perspectives, whilst challenging preconceptions of jewellery and its role in society (Wallace et al., 2007). This paper describes the idea and implementation of a safety system for digital jewellery based on such wearable sensors and alarm technology.

The study that this paper is based on is drawn from a perspective on research through design (Zimmerman et al., 2007) and the exploration of artifacts (Fällman, 2008) within design research. The study focused on producing a contribution of knowledge through design experiences and design inquiry. In this project, the artifact was a part of interaction design research. Fällman describes RTD as a combination of research and making that focus is on design as a practice and not as a research discipline that makes contributions of knowledge (Fällman, 2003). Research through design as a methodological approach often describes as a process in which doing design work is part of doing research (Tsaknaki, 2017). This term refers to a process of practical work at its centre (Fällman, 2008), which can result in artifacts as concrete outcomes, most often in the form of prototypes (Tsaknaki, 2017).

Within the study an interactive necklace called *Sunshine* (see Figure 1) has been developed. The Sunshine necklace is a digital aesthetic jewelry, as well as, a personal alarm connected to an emergency center. The device is activated when a user presses a button on the necklace (see Figure 1) and then sends an alert with the location of the user to an alarm center. The users press the button when in danger or exposed to harassment, violence and/or abuse. In order to create this artifact, aesthetics principles, individual values, personal desired, women’s safety, material, form, shape,

and last but not least, functionally have been considered. Users have been involved since the very beginning of the study, which is done using a participatory design approach (Lundmark, 2016; Velden & Mörberg, 2014) based on the co-creation values of working together with users and various stakeholders (Lundmark, 2016).

This paper addresses a design exploration focusing on interactive jewellery and wearable computing that could affect sexual harassment in social contexts in everyday life. This study so forth addresses a design exploration of a piece of jewellery that can be seen as a symbol for women’s safety, unity and equality. The combination of digital technology and fashion design demonstrate that people can be brought together and especially be empowering in social contexts where sexual harassment might be a part of women’s everyday life.

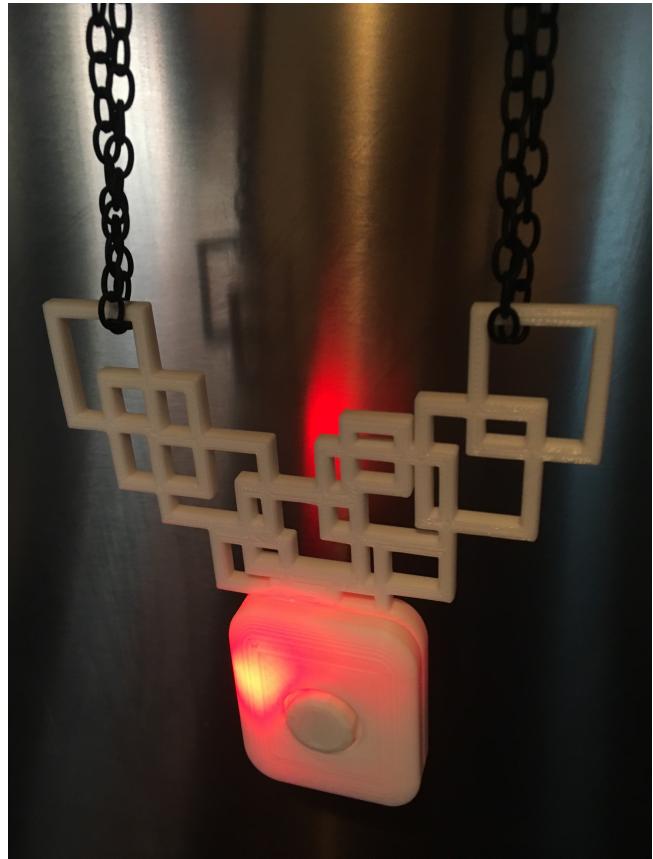


Figure 1. The final artifact, the Sunshine necklace. The button in the middle of the necklace is the activator of the personal alarm that is captivated inside the necklace.

BACKGROUND

According to a research by Cornell University and street harassment campaign *HollaBack!*s, 84% of women around the world have experienced street harassment by the time they are 17 years old (Hollaback, 2014). Another study

shows that almost one in three young women do not feel safe in public places at night and most females have experienced unwanted sexual contact in social contexts (Graham et al., 2017). In their study, the focus is on sexual harassment in social activities especially at bars and parties; they explore women's responses to these unwanted touching through online surveys. The result shows that most young female bargoers experienced sexual contact in social drinking (Graham et al., 2017). All these numbers and facts show a clear image of a huge problem in our societies when it comes to women safety. It is very important to eliminate risk of sexual assault and unwanted touching in social contexts and public places. Although all laws and rules on sexual harassment, these issues still exist, according to UN 144 countries have laws on sexual harassment, but even when laws exist, this does not mean they are always adaptable with international standards and recommendations or implement.

Wearable technologies provide various ways to communicate not only with "reconfigurable components that augments self expression, but also by being actively involved in electronic networks" (Mura, 2008). It is very interesting to examine how accessories can be used for communicating emotions, moods, feelings and a piece of digital jewellery can also make it easier for people to feel safe and powerful (see Graham et al., 2017). Wearable technologies and digital jewellery has been shown to increase the sociality of long distance communication that provides a real communication of emotion between humans and a new way to make a statement (Olivier & Wallace, 2008).

Through various approaches designers tend to show that emotional and personality is important in jewellery design, as jewellery designers often aim to create objects that will be more meaningful for people and give a different experience than just a commercial and functional device (Wallace et al., 2007). There are some examples that using digital technologies within jewellery practice to explore personal relationships or using digital jewellery that react to interactions between people (see Tsaknaki, 2017), for instance *Blossom* is a ring that made from wood, glass, silver and vintage postage stamps (Olivier & Wallace, 2008). It's a piece that user worn cupped in the hand, its organic; it had strong connection to family and personal feelings and their background. At the heart of jewelry piece, there is a structure holding vintage postage stamps and it would be connected to a rain sensor, once the rain sensor had registered a certain quality of rain, a signal would be sent to the jewelry and the mechanism would be activated

and the stamps blossoming (Olivier & Wallace, 2008). This type of interactive jewellery plays a more emotionally meaningful role in the people's life, interactive jewellery can be seen as a new medium to interact and communicate, likewise it is more fun, enjoyable and entertaining to wear a piece of jewellery that you can interact with and can empower you collectively. Using technology to make interactive jewellery can be an alternative way to design and creative pieces that make unique experience that we never had before.

Previous studies show that women always have tried different strategies and new ways to reduce sexual harassment; for example, direct or aggressive refusal strategies, ignoring the person, moving out of reach, leaving the area, using facial expressions to show the behavior was unwanted, telling the person to stop, aggressive or forceful reactions, and getting help from a friend (Graham et al., 2017).

Drawing on the presented previous research the aim of this project is to create a jewellery piece with a strong focus on empowerment, women's safety and make a statement in relation to sexual harassment.

EMPOWERMENT IN DESIGN

In this section, empowerment through design and participation in design will be discussed. Empowerment and participation in design have been defined as involving users in a project that give people the power to take part in something that contribute to the making of something valuable (Lundmark, 2016, p. 47). Previous studies show that the participatory design discourse has a strong moral and rhetorical claim by its emphasis on users' empowerment (Ertner et al., 2010). Design has a strong role in human's life and the ability of design to build capacity by 'empowering people' is perhaps one of its most important characteristics (Muratovski, 2016). This paper builds on user's participation and examined how the participants feel safe and powerful by using the artifact. Lundmark (2016) argues that in PD projects you give users a voice that "refers to giving future users and participants decision-making power in the design practice" (Lundmark, 2016, p. 47). In this study, the users have created something that contributes to their security in social contexts and also having control over their freedom in public places. In fact, empowerment in design helps researchers to share power and to enable other people to flourish (Steen, 2013).

METHOD

In this study a series of concepts were developed in the form of workshops, discussions, sketches, prototypes, user tests and evaluations. These concepts were iterated and evaluated with help of users and the company behind the functionality of the alarm function of the artifact. In this project, the user's needs were a very important factor, the users were involved in the very beginning of the research phase and the main project has emphasized on research through design and exploration of artifacts. During the project the author had constantly dialogue with the target group which were women in various ages in order to understand their needs, requires and desires when it comes to wearing jewellery and it has also discussed women's safety issues in social contexts.

The project has used research through design approaches (Fällman, 2008) and also participatory design approaches (Lundmark, 2016; Velden & Mörtberg, 2015; Zimmerman et al., 2007). In order to provide better understanding of complex and future-oriented issues in the design field. The reason for using such approaches is that participatory design increases the chance that the final result of a design process represents the values of the future users (Velden & Mörtberg, 2015).



Figure 2. An image from the workshop where the users discuss the material and the shape of the prototypes for necklace artifact.

Pre-study and the target group

The project started with research about aesthetic principles and technical solutions for the artifact. The work has begun with a pre-study, where three workshops with five users were conducted. The aim of these workshops with the target group, girls and women in the ages between 28-60, were to

discuss the idea and their needs when it comes to safety, and also to their ideas about carrying a piece of jewellery (see Figure 2).

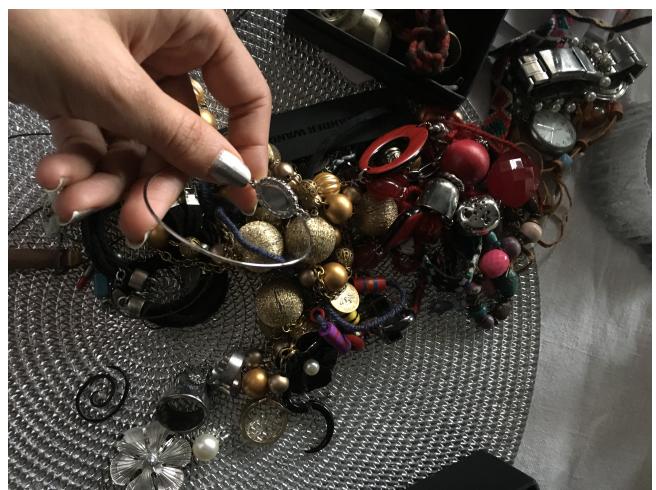


Figure 3. A detailed image from the workshop where the users are discussing about the material and the shape of the artifact by the use of trigger materials.

The workshops were designed as an open discussion section where the participants got access to various materials, different kinds of jewelries (see Figure 3) to experience in order to build a piece of jewellery according to their own inquiries.

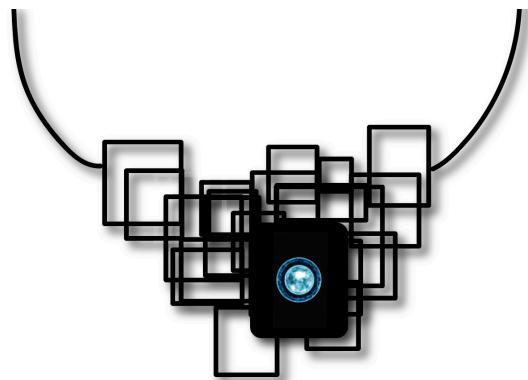


Figure 4. One of the first refined concepts sketches of the Sunshine necklace designed in Adobe illustrator.

The design process: prototypes and tests

In this chapter I will present a brief outline of the design process, I will describe each phase of the design process by details in order to give a better understanding of entire process. The design process contains series of sketching and designing, series of concepts, prototypes, user tests, and evaluation of the artifact.

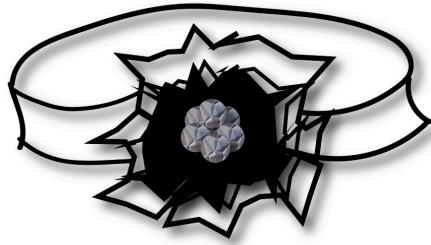


Figure 5. Concept sketch of the bracelet

Two concepts have been developed and tested through several working prototypes. One of the most important discussions in workshops was about the form of artifact, what type of jewel should it be? Should it be a bracelet, a necklace, earring or something totally avant-garde. There were two concepts, necklace-concept (see Figure 4) and bracelet-concept (see Figure 5) but both of them have good and bad sides. Positive things about bracelet are that users can hide the device quickly where they do not feel safe to show their statement or if they do not want to exposed in public places, they can wear it 24 hours and it may work like a watch. Negative things about bracelet are that when you are working with computer and typing or writing the bracelet may bother you, or for instance it is not easy to get access to the button if you wear winter jacket or gloves. Positive things about necklace are that users can make statement and show it off which is the function of a piece of jewellery and the meaning of the study, to empower women and make a statement, the access to the button is easier, it is more eye catchy and you may feel strong to carry it. But the negative sides of necklace are that you can be a target for hate crime or attack because of your statement, somebody can drag the chain and suffocate you.



Figure 6. Series of sketches of the necklace ideas

Sketching and designing

Designing the artifact started with series of sketches manually with pen and paper (see Figure 6) and later digitally. One concept of many sketches for further work has been chosen in order to develop it. The concept was the necklace and bracelet has been designed in Adobe illustrator for visualizing the artifact (see figure 4 and 5). The final step was to design 3D model and then print it out for further user-tests. TinkerCad ¹was used as the program for 3D modeling. The reason to work with 3D modeling and printing was that it is a new technology that gives you more opportunity to make different prototypes and save time and money. You can integrate the technology in your prototype easier and cheaper (Yan & Yeong, 2014). At the same time, it looks good enough to present it for users as Hi-Fi prototype and to get some feedback from the potential users (see Figure 7)

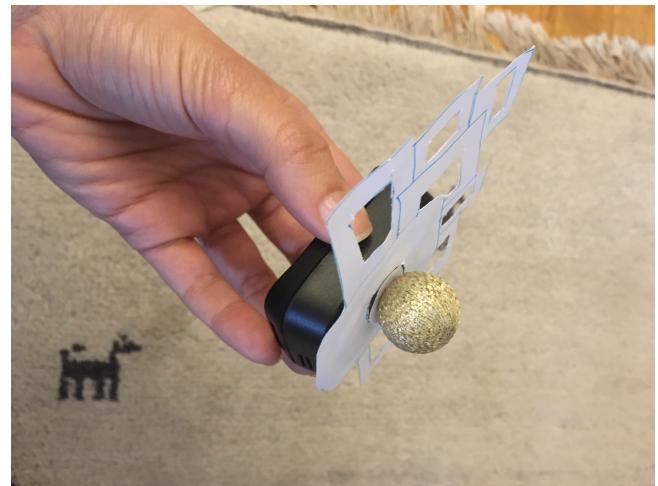


Figure 7. Prototyping in low-fi material and the alarm from Axel Group

Functionality and the Alarm Company

The original alarm (see Figure 9) that has been uses in the artifact is a personal alarm device that the company called Alex group (see Figure 8) offered the project. The project has been presented to this company and after the pitch they showed their interest in order to collaborate and they offered help and support to build a piece of jewellery together according to users needs. Axel Group (see Figure 8) is a supplier of personal safety solutions. They present the company like that “Our activities focus on personal

¹ The program is an online and free software program

safety & work environment, and our work is based on the regulations of the Working Environment Act on Single Work and Violence and Threats in the Work Environment" (Axel Group, 2018). The alarm suited for various safety needs, it is connected to SOS Centre and it actives when user press the button, the device can be set up to contact wanted phone numbers and places, the device sends an alert with the location of users to SOS center. With the support of these techniques, artifact could be built and the software and the function that suited to the project could be integrated.



Figure 8 and 9. Different types of larms at the Axel group Company

User Reactions & feeling safe

Seven women (see Figure 11) in various ages have evaluated the artifact; their feedbacks have documented by writing down what they said, the comments and opinions about design, functionality, the concept and their feelings about carrying *Sunshine*. Pictures have taken of prototype while the users wear the necklace. Users wanted a piece of

jewellery to give them safety when they are in public places, women wanted something to empower them, to unite them and encourage sisterhood. The aim of this study was to describe the experiences of women through testing a personal alarm, the necklace and their reasoning about safety, if they feel safe through wearing a personal alarm in form of digital jewellery. One of the users said "I feel safer if I carry a device which is connected to SOS alarm or to a family member's mobile phone" (Woman, 37 years old). A human/women right activist said "Sunshine give me hope and power to make statement and show it off" (Women 35 years old). Showing off is the function of a piece of jewellery and the meaning of the study, to empower women and make a statement and encourage sisterhood. Previous study shows that using personal alarm increase feeling of being secure and safe. "The results showed that the mobile safety alarm was experienced as a tool to be active and mobile, *being able to do what they liked to do*, and have control over their life. The concept mobility or *freedom of movement* seemed to involve both self - determination and empowerment." According to previous research, empowerment organizes life in a way that enhances self - control and self - determination (Rappaport, 1981). Based on the results of this study, it might be concluded that mobility, which can be seen as prerequisite for participation in society, is a dimension of empowerment (Melander-Wikman et al., 2008).



Figure 11. The users testing the necklace *Sunshine*

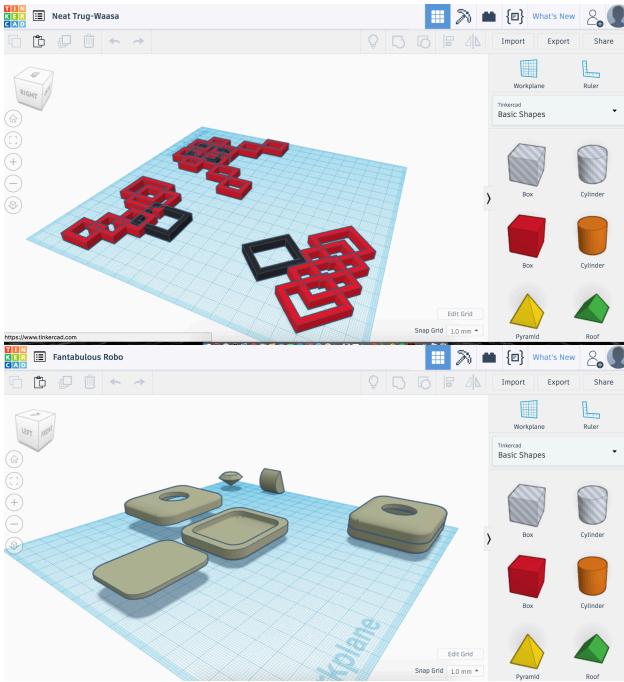


Figure 10. 3D prototypes of the Sunshine necklace

THE USE OF THE SUNSHINE NECKLACE

The necklace consists of an alarm system, which is connected to SOS center and is chargeable. *Sunshine* is more than jewellery; this necklace is made by women for women to give them more power, freedom and security in public places. This study wants to contribute to women's safety in social contexts through digital jewellery and design experience. Users wanted a piece of jewellery to give them safety when they are in public places, women wanted something to empower them, to unite them and encourage sisterhood. One of the users said "Sunshine gives me Cleopatra feeling and I like it" (Woman, 29 years old) and this is the purpose of creating such *Sunshine* necklace, in order to give women more power and they feel safer. This device is about safety, sisterhood and empowerment.

DISCUSSION

As a woman in patriarchal world, I myself have been exposed to unwanted touching, street harassment and assaulting since I was a child, and I can still remember all that horrible moments that still affecting my grownup life. I started to think about this issue a long time ago, but I could not find a rational way to address the problem. After the #metoo campaign or movement (Ahlström & Hansson, 2017) I have started to consider about sexual harassment and how women around the world have united through a hashtag, therefore I wanted to start my campaign and research to find a way to reunite women through a digital,

interactive jewellery and it was the moment that the idea to create something by women-for women has burned. I always wanted to feel safe and secure when I am late night out or when I am in public places for example music festivals or a pub. These kind of fear and unsure feelings that women experience everyday is my impulsion to create something that protect women and give them more power and freedom in social contexts.

Through new strategies we could be able to face and solve the problem for example, technology and new technique would be helpful in order to address the problem in an innovative and creative way. For instance, an interactive, modern, digital jewellery and wearable computing for everyday life can affect sexual harassment against women.

In this case the necklace gives women new opportunities to control safety and security by themselves. They should be more independent when they are outside, they should not need a company on the way home. This new strategy, which is digital jewellery and wearable technology, might contribute to eliminate unwanted touching and street harassment and also provide an insight about the impact of digital jewellery on women's safety in relation to sexual harassment.

During these initial workshops with the users most of the women expressed that the device should consider functionality, accessibility, appearance and quality of material. It was also important how the information and safety would work in practice. We discussed about shape, form, color and fashion elements, because participants believed that you could communicate a message through fashion and make a statement by using specific jewellery or clothes. Karen Pine professor in psychology argues that; "A piece of statement (bold) jewellery that marks you out as an individual will make you feel special like wearing a badge of honor or medal" (Pine, 2014). She also argues "What we wear has cognitive, social and emotional consequences. The right clothing can change who we are, how we think and how we feel. So, we should never underestimate that power" (Pine, 2014). As I mentioned previously, *Sunshine* is more than jewellery; this necklace is made by women for women to give them more power, freedom and security in public places. In this study, the users have created something that contributes to their security in social contexts and also having control over their freedom in social contexts. This necklace is a piece of jewellery to empower women and give them safety.

CONCLUSION

Through participatory design and co-design of an artifacts I have explored how with help of digital jewellery and wearable technology empower women in social contexts. Women always tried different strategies and new ways to reduce sexual harassment; in this case the necklace gives women new opportunities to control safety and security by themselves. They should be more independent when they are outside, they should not need a company on the way home because they have *Sunshine*. This new strategy, which is digital jewellery and wearable technology, can contribute to eliminate unwanted touching and street harassment and also provide an insight about the impact of digital jewelry on women's safety in relation to sexual harassment. In an advertising campaign for a Swedish company called *Åhléns*, professor Karen Pine says, "just one small accessory makes it big more of a statement about us and perhaps gives it us more confidence then to start expressing ourselves more". The campaign is about fashion psychology, power of cloths and how we can affect society through our clothes and also how we influence and empower each other (*Åhléns*, 2018).

The result of the study is an interactive, digital necklace named *Sunshine*. As mentioned previously the artifact is a personal alarm, and it is connected to an alarm center and will be activated when users press on a button. The device will send an alert with the location of the user to an alarm center. So, I believe that digital jewellery could be a way to reduce sexual harassment and in the same time empower women in social context and public places.

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