

ObSURFing women's surfing communities:
Encouragement in the women's surfing
community in Scheveningen.

University of Twente

Marije Benthe Kok

Februari 2024

Abstract

Acknowledgement

Special thanks to Marcus Gerhold and Thérèse Bergsma, for their encouragement and advice. Thank you so much for your time, warm cups of tea and lovely conversations about life and this GP. I would also like to thank Hart Beach Surfing for providing me with this project and for offering me their expertise, time and resources.

Contents

1	Introduction	8
1.1	Research questions	9
1.2	Report structure	9
2	Background research	11
2.1	Observations by Hart Beach	11
2.2	Insight into the literature	11
2.2.1	Going against the waves - The barriers female surfers face	12
2.2.2	The Power of the ocean - How these barriers affect women’s surfing	13
2.2.3	Lining up for change - How these female surfers push back	14
2.2.4	A changing tide	15
2.3	Related work	15
2.3.1	Women’s surfing initiatives	16
2.3.2	Community building tools	18
2.3.3	Surfing technology	20
2.4	Conclusion	24
3	Methods and techniques	26
3.1	Design process	26
3.2	Ideation phase	29
3.3	Specification phase	29
3.4	Realization phase	30
3.5	Evaluation phase	30
3.5.1	User Evaluation Interview Questions	30
4	Ideation	33
4.1	Design considerations	33
4.1.1	Design directions	33
4.1.2	Communication	34
4.1.3	Feedback modalities	35
4.2	Persona Profiles	35
4.3	Ideation Methods	36
4.3.1	Mood-boarding	36

4.3.2	Mind map	37
4.3.3	Sketches	37
4.3.4	Tinkering	38
4.4	Design Decisions	41
4.4.1	During Surfing	41
4.4.2	On Body - On Arm	42
4.4.3	Haptic and Visual Communication in Water	42
5	Specification	43
5.1	Stakeholder identification	43
5.2	Requirements	43
5.2.1	MoSCoW method	44
6	Realisation	46
6.1	Creating the prototype	46
6.1.1	Electrical elements of the prototype	46
6.1.2	Feedback meeting with client	50
6.2	Final prototype of bracelet	51
6.2.1	Materials	52
6.2.2	Design	53
7	Evaluation	54
7.1	User evaluation	54
7.1.1	Variables	54
7.1.2	User Evaluation Target group	54
7.1.3	Evaluation Set-up and Process	55
7.2	Findings from the user evaluation	58
7.2.1	Observations during user evaluation	58
7.2.2	Usability and Intuitiveness	59
7.2.3	Overall experience	59
7.2.4	Receiving feedback	60
7.2.5	Giving feedback	60
7.2.6	Quantity of feedback	61
7.3	Conclusion	61
8	Discussion and Future Work	63
8.1	Discussion	63
8.2	Recommendation for future work	64
8.2.1	Physical recommendations	64
8.2.2	Evaluation recommendations	65
8.2.3	Ethical recommendations	65
8.2.4	Tool implementation recommendations	65

9	Conclusions	66
9.1	Use of external sources	71
9.1.1	Grammarly	71
.1	Information Brochure	72
.1.1	Information Brochure	72
.1	Informed Consent Form	73
.1	Women’s Surfing Communities User Evaluation Test 1 Transcript	74
.1.1	Observational notes	74
.1.2	Interview questions Test 1	74

List of Figures

2.1	Daughters of the Ocean Surfskate event	16
2.2	IWS	17
2.3	New Zealand Women's Surfing Association (NZWSA) Logo from 1977 by Ross Guy [Guy, 1977]	18
2.4	AWSA Logo	18
2.5	Strava	19
2.6	Garmin Watch. Image by Kelly, Pexels	21
2.7	Apple Watch. Image by Pixabay, Pexels	21
2.8	Nixon Ultratide	22
2.9	Glassy Sketches	23
2.10	Trace	24
3.1	A Creative Technology Design Process	28
4.1	Mood board	36
4.2	Ideation Sketches 1	38
4.3	Ideation Sketches	38
4.4	width=.7	39
4.5	width=.7	39
4.6	On-arm wearable	39
4.7	On-arm wearable	39
4.8	On-arm wearable	40
4.9	On-arm wearable	40
4.10	On-arm wearable	40
4.11	On-arm wearable	40
4.12	On-arm wearable	40
4.13	On-arm wearable	40
4.14	On-arm wearable	40
4.15	On-arm wearable	40
4.16	On-arm wearable	40
6.1	Prototype with buttons, single LED lights and wireless commu- nication	49
6.2	Final prototype with buttons, LED strip and wireless communi- cation	52

7.1	User Evaluation Test Set-Up Design LAB	55
7.2	User Evaluation Test Set-Up Saxion	56
7.3	Origami Tutorial	57

Chapter 1

Introduction

Paddling out and making it through the breaking waves. Popping up on the board and letting the wave take you on a ride. Wave surfing can be a tremendously liberating activity that requires one's physical and mental strength to not only overcome the battle with oneself but also with the ocean. Unfortunately, the current surfing community is very male-dominated and, at times, not very inviting. Though many women are united by their passion for the waves, for many, being a minority out in the water, can be an isolating experience that comes with many challenges and barriers to overcome.

The clients of this project, Hart Beach Surfing, have noticed an increase in women who are interested in joining the surfing community. In their experience, the number of women who are interested in learning board sports, including wave surfing and skateboarding, is steadily increasing. Ever since surfing has started to grow in popularity all around the world, the surf world has been quite a male-dominated field [Fendt and Wilson, 2012] and can be quite intimidating for any person, man, or woman, to get started in. The line-up can be sexist, aggressive, and straight-up egocentric. [Olive et al., 2015, Waitt, 2008] However, for many, the love for surfing is so big, that they find ways to fight these constraints. One way these women find their way around the overwhelming and intimidating effects of the current surfing community is by creating spaces in which they feel comfortable and encouraged. [Fendt and Wilson, 2012] To provide these women with an interest in surfing with a positive surfing experience and an encouraging surfing community, the goal of the project is to create a prototype of a tool (consisting of e.g. a website, app, instruction videos, wearable electronics) that encourages beginner and advanced female surfers to surf together and encourage each other in the process. This tool should strengthen the surfing community and bring female surfers from the area of Scheveningen together. Literature research related to women in surfing sports will provide the theoretical foundation for the research. The research objective of the project is to investigate the barriers and challenges faced by female surfers in Scheveningen. It is expected that this research will give an insight into the barrier that keeps female surfers from the water. Secondly, a tool should be developed, and

user-tested, to address these barriers and challenges and strengthen the female surfing community. Inspired by these female surfers who dare brave the impact zone of the waters with boldness and determination, this research project will strive to create a tool with just as much positive impact.

1.1 Research questions

To gain a structured insight into this topic, one research question and three sub-research questions were formulated to come to a better insight into what barriers women face when surfing and how this can be improved.

RQ: How can interactive technologies be used to create a tool that lowers the identified barriers and challenges of becoming part of the surfing community of beginner and experienced surfers, and promotes a strong and encouraging female surfing community in Scheveningen?

The research questions are each accompanied by a short description.

Sub-RQ 1: What are the barriers that keep female surfers from surfing?

To gain an insight into what the needs and wants are of these female surfers regarding the current surfing community, the existing barriers should be identified.

Sub-RQ 2: What are the needs and wants of female surfers regarding a tool that aims to create a stronger and more encouraging female surfing community?

During the design process, it is important to know what the requirements of a tool are. It is important to know what the needs and wants of a tool designed for female surfers are. This is being explored in the process of answering the second research question. The answers to this question will form the base for the product requirements.

Sub-RQ 3: What effect does this tool have on the perception of the female wave-surfing community in Scheveningen?

To evaluate the impact of the tool, the following sub-research question was formulated. This question will primarily be answered during the evaluation phase of the project.

1.2 Report structure

This report will lead with background research on the existing literature regarding women in surfing communities. The research will look at how women perceive the current surfing community, what barriers they experience, and what measures are currently being taken by these female surfers, to challenge

or overcome these barriers. The research background will also provide an insight into the state of the art. This report will look into existing female surfing initiatives and communities, the current state and developments in the world of (wearable) surfing technology, and will provide insight into digital community-building tools. The report will provide all necessary reasoning on the methods and techniques used during this research in the Methods and Techniques chapter. Through iteration, ideas of a tool will be created and all related findings will be presented in the Ideation chapter. The Specification chapter will be a space in which executive decisions about the prototype will be made using the identified requirements and specifications. From these findings a prototype of a tool will be created and analyzed, documented in the Realization chapter. This prototype will be tested and evaluated. The findings from the user testing will be presented in the Evaluation chapter. In the Discussion chapters, the findings from all previous chapters will be interpreted, and the limitations of the research project will be discussed. From this, recommendations for future work are presented. In the Conclusion chapter, making it the last chapter of this report, insight will be given into the performance of the prototype and definitive answers to the research questions will be given.

Chapter 2

Background research

In this chapter, through a discussion on observations from the clients and by studying current literature on the barriers women face within the surfing community, the aim is to answer the first sub-research question. Gaining answers on what barriers female surfers are faced with will give the project more context and will serve as a guiding reference of the problem when designing the tool. Furthermore, in this chapter, we will look into different aspects of the related work surrounding community building, surfing technology and women's surfing initiatives.

2.1 Observations by Hart Beach

Previous observations on the surfing community were made by Hart Beach that led up to the creation of this research project. The owners of Hart Beach experienced that the line-up of surfers in the water could sometimes get negative. They experienced localism, which is when local surfers express their dislike of non-local surfers on their beach [Olive, 2019]. They also recognized that the community was not always encouraging and welcoming for newcomers and beginner surfers.

2.2 Insight into the literature

Sports like surfing provide a unique opportunity to look at how progressive gender dynamics can play out in sports, as opposed to many organized and gendered sports, which are strictly separated by gender [Wheaton and Thorpe, 2018, Comley, 2016]. However, ever since surfing has started to grow in popularity all around the world, the surf world has been quite a male-dominated field [Fendt and Wilson, 2012] and can be quite intimidating for any person, man, or woman, to get started in. The line-up can be sexist, aggressive, and straight-up egocentric [Olive et al., 2015, Waitt, 2008, Waitt, 2008]. Given this

information, a critical review must be carried out to shed light on the barriers female surfers face.

A big part of the surfing experience is talking to fellow surfers about the exhilarating waves a surfer has just caught [Anderson, 2014]. A sense of community may be as important, as it is to ride a perfect wave, a tool is being designed to foster an encouraging surfing community of women. To paint a picture of the barriers female surfers face when practising their sport, this literature review will provide insight into the barriers female surfers face, how these barriers affect them, and what is currently done to address these barriers.

Inspired by these female surfers who dare to brave the impact zone of the waters with boldness and determination, this literature review will provide the basis for a research project that strives to create a tool with just as much positive impact. It will do this by looking into the barriers female surfers face, how these barriers affect these women, and finally what they do to take control of the waves they make.

2.2.1 Going against the waves - The barriers female surfers face

Literature shows there are three main categories in which women experience pushback when partaking in the sport of surfing. The first category is the most apparent and visible to those observing the behaviour of the surfing community. Through the territorial behaviours that play out on the beach, women are repeatedly excluded. They experienced localism, which is when local surfers express their dislike of non-local surfers on their beach [Olive, 2019] and exclusionary sexism in the water. The second category is less visible to non-surfers, though definitely not less demeaning. As women make their way into the professional surfing sphere, it becomes obvious they are marginalized through objectification and gender discrimination. As Knijnik et al. (2010) describe in their study on the perception of the female body of Brazilian competitive surfers a paradox presents itself. Navigating through the world of female professional surfing presents female surfers with many contradictions. The media coverage of women's surfing, sponsors, and investors tend to focus on the physical attributes and have sexualized their bodies. Unavoidably, surfing puts people their bodies on display. As surfing is practised in an environment where people typically dress less conservatively, namely the beach, this culture is unavoidable when one practices surfing. Their athletic and model-like bodies continuously form the basis for their opportunities with sponsors. Their bodies are discussed and judged on their health and used for marketing and advertisement. Female surfers are therefore judged based on their bodies by their sponsors and investors, rather than their athletic abilities. The same female surfers are constantly judged on their surfing abilities while being compared to and belittled by their male competitors. They have to navigate the established cultural norms, though they want to feel good in their own bodies while doing the thing they love, and not be marginalized while doing so [Knijnik et al., 2010]. Hunter describes a similar paradox while also mentioning that the objectification of women's bodies in the

context of surfing is not only devalidating, it is also unsafe. Through this objectification, women's bodies are exposed to the impacts of surfing, while male surfing attire keeps them warm and protected [Lisahunter, 2017]. "Performance expectation for men has always been athletic performance, while for women it was feminine appearance first and then also performance." [Lisahunter, 2017, p. 1392]

Historically, women have been marginalized in the professional world of surfing as they have seen lower participation opportunities, gendered differences in prize money and less media coverage than their male surfing competitors [Wheaton and Thorpe, 2018]. The legitimacy of these female surfers is constantly questioned. When a female surfer rode the biggest wave of the year, this event proved exactly this point. Rather than celebrating the two women who rode the largest wave of the year 2019-2020, a debate started about who actually caught the bigger wave. Precise and scientific methods were applied to accurately measure the waves, while these methods had never been applied to male big wave surfers [Schmitt and Bohuon, 2021]. The third category female surfers are marginalized is harder to identify. Women identified they were often the only, or one of the few female surfers in the line-up [Olive et al., 2015, Fendt and Wilson, 2012]. Even many of the women who were interviewed in the study by Olive et al. (2015) initially did not identify any harmful and marginalizing behaviour of the surfing community. However, throughout their answering, certain contradictions arose. Though the women in the study were hesitant to implicate that the local men were sexist, within their answers they recognize that as a minority, women are differentiated in the surfing world. They recognized they were greeted with great tolerance and respect in the water, receiving compliments and support from surfers in the water. They received advice and encouragement which was something men would not get. These probably well-intended comments felt humiliating and degrading. Having experienced this herself, Olive, the author of the article was quickly "reminded that she was the only woman in the surf: the only one who was deemed in need of a push onto a wave" [Olive et al., 2015, p. 15].

2.2.2 The Power of the ocean - How these barriers affect women's surfing

The effects of these barriers range wide, however, the literature surrounding this topic strongly suggests manoeuvring through the surfing community as a female surfer is a devalidating and condescending experience. Initially, the women who were interviewed in the study of Olive et al. (2015) did not seem to pay to much attention to the added support they received from the surfing community. However, as the interview continued, they came to realize it was quite patronizing and that it felt condescending, as if they were not considered "authentic as surfers" [Olive et al., 2015, P. 14]. Due to the fact that these women had to face extra barriers, they started to doubt their surfing abilities. A study done by Comley (2016) showed that most of the women who were interviewed had taken surfing lessons, while none of the men had taken this

route into the surfing community [Comley, 2016]. Though many women express an immense love for surfing [Spowart et al., 2010, Fendt and Wilson, 2012, Olive et al., 2015], many still feel ashamed for partaking in a leisure activity [Spowart et al., 2010, Fendt and Wilson, 2012]. Women also felt the pressure to perform well in surfing as they felt like they represented the complete female surfing community [Comley, 2016].

2.2.3 Lining up for change - How these female surfers push back

Female surfers have been fighting the constraints of the surfing culture in two main ways. To start, they made changes to their attitude towards the surfing community or demanded changes within the (professional) surfing community [Wheaton and Thorpe, 2018], used their disadvantages to their advantage [Schmitt and Bohuon, 2021]. Secondly, they found spaces in which they felt encouraged and genuinely supported.

Some women of the study done by Olive et al. (2015) reported to becoming more assertive in the line-up, making an effort to take up the space in the line-up they deserved [Olive et al., 2015]. Other women changed their attitude in a different way and stepped down to surf smaller, less impactful waves as their love for surfing was greater than their want to fight the barriers [Comley, 2016]. In the professional world of surfing, opportunities to create an equal gender dynamic are being explored [Wheaton and Thorpe, 2018]. Though the legitimacy of female surfers was questioned when determining the surfer who surfed the biggest wave of the year, these female surfers used this incident as a way to validate their achievements. Having a scientific backup of the impressive achievements does not allow the surfing community to question their skills and does not leave any room for discussion. These women surfed the biggest waves, and no one can say otherwise [Schmitt and Bohuon, 2021].

Women describe their community as one of the big factors that make them feel encouraged and supported [Olive et al., 2015] facing these challenges of the ocean and at the same time of the surfing community together gave many women a sense of empowerment as if they came at the problem with an army. These women felt supported and encouraged by each other, rather than the competitive nature of the existing surfing community [Comley, 2016]. Women are more likely to put their own leisure needs aside, making them less likely to partake in time-consuming adventure sports like surfing [Fendt and Wilson, 2012, Spowart et al., 2010]. A study done by Spowart et al. (2010) narrowed this down even more and showed that surfing as a group of moms allowed some of these mothers to surf, even though their partner may not be supportive of it. Having this group also encouraged these women to stay active in their surfing hobby [Spowart et al., 2010]. Surfing with a group of women provided a platform to get better at surfing and bond over the tidal changes of womanhood [Comley, 2016].

2.2.4 A changing tide

Female surfers face significant barriers when it comes to entering the surfing community. They are marginalized in professional surfing, and experience aggressive and sexist behaviour in the water, though this is not always in the way one might expect. Most of the time it is more subtle. It can be felt in the way female surfers are greeted with greater support and enthusiasm, but only because they are female. It is not always a blatant sexist comment, it's a little "harmless" push into a wave that lets these women know they are not considered authentic and worthy surfers. These behaviours within the surfing community make these women feel devaluated and make them question their surfing abilities. Contradicting standards in professional surfing prove it very difficult for female surfers to be fully accepted within the current surfing community. However, steps are being taken to fight these constraints. Women have changed their attitude towards the community or changed the attitude of the community towards them. These women also found empowerment in creating or joining women's surfing communities in which they do feel empowered. They found spaces in which their learning process is celebrated, rather than looked down upon. There is still a lot to be done to get to the point of equal gender dynamics in the world of surfing, both in personal dynamics and within the professional surfing community, though slowly, steps are being taken.

2.3 Related work

To get an insight into what technologies can be used to address the barriers faced by female surfers, we did a study of related work on this topic. The study looked closer into what surfing technologies were out there and how they could potentially be applied to this project. This way, the research can build upon existing findings while still creating something new and meaningful for the clients and the user. To structure the coming section, this research was divided into three sections, namely Women's Surfing Initiatives, Community Building Tools, and Surfing Technology. This research was partially started because of the successes of the Daughters of the Ocean events by ROXY. Given that these women's surfing events in the Netherlands are gaining popularity, there might be other women's surfing initiatives already set up around the world that could serve as inspiration for this research project. To build upon the current community tools available, a study on community-building tools was done. The answers to 'how do these tools help people connect' and 'how do they stay connected' will form the foundation for the tool this research project is creating. To implement the findings on women's surfing initiatives and community-building tools using interactive technology, a study on the current applications of surfing technologies was done. Considering their possibilities and limitations, an innovative and meaningful tool can be created.

2.3.1 Women’s surfing initiatives

There is a need for a space in which female surfers can feel safe and encouraged within the surfing community. This section will highlight several initiatives throughout the Netherlands and around the world to provide female surfers with a different community experience.

ROXY Daughters of the Ocean events

The surf brand ROXY ¹ is a lifestyle brand marketed towards the young female surfer. In their advertisement, one can see fierce and stylish women practising board sports like snowboarding, wave surfing and skateboarding. ROXY, together with Hart Beach Scheveningen have organized several women-only surf and skate events, under the name of Daughters of the Ocean. These events are organized every couple of months and, for now, are open to a limited number of attendees. One event they organized was a movie night where they watched a movie on an influential female surfer after a surfing workshop. Another event that they organized was a surf skating event where beginner skaters could their first taste of the surf skate, while more experienced skaters could ask questions about their technique while riding the skate bowl located next to Hart Beach Restaurant. From their experience, these events have been increasingly more popular amongst the female surfing community and they expect a significant growth in the number of attendees at their events. One of their selling points is the fact that the attendees’ skill level does not matter, everyone is welcome.



Figure 2.1: Daughters of the Ocean Surfskate event

Institute for Women Surfers

The Institute of Women Surfers (IWS) ² is an educational initiative that aims to connect female surfers, activists, artists, business owners, scientists, and educators. By doing this they aim to provide a platform for peer teaching, learning,

¹Surfing Lifestyle brand, <https://www.roxy.com/>

²<https://www.instituteforwomensurfers.org/>

and mutually beneficial projects. Through their initiatives, their ambition is to form a strong community of female surfers and people, businesses, or organizations who support inclusive and equal surfing spaces. Through their platform, they promote discussions on topics relevant to the female surfing community, as well as supporting academic and non-academic research. On their website, they provide many different types of educational resources. The Institute for Women Surfers does a lot to empower women through education, training, and clinics. Their intention is to do this by viewing as many projects as mutually beneficial opportunities. The IWS, for example, sponsors trainings where the participants contribute their own skills and expertise instead of paying an admission fee. During these trainings, the IWS aims to address overarching topics in the surfing community. Much of the work the IWS does is addressing gender equality in surfing. This gender equality can present itself in commercial ways, as well as cultural and interpersonal ways.



Figure 2.2: IWS

Aotearoa Women’s Surfing Association (AWSA)

The Aotearoa Women’s Surfing Association (AWSA) ³ is a non-profit organization overseeing women’s surf in New Zealand since 1977. The AWSA was brought to life because there was “a need for advocacy in the sport of surfing” [Thomas, nd] The co-president of AWSA, Daisy Thomas, speaks passionately about the advancements the female surfing community has gone through since then, fostering an encouraging and collaborative community. They aim to “represent and *tautoko* (support) the interests of *wāhine* (women) and *kōtiro* (girl) surfers in Aotearoa as a collective” [Thomas, nd]. They strive to create equality in the line-up, and create an inviting and safe space for female surf enthusiasts to develop and express their love for surfing.

³<https://www.aotearoawomenssurfingassociation.org/>



Figure 2.3: New Zealand Women's Surfing Association (NZWSA) Logo from 1977 by Ross Guy [Guy, 1977]

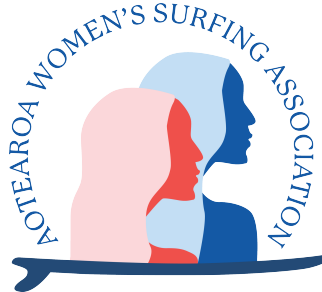


Figure 2.4: AWSA Logo

Other women's surf initiatives

Every Thursday night, a group of motivated female surfers comes together for the Surfblend Ladies Surf Night⁴ on the Kijkduin Beach. Similarly, every three months an All Girls Surf session is organized by Surfgirls NL⁵. Every time they pick a different spot between Den Helder and Domburg to surf at. They stay connected through WhatsApp groupchats, all with different functions. Both of these initiatives express that the events are encouraging and accessible for all different surf levels.

All around the world, women's surfing initiatives have been set up to empower women in the surf. Communities like Brown Girl Surf in California [BrownGirlSurf, 2023] even take it to another level and also teach people about the struggles women of colour face in the water. SwellWomen [SwellWomen, 2023] organizes women's surfing retreats to destinations around the world.

Conclusion

Women have been seeking places where they feel welcomed and encouraged all over the world. The Daughters of the Ocean events saw a great turnout when they started organizing their women-only events in Scheveningen. For years organizations around the world have been striving to create more equality in the line-up and will continue to do so for years to come. It has become apparent that women have and will keep on gravitating towards each other and seeking out the support of fellow female surfers to form a front against the barriers they face in and around the water.

2.3.2 Community building tools

Though this project is on surfing communities specifically, it is beneficial to take a look at other, more generalized community-building methods and pre-existing

⁴<https://www.surfblendsurfschool.com/surfles/ladiesnight/>

⁵<https://www.surfgirls.nl/all-girls-surfsessies>

systems out there.

Strava

Strava⁶ is a social fitness platform that allows users to keep track of their physical activity and share their achievements with fellow Strava users [Couture, 2020]. Initially designed for cyclists and runners, the online platform has grown substantially over the years to a multifaceted social platform, reaching one billion uploaded activities in the app in 2017 and millions of accounts [Couture, 2020] Using GPS data from the user's smartphone, physical activity is recorded and stored in the Strava App. Strava has options for recording kite surfing sessions, windsurfing sessions, and snowboarding sessions.

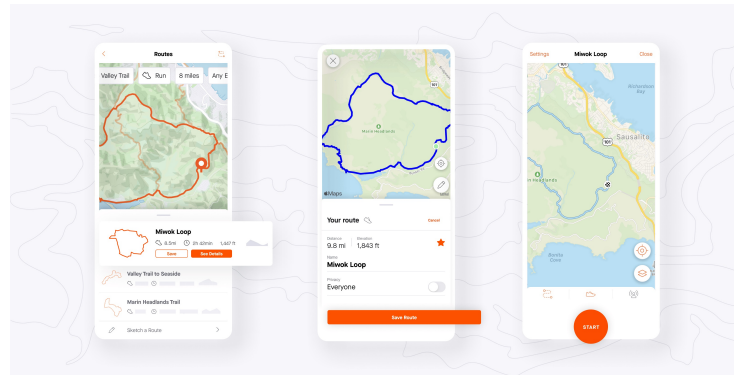


Figure 2.5: Strava

Strava makes use of *kudos* to motivate their users. Kudos can be given to fellow Strava users when they share their physical activity on the app, similar to a 'thumbs up' in real life. This kind of recognition of the user's physical activity has a positive influence on the running behaviour of the research done by Franken, Bekhuis and Tolsma. [Franken et al., 2023]

Zwift

Zwift⁷ is an indoor cycling system that uses gamification to motivate people to exercise. The user can hold indoor cycling training. Zwift also offers a feature in which people can cycle together through competitions within the game.

Conclusion

A similar system of encouragement can be applied when designing a tool for female surfers. If positive recognition of physical activity can have a positive

⁶<https://www.strava.com/>

⁷<https://eu.zwift.com/>

impact on runners [Franken et al., 2023], it could also have a positive effect on surfers.

2.3.3 Surfing technology

Within the domain of adventure sports technology, and even surfing sports technology, there are already several products, concepts and prototypes out there with the aim to enhance the surfing experience. Some are still in the early stages of prototyping and are merely a concept, ready to be created, whereas other products are ready for the user to enjoy. Though there are systems on the market that are designed specifically for the purpose of tracking surfing behaviour, surfers do not have to be limited to just these systems for one specific purpose. The Apple Watch^{8,9} is a widely used wearable technology used by many surfers. Combined with applications like Dawn Patrol¹⁰ or Surfline Sessions¹¹, the Apple Watch becomes a powerful tool for surfers when tracking their surf statistics. The user can get an insight into various different aspects of their surf. It tracks the amount of waves they have caught and notifies the user when the next set of waves is coming so the user can get into the right position. After their surfing session, the user can share the successes of their surfing session with their friends through the app. Dawn Patrol and Surfline Sessions are freemium apps for Apple Watch users. Surfline Sessions is also compatible with Rip Curl¹² and Garmin¹³ watches. Both of these apps offer the user insight into their surfing data which they can later share with their friends. Both apps also work together with Surfline cameras¹⁴ so surfers can find the waves they rode on one of the Surfline cameras. One of the advantages of using the Apple Watch is that it is more than just wearable surf technology. Users might already own an Apple Watch and do not always have to add something to their surfing equipment.

⁸Apple Inc. is an American multinational technology company. [https://en.wikipedia.org/wiki/Apple-Inc./](https://en.wikipedia.org/wiki/Apple-Inc/)

⁹The Apple Watch is their smartwatch product. <https://www.apple.com/watch/>

¹⁰<https://www.dawnpatrol.cloud/>

¹¹<https://www.surflines.com/lp/sessions>

¹²<https://www.ripcurl.com/>

¹³<https://www.garmin.com/>

¹⁴Surflines has set up cameras on certain beaches for their users to monitor the surfing conditions before surfing and watching themselves back on video after surfing. <https://www.surflines.com/surf-cams>



Figure 2.6: Garmin Watch. Image by Kelly, Pexels



Figure 2.7: Apple Watch. Image by Pixabay, Pexels

Nixon Ultratide

Nixon¹⁵ is a premium lifestyle brand selling watches and other accessories. Nixon's Ultratide¹⁶ watch powered by Surfline is a surf watch that provides the user with real-time data on the conditions of their surf. The Ultratide provides information on "tide, time, wave height, swell direction, wind direction and speed, water and air temperatures" [Nixon, 2020] directly to the smartwatch. The watch can then be connected to the Nixon Ultratide app (iOS only) after which the user can share their surf session with their friends.

¹⁵<https://www.nixon.com/>

¹⁶<https://www.nixon.com/blogs/stories/ultratide>



Figure 2.8: Nixon Ultratide

Glassy wearable

Glassy¹⁷ is still in the developmental stages of the design process and is not yet available to the end user. Like the Nixon Ultratide and the Apple Watch, Glassy is a piece of wearable technology around the user their wrist. Together with the GlassyApp, it gives the user insight into their surfing statistics. It also notifies the user when the surfing conditions are good and when the next set of waves is coming.

¹⁷<https://glassy.pro/>



Figure 2.9: Glassy Sketches

Trace stick-on sensor

A product that is available to users through a Kickstarter campaign is TRACE¹⁸, an activity monitor for skateboarding, surfing and snowboarding. What sets this product apart is that, contrary to the aforementioned products, this is not a wearable technology. TRACE is a sensor-filled disc that can be mounted on various surfaces like a skateboard or a surfboard. It then collects data the user can later access. This data can then be shared with friends through an app on the user their phone.

¹⁸<https://www.kickstarter.com/projects/activereplay/trace-the-most-advanced-activity-monitor-for-actio/faqs>



Figure 2.10: Trace

Conclusion

Though smartwatches monitoring health aspects and physical parameters are widely available, not much technology is available serving any other purpose than tracking statistics. Many of the surfing technologies that are described above incorporate a wearable device that connects to an app. A feature that is also often found in these systems is the ability to share aspects of the system, like time spent in the water, or the amount of waves caught, with friends through an app. Current technology made it possible to create technological applications that can withstand the power of the ocean, namely exposure to water, cold temperatures and strong impact. This brings many opportunities to design a tool that can survive the unforgiving ocean. Looking at the fact that there are several tools already on the market that encourage the user to wear a piece of technology on their body, indicates that there is an opportunity to create similar products with different functions, like a tool that strengthens the surfing community.

2.4 Conclusion

By taking a look at the relevant research available and reviewing related work on surfing communities, community-building platforms, and surfing technologies, insight is given into the current state of the surfing community. Within the surfing community, there is a need for female connection and a more encouraging environment. Through the use of digital community-building tools, communities can be formed, improved and strengthened. When designing the tool, the effects of social encouragement through digital means should be considered and seen as a powerful tool to strengthen a community. To apply these methods of digital

social encouragement, various technologies can be applied. So far, most wearable technologies have been smartwatches or external sensors that allow the user to track their physical health, geospatial, and trajectory data. This allows for the exploration of different applications of wearable technology in surfing.

Chapter 3

Methods and techniques

In the following chapter, all steps that lead to to completion of the research project are discussed. In the section on the Design process, and the related section of the design phases, the Design Process for Creative Technology will be discussed and how it will be implemented in this graduation project. The sub-sections will give an insight into different design methods and techniques that were used during the design process, like identifying the stakeholders, formulating requirements and using the MoSCoW method. In the last section, the evaluation process will be discussed.

3.1 Design process

The aim of this project was to create a tool that would help female wave surfers in Scheveningen to connect with fellow female surfers and stimulate an encouraging environment. To achieve this, a tool was designed with the use of existing technology. The design process for this project, on the one hand, needs to give an insight into the human aspects of community building, and the interactions within the surfing community. The design needed to address a need of the user and therefore required a user-centered design approach. On the other hand, to create a technological prototype of a tool, this project also requires traditional engineering design principles.

The Design Process for Creative Technology [Mader and Eggink, 2014] is designed for design processes that “make use of existing technology in novel combinations –in contrast to developing new technology”. [Mader and Eggink, 2014, p. 1] Therefore, in this research project, the Design process for Creative Technology by Angelika Mader and Wouter Eggink was used. [Mader and Eggink, 2014]

The Design Process for Creative Technology is a design approach that is suitable for processes that require both “user centred design approaches” [Mader and Eggink, 2014, p. 1] and “classical” engineering design principles”. [Mader and Eggink, 2014, p. 1]

Designing focused on humans and their interactions with a product comes with many factors that have to be considered. These factors often do not present themselves all at the same time. They are discovered or created throughout the process, making the process non-linear. Throughout the design process of the tool, new insights and findings have to be implemented and iteration is crucial. The Design Process for Creative Technology is based on the idea of spiral models. Through iteration, the designer will move from one design phase to the other, and back. The Design Process for Creative Technology is based on four phases: the Ideation phase, the Specification Phase, the Realization Phase, and the Evaluation Phase [Mader and Eggink, 2014]. The project moves through all said stages and in every new phase, the project builds upon the previous phases and can circle back to any of these phases if new insights are presented. This therefore allowed this project to use findings from for example the (expert) interviews with surfers during brainstorming sessions, evaluate designs, and go back to the drawing board when more information has presented itself throughout the process.

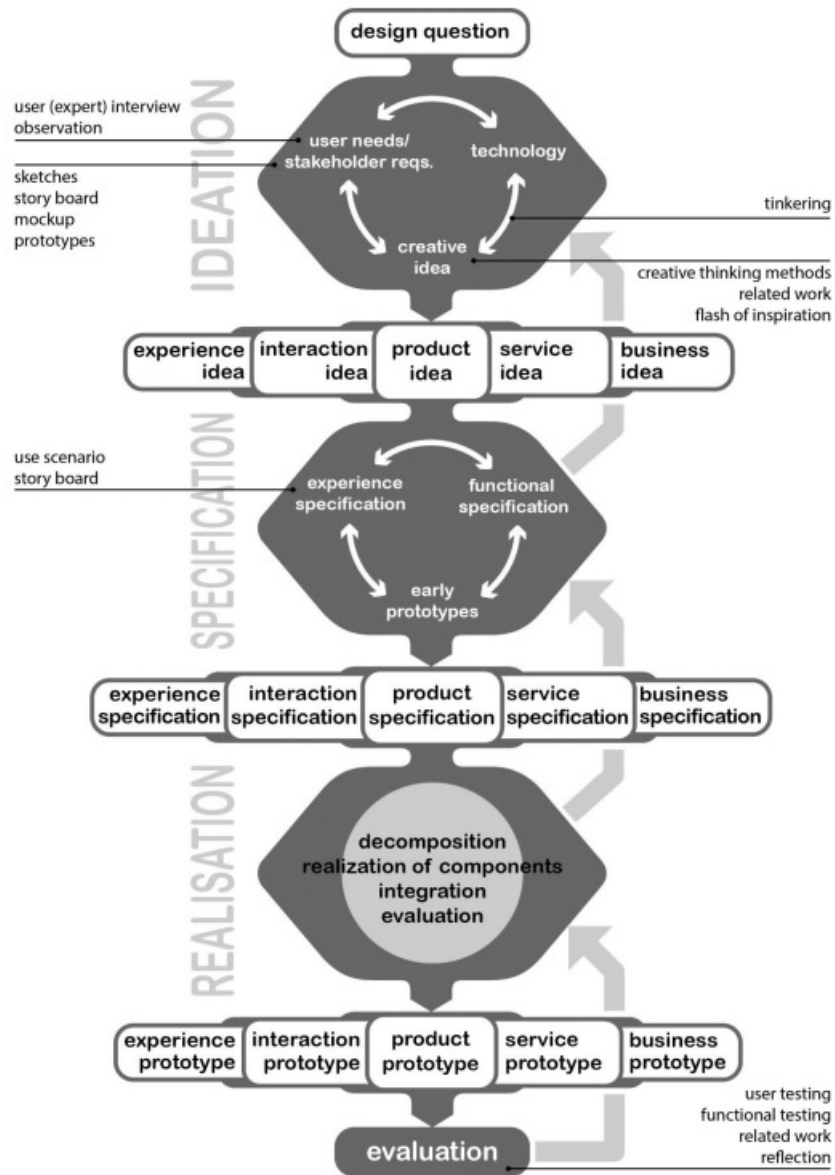


Figure 3.1: A Creative Technology Design Process

3.2 Ideation phase

The Design Process for Creative Technology starts with the ideation phase. Where the Design Process for Creative Technology could start with tinkering, a “process that starts with technology” [Mader and Eggink, 2014, p. 4] to use technology as the initial source of inspiration for the design process. It takes a technology and starts iterating from there. However, this project started with creating a clear overview of the current surfing community.

In collaboration with the clients, observations on the current surfing community were made. These observations contributed to creating the problem statement. From this problem statement, user needs and design requirements can be deducted.

To visualize the current stage of the project, a mood board was created. The goal of the mood board was to visually show the space in which the project is located. Mood boards are a suitable way to visualize the values of the project and convey the desired tone of the project.

To get all creative ideas onto paper, a brainstorming session was held. By creating a mind map of all possible solutions or aspects of a solution a visual representation of the current state of the project was created. All ideas, feasible or not, were put into writing, accompanied by simple sketches.

To quickly get a feel for the ergonomics and functionality of the ideas, rapid prototypes were created. This way, ideas that do not fit the project, are easily discarded, and fitting ideas can easily be identified and iterated upon.

3.3 Specification phase

The Specification Phase aims to gain an understanding of “what” the project needs. In the Specification Phase, the project builds upon the previous phase, namely the Ideation Phase, and can circle back to this phase if new insights are presented during the Specification Phase.

Stakeholder identification

Many people are affected by the product that was designed, not only the target audience of female surfers. To make sure everyone that will be affected by the design, a stakeholder analysis was conducted. Conducting stakeholder analysis will give the project an insight into all the needs and wants of all the involved stakeholders.

Requirements

To identify the design requirements for this project, the MoSCoW Method was used. This method categorizes the design requirements into 4 categories, namely:

Requirements labelled *Must have* are the minimum design requirements

Requirements labelled *Should have* are the design requirements that are important but not crucial

Requirements labelled *Could have* are design requirements that are valued in the design, but not as important

Requirements labelled *Won't have* are requirements outside of the scope of the project

3.4 Realization phase

In this phase, the project builds upon the previous phases, namely the Ideation Phase and the Specification Phase, and can circle back to either of these phases if new insights are presented during the Realization Phase.

During this phase, a physical product is created. Through iteration and periodical user testing, the product will start to take its shape. Building the prototype will consist of several proof-of-concept prototypes, aiming to test out all different components before implementing them together into a final prototype. This is done to explore different types of electronics to determine which elements are most suited for the application of the bracelet. In this process, the electronics are tested and judged based on the requirements that were set. The materials used in this stage will be purchased through online retailers or the STORES store on the campus of the University of Twente. During the process of taking the concept of the bracelet to a realized physical version, the clients will be consulted and their input will be considered. At the end of this Realization Phase, a fully functional prototype is created for the identified problem and addresses the identified requirements.

3.5 Evaluation phase

The Evaluation phase builds upon the previous phases, namely the Ideation Phase, the Specification Phase, and the Realisation Phase. When new design insights are uncovered, the design process can circle back to any of these phases. In this phase, the functional prototype will be tested. The prototype will be tested on how well it aligns with the requirements and to answer the research questions.

If the prototype reaches a water-tight state by the time of user testing, the user tests will be held in the water. If the prototype does not reach a water-tight state by the time of user testing, the tests will be held on land.

When seeking out the participants, there were no specific inclusion or exclusion criteria for the ages of the participants. The participants all had to speak Dutch or English to participate in the interviews.

3.5.1 User Evaluation Interview Questions

The following questions were asked following the user evaluation test.

- How intuitive did you find the tool's design?
- Can you describe our experience using the tool to communicate with the other participant?

General experience

- Walk me through the experience of using the tool during this user test.
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?
- What factors contributed to this?
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?
- What factors contributed to this?

Receiving feedback

- Tell me about your experience receiving feedback.
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel seen by the other participant?
- What factors contributed to this?
- How did the aspect of being seen make you feel?
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel encouraged by the other participant?
- What factors contributed to this?
- How did the aspect of encouragement make you feel?
- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extend did the received feedback affect your performed tasks?
- What aspects contributed to this?

Giving feedback

- Tell me about your experience giving feedback.
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you notice the other participant?
- What factors contributed to this?
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel like you encouraged the other participant?

- What factors contributed to this?
- How did the aspect of encouraging make you feel?
- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extend did giving feedback affect your performed tasks?
- What aspects contributed to this?
- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel connected to the other participant by giving them feedback?

Quantity

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?
- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

Chapter 4

Ideation

This chapter of this report will discuss all the steps that were taken and the considerations that were made during the Ideation phase. This project started off with a mind map brainstorming session. From there, sketches were made to visualize the concepts. To gain a perspective on how the tool should feel, and what it should represent, a mood board was created. From the findings of the mind map, brainstorming, sketches, and mood board, several lo-fi prototypes were created.

4.1 Design considerations

4.1.1 Design directions

During this ideation process, the problem was considered from three different perspectives. The solutions that were thought of can be classified into three main categories, namely, interactions before a surfing event, interactions during a surfing event, and interactions after a surfing event. During these three events, an opportunity for an intervention presents itself. With this intervention, the behaviour of the user can be impacted so that the sense of community within female surfers is strengthened.

Interaction before surfing session

The first stage of the surfing process that has the potential for an intervention is the time before a surfing session. If the user wants to go surfing, there are several steps they will go through before they catch their first wave. It all starts from the moment the user has the initial thought of surfing. They start to feel like they want to surf and from that moment on, they start planning their surf session. They decide when they want to surf, and also not unimportant, where. Will it be today, within the next couple of days, and what beach will they go to to catch the best waves are all questions the surfer will have to think about. Deciding when and where to surf often is influenced by the quality of the waves.

Wave predictions are a good indicator of how tall the waves are going to be, what their period is (time in between each wave), and how strong and in what direction the wind will blow. All of these factors are considered by the average surfer before making a decision on whether or not they will take their board for a spin. In addition to deciding when and where to surf, the user will have to decide whether they want to go surfing alone, or with fellow surfers. Some surfers have friends who also surf making going surfing together more accessible. However, not every user will have friends who also surf, and as surfing can be a time-consuming and physically intensive hobby, not every friend will have the time or energy to go surfing. This section of the decision-making process is particularly interesting for this research project and potentially allows for many design opportunities that impact the female surfing community.

Interaction during surfing session

As soon as the user sets foot into the water and paddles out to catch their first wave, the next opportunities for interventions starts. From now on the user will have the opportunity to interact with the other people in the water. This is also the moment the user feels the effects of the surfing community. Positive interactions with fellow surfers, especially fellow female surfers, are very important as they will add to the overall experience of surfing for the user. Surfing can be quite a lonely sport as the surf spot is often quite spacious and most of the time, only one person rides the wave at the same time. It can be difficult to communicate encouragement over the rushing waves. Whenever the user accomplishes something, there is cause for celebration. The large and powerful nature of the ocean makes it difficult to share the successes of the user with others because of communication issues.

Interaction after surfing session

As the user has caught the waves they wanted to catch, it is time to get back to the beach. Because every surfer starts and ends on the beach (let's just hope so) this is a great opportunity for an intervention that brings female surfers together. As the user packs up their gear and walks along the beach as they head back home there could be a type of interaction that pulls them in and strengthens the female surfing community. The user might want to talk to someone about how good their surfing session went, or maybe just complain about how little waves they were able to catch today. This also poses an opportunity for an intervention. Sharing one's experiences is a very important part of the surfing experience and is often overlooked.

4.1.2 Communication

Communication stands at the base of what is considered a community. Without any form of communication, a community will cease to exist, or not even form at all. The people within the community need to feel each others presence in

order to feel connected to one another. Whether this verbally talking about their experiences, being able to see what everyone is up to, or communicating heptically through touch. What is really needed in the female surfing community is a way of communication, whether that is before a surfing session, in the water, or after the user is done surfing and processing their day.

4.1.3 Feedback modalities

To explore the different ways in which the user could communicate within the surfing community, during the Ideation phase, different forms of communication, or feedback were considered.

Haptic feedback

Haptic feedback uses the sense of touch to communicate. Through vibrotactile feedback, thermal feedback, force feedback, or electrotactile feedback a message could be relayed to the user. Haptic feedback can be a powerful medium of interaction. Touch has a very social quality and is often associated with intimacy. [MacLean, 2000]. When a socially distant situation is presented, like the the lack of feeling connected in the wide ocean, haptic feedback could offer “social context” [MacLean, 2000, p. 785].

Auditory feedback

One way the communication barrier could be improved is if the way surfers communicated verbally is improved. One of the problems is that the surfers sometimes are spaced out on the water quite far apart from each other, making it hard to audibly interact. If this form of communication were to be improved, this would have an impact on how the community would be perceived.

Visual feedback

Visual feedback is used often in product design. It is straightforward and allows for very versatile design opportunities. Visual design is all around us, and all physical products are affected by it. Suitable visual design can enhance the user experience and engagement of the user. Visual feedback in a design is not always necessary, however, for this design project, it could be suitable.

4.2 Persona Profiles

Not every woman experiences the surfing community the same. Some are experienced surfers with an already established group of friends who may or may not surf, too. Some may have some experience surfing overseas and want to pick up the habit of surfing closer to home. Some may have never set foot in the sea and want to try their luck at surfing their first wave. Because there are so many different users who might approach the tool in a different way, it was

important to get a clear picture of what they may look like. To get a better sense of their motivation behind wanting to use the tool, persona profiles were created. When making the persona profiles a range of different qualities, like age, surfing ability, and prior experiences were identified and mixed to create unique characters. By looking at their needs, wants and motivation behind wanting to use the tool, the design of the tool can accommodate many different users. Within the persona profiles, the following parameters were explored: i) Age, ii) Location, iii) Professions, iv) Surf level, v) Experience with the surfing community, vi) Introverted/extroverted

4.3 Ideation Methods

Different types of methods were used in the ideation process. The outcomes of these exercises and methods are discussed in the following section.

4.3.1 Mood-boarding

To visualize the current stage of the project, a mood board was created. The goal of the mood board was to visually show the space in which the project is located. Mood boards are a suitable way to visualize the values of the project and convey the desired tone of the project. As with the mind map, creating a mood board helped visualize the design space and condensed large concepts into a structured visualization. Creating the mood board also acts as a reminder of what the core aim of the project is about.



Figure 4.1: Mood board

4.3.2 Mind map

To visualize all the different ideas and concepts that arose during the Background Research phase, a mind map was made. The concept and design space for this project was quite broad, and the clients had a very open mind as to what they envisioned for the prototype. Therefore, a mind map was a suitable tool to quickly organize the complexity and largeness of the project and categorize different sections of the project. By doing this, three main directions of the design process were formulated. In designing the tool, the project could focus on designing a tool that can be used before a surfing session, for example at the user their house. The tool could also be designed for use during a surf session, for example, as a wearable the user can wear in the water. The tool could also be designed for use after a surf session to, for example, log a surf session afterward in collaboration with other users. More on this in a later chapter. The mind map resulted in several ideas and concepts for the prototype and helped the project formulate that the tool could be designed for use before surfing, during surfing, or after surfing.

4.3.3 Sketches

To give the ideas and concepts formulated in the mind-mapping process some shape, simple sketches on paper were made. Because the ideas and concepts did not have a definitive shape or form, yet, sketching them out, allowed for quick iterations of physical shapes, placements on the body, simple use cases, and simple user interaction visualization. Within this process, the three design directions were considered and most sketches fall within any of the three categories.

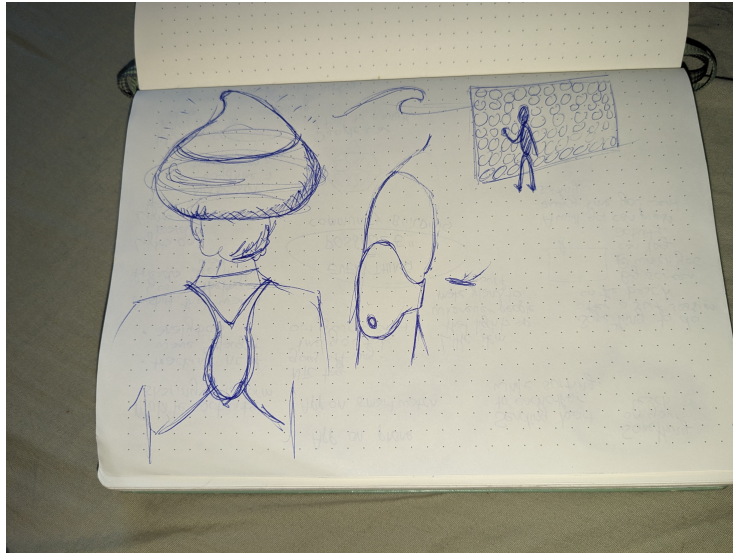


Figure 4.2: Ideation Sketches 1



Figure 4.3: Ideation Sketches

4.3.4 Tinkering

To explore the options of wearable technologies on the body, quick prototypes were made out of a sturdy leather-like material. By making these quick iterations of designs, ideas that were less suitable could quickly be discarded, while

the opportunities for better options could be explored. Creating these physical prototypes also allowed for early and quick user testing. Placement, ergonomics and size could easily be evaluated.

Tinkering with fabric



Figure 4.4: On-upper-arm wearable



Figure 4.5: On-arm wearable

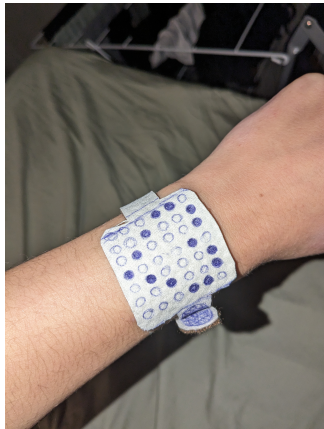


Figure 4.6: On-arm wearable



Figure 4.7: On-arm wearable



Figure 4.8: On-arm wearable



Figure 4.9: On-arm wearable



Figure 4.10: On-arm wearable



Figure 4.11: On-arm wearable



Figure 4.12: On-arm wearable



Figure 4.13: On-arm wearable



Figure 4.14: On-arm wearable



Figure 4.15: On-arm wearable



Figure 4.16: On-arm wearable

The wearable in figure 4.4 can be worn on the upper-arm of the user, eliminating the opportunity for visual feedback. However, it is a suitable placement for not interrupting the surfing movement. The wearable in figure 4.5 2 can be worn on the lower arm and would have some sort of visual feedback on the side. It could be worn by both left and right-footed people. The third wearable, which can be seen in figure 4.6 and figure 4.7 can be worn on the wrist and resembles the Apple Watch the most. A grid of LED circles would form the base for visual communication. In this case, a heart was formed by turning LED on and off. A velcro closure was imitated to allow for all kinds of wrist sizes. The following wearable that can be seen in figures 4.8, 4.9, 4.10 is similar to the previous wearable. A large button that is easy to press on the side allows the user to communicate with fellow female surfers. The LEDs on the other side can light up to allow for a form of visual communication. Because the hand and wrist are used quite extensively during surfing, later testing would have to look out for limiting movements in this area so these can be avoided. The wearable that is shown in figures 4.11, 4.12, 4.13 is a wrist-guard type of wearable with a large surface area for visual communication. However, the need to bend the wrist during surfing, makes this prototype harder to realize. The wearable that is shown in figures 4.14, 4.15, 4.16 explores the use of a neoprene glove and integrated technology. Either a form of visual communication is placed on or under the glove.

4.4 Design Decisions

4.4.1 During Surfing

Previously, multiple design directions were discussed and considered. To ensure all opportunities for a behavior change intervention were explored in previous phases of this project these design directions gave structure to the created ideas. To narrow down the scope of the project and work towards a more precise concept, one of the design directions was chosen to continue the project with.

The moment when the most impact can be created on the community is before or during a surfing session. Before a surfing session, the user can still be influenced by the tool to change their behaviour and there are still opportunities to promote surfing together. During a surf session, though the tool does not have much influence on who is in the water, it can be an opportunity to promote a safe and uplifting environment for the women who are in the water.

Though there were several behaviour change interventions that could have an effect on the sense of community among female surfers, all options did not fully fit within the scope of this project. Because the interventions were only presented to the user after a surfing session, they were expected to not have the biggest impact on how the users perceived the community.

To improve the sense of community in the water and move away from the undesirable conditions of the current surfing community, this project will from now on focus on design opportunities in the water during a surfing session.

Though it would also be beneficial to create a tool that can be used prior to a surfing session, a tool that can be used during a surfing session was favoured. This is because it allows for immediate communication between the users and hopefully fosters a more fitting surfing environment for women.

4.4.2 On Body - On Arm

The decision was made to not place the tool on the user their surfboard. It is hard to incorporate a meaningful design into a surfboard. Surfboards are quite fragile already so adding more "moving parts" might not be the way to go.

The decision was made to not place the tool on the user their leach. the ankle is not very sensitive so haptic feedback may not be very effective. Audible and visual feedback may also not provide the most desirable effects. Leaches break often so it might not be the most reliable to put extra tech on it. Apart from the board, and the leach there are not many places on which one can put technology. Incorporating technology into the design of the tool is most suitable when it is situated somewhere on the body of the user. The decision was made to place the tool on the user's body, specifically on the lower arm of the user. The forearm does not bend while surfing, nor does it take large impacts, making it a suitable placement for the bracelet.

4.4.3 Haptic and Visual Communication in Water

When the decision to put the design onto the body of the user was made, the different options for feedback were considered.

The first iteration of a a prototype incorporating electronics consisted of 2 nRF24101, 2.4 GHz transceiver and two Arduino Nanos with ATmega328P microcontrollers. They were programmed to send and receive messages to and from the other transceiver. Two LEDs, one connected to each Arduino Nano indicated a received message upon lighting up.

Chapter 5

Specification

The specification phase is a crucial phase of the design process and provides the conceptual base for the later phases. The goal of the Specification Phase was to use the preliminary requirements and carry them over to this next phase to form well-defined requirements. In addition, precise specifications for the tool were created. Understanding the needs of the women who will use the product and translating these needs into meaningful designs is essential when creating a tool with a long-lasting impact. Constructing these requirements and specifications was done in close collaboration with the clients and stakeholders. In this phase, the connection between conceptual ideas and physical solutions is made. It forms the base for a product that not only physically functions as designed, but also fulfils the users' needs and wants.

5.1 Stakeholder identification

Many people will be affected by the tool that is designed in this project. To identify everyone who will be affected by the design, a stakeholder analysis was conducted. Conducting stakeholder analysis will give the project an insight into all the needs and wants of the involved stakeholders.

The following list contains all the stakeholders that could be identified at this moment. However, everyone who might experience the slightest effect from the designed product can be identified at this point. Eight different categories of stakeholders were identified namely: i) Hart Beach owners, ii) female surfers, iii) male surfers, iv) manufacturers, v) suppliers, vi) designer of tool, vii) distributor, and viii) the general surfing community.

5.2 Requirements

In order to answer the previously set research question, the prototype of the tool needs to fulfil several requirements. By understanding what these requirements

are, the project is guided towards an impactful design. To categorize the requirements, the MoSCoW method was used. Each requirement is accompanied by a description of its significance.

5.2.1 MoSCoW method

Must have

Requirements labelled *Must have* are the minimum design requirements

- Wearable on the user's forearm
The device should function optimally when worn on the user's forearm. The forearm is suspected to be an intuitive placement as it does not obstruct the vision of the user, though it can be visible if the user wants to view it.
- Allow for a form of visual communication with at least one other surfer
When the device is worn, the users must be able to communicate with at least one other user. The form of communication that is chosen in this project is visual communication.

Should have

Requirements labelled *Should have* are the design requirements that are important but not crucial

- Promote a sense of togetherness
The tool should increase the sense of connectedness and togetherness within the users who wear the prototype.
- Setup within a minute
Going from standing on the beach to paddling out to catch a first wave oftentimes does not take a surfer a long time. If they are unlucky they still have to screw in their fins, wax their board or attach their leash. However, if they took 5 minutes to do these things back home, they just had to jump into their wetsuit, wrap their velcro leash strap around their ankle and hit the water. Wave surfing does not take much time to set up. Therefore it is important to not add unnecessary bulk to this schedule to set up the tool.
- Intuitive user interface
Surfing requires a lot of focus. Someone needs to hold their balance, interpret the wave correctly so the energy of the waves propels them forward, while at the same time being aware of their surroundings. The interface should primarily add to the experience, not take away the surfer their focus. Presumably, there is only a short window of time in which the user

can interact with the tool, for example when taking a short break or in-between paddling out, making it crucial that the interaction can be finished within a couple of seconds.

- Not hinder the movements of the arm while surfing

Wave surfing comes with a set of movements and manoeuvres unique to the sport. Wearing the bracelet should not hinder the surfer who is wearing it to an uncomfortable extent.

- Water-proof

Because the bracelet will be worn in a naturally watery setting, the bracelet should be waterproof.

- Communication range of at least 50 meters

In the water, the surfers can be quite far apart from each other and the wristband would offer the users an added line of communication. For this prototype, the bracelet should have a minimum line of sight communication range of 50 meters.

Could have

Requirements labelled *Could have* are design requirements that are valued in the design, but not as important to the functioning of the prototype

- Aesthetically pleasing to the user To appeal to the target audience, the aesthetic of the wristband should be sufficient.

Won't have

Requirements labelled *Won't have* are requirements outside of the scope of the project

- Sustainable materials
- Ocean Safe

Chapter 6

Realisation

To translate the ideas that were created into a physical prototype, the realization stages come into play. In this stage, the necessary electrical components are tested and implemented to form a functioning prototype.

6.1 Creating the prototype

In the realization stage, many different design decisions were challenged and made. The results of these considerations are discussed in the following section.

6.1.1 Electrical elements of the prototype

Due to different order placements of the Arduino Nanos, slightly different arduino's were used for each bracelet. One of the arduino's therefor had a processor that used an ATmega328P (Old Bootloader) bootloader while the other Arduino Nano had a processor that used an ATmega168 bootloader.

During the realization process, several proof-of-concept iterations were made to test various aspects of the prototype on their own and in conjunction with other elements of the prototype. The process started with serial communication using the NRF24L01 modules.

Different sources reported different ranges of communication regarding the NRF24L01 module. A tutorial of How to Mechatronics on the NRF24L01 reports a range of circa 100 meter (in open space) [Dejan, 2022b]. The webshop where the module was bought, however, reports a line of sight communication range of 750 meter [electronics, b]. Both of these values would suffice for the prototype of the wristband. There was no information reported on how the module would behave in a situation where the module in used inside of a material, which would be necessary in a waterproof casing. Even if the prototype does not reach a waterproof state, the prototype would most likely obstruct the line of sight communication of the module slightly due to surrounding materials and potential body parts blocking the module. When the prototype was build,

Line of sight communication range	Obstructed communication range
50 meter	5 meter

Table 6.1: NRF24L01 Module Communication Range

the line of sight communication range was tested using the NRF24L01 module, as well as the obstructed communication range. This was done by connecting each module to a laptop computer and using code that allowed written communication to be sent from one module to the other. By slowly moving the computers away from each other, the communication range was tested. In the line of sight test, there were no objects in the direct line of sight of the two modules. During the obstructed test, the module was covered by two thick layers of fabric. The test was conducted by connecting each module to a laptop computer and using code that allowed written communication to be sent from one module to the other. By slowly moving the computers away from each other, the communication range was tested. This test was done in the DesignLab. The results are shown in the table below.

The line of sight communication range of the NRF24L01 module, namely 50 meters, would be suitable for the prototype. After 50 meters, the communication became slightly more unreliable, meaning not all messages that were sent reached the receiving module. The obstructed communication range of the NRF24L01 module, however, does not suffice for the prototype. The two computers could not be moved away from each other more than 5 meters before the communication started to become unreliable, meaning not all messages that were sent reached the receiving module when the modules were 5 meters apart or more.

Because the NRF24L01 module did not offer a sufficient communication range for this prototype, the HC-12 module was implemented and tested. Regarding the HC-12 module, different sources report different ranges of communication. A tutorial of How to Mechatronics on the HC-12 module reports a range of up to 1.8 km [Dejan, 2022a]. This article, however, does not mention whether this is regarding line of sight communication or obstructed communication. The webshop where the module was bought, however, reports a line of sight communication range of 1000m [electronics, a]. Both of these values would suffice for the prototype of the wristband. As goes for the NRF24L01 module, it is important to check these values first-hand. First, the line of sight communication range was tested. Second, the obstructed communication range was tested using two layers of thick fabric to obstruct the HC-12 module. These two test can however, not be compared with each other exactly. Both the NRF24L01 test and the HC-12 test were conducted in the DesignLab, however, the DesignLab did not have an open space big enough to test the line of sight communication range. When the limit of the space in the DesignLab was reached, of 100 meter, the test continued into a hallway, obstructing the modules with walls and various objects. This part of the test will be called the unobstructed test. The

Line of sight communication range	Unobstructed communication range	Obstructed communication range
100 meter	300 meter	100 meter

Table 6.2: HC-12 Module Communication Range

test which obstructed the module with two layers of fabric will be referred to as the obstructed test. This test also continued into the hallway, obstructing the modules with walls and various objects.

Though these tests did not test the full capabilities of this module, the results were significant enough for the sake of the prototype. The Line of Sight test, the Unobstructed, and the Obstructed test all scored higher than 50 meters making the HC-12 module a good option for the prototype. Even though in two of the three tests, the modules were obstructed by fabric, walls or other objects, they performed well enough to comply with the requirements of the prototype.

After the communication module HC-12 was chosen to continue building the wristband prototype, the next proof-of-concept iteration was built. A simple button and a single LED were added to the circuit of the prototype. Code was written so that a button press on the sending Arduino Nano, would turn on the LED on the receiving Arduino Nano, and vice versa. The two circuits were now programmed to perform two-way communication through the HC-12 module.

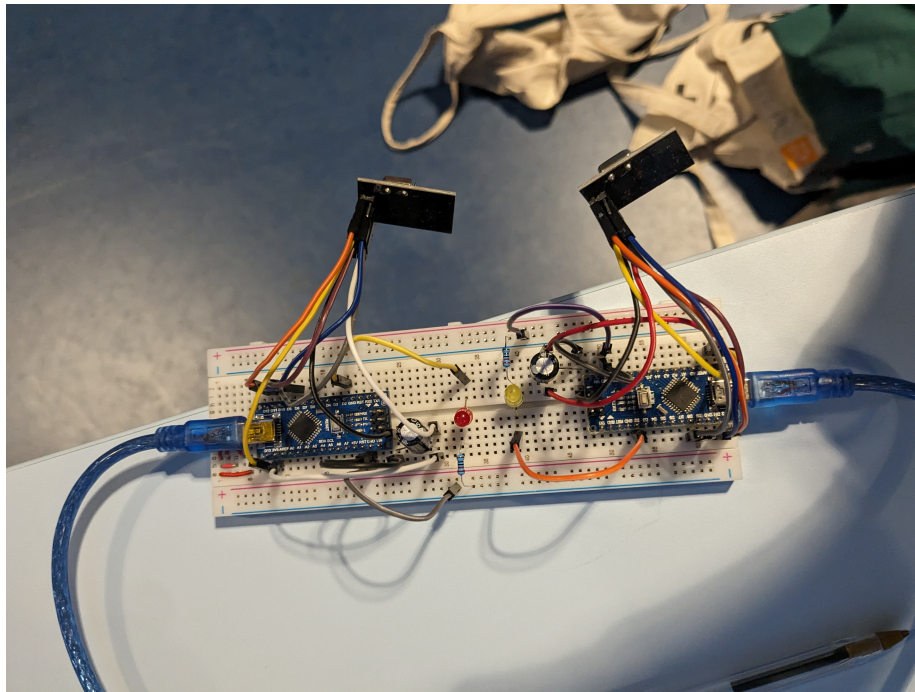


Figure 6.1: Prototype with buttons, single LED lights and wireless communication

After this was achieved, the single LED was replaced by 5 LEDs on an LED strip. Up until this point, the 5V power of the prototype was supplied by the USB port of the laptop. To make the prototype wireless, no wire required from the wristband to the laptop, a battery case with 3 1.5V batteries was attached to the Arduino Nano to power all components. The wired connections were thereafter soldered together eliminating the need for a breadboard. In this process of soldering the components together, the choice for the button changed multiple times. At first, simple buttons were used on the breadboard. These buttons were quite rigid and hard to press, they did, however, give solid feedback when the button was pressed, almost like a physical click. Because these buttons required quite some force, and because they were rather small, another type of button was used. The buttons that were chosen were larger keyboard-like buttons. They were larger so pressing them would be more intuitive. They were also way easier to press. These larger buttons were also easier to wire as they only required two connections, rather than the 3 connections the previous button required. These keyboard buttons, however, did not hold up to the stresses they were put under while building the prototype. The connections of the buttons were less than half a centimeter and broke as soon as they were bent more than once. Once again, a different type of button was chosen for the prototype. These buttons were momentary make switches. They were a

little bit more difficult to press, however, not as difficult as the first button. They were a bit smaller than the keyboard buttons. If another version of the prototype were to be built, a different type of button would be used. However, these buttons were sturdy and were threaded which allowed for easy installation on the prototype.

The initial plan of the realization of the wristband prototype was to create a waterproof prototype by sealing the electronic parts with epoxy resin. This way, user testing in the water would be an accessible option. However, due to various reasons, this was not feasible within the time span of this research project. The first factor that contributed to this was the unreliable nature of the electrical components that were used to build the prototype. During the process of building various stages of the prototype, several components had to be replaced or repaired. Some components gave out due to mistakes that were made during the building process, while other components seemed to have reached the end of their life cycle within the span of the research project. Because these components were quite fragile and unreliable in their lifespan, emerging them in epoxy resin would take away the ability to repair or replace any components if needed. Having the risk of the prototype failing at an unexpected moment, and not being able to repair or replace a single component would pose a risk of delaying or interrupting user testing. In the interest of time, this would not be a favourable scenario. The second factor that played a role in the decision to not create an epoxy resin prototype was the fact that the batteries did not have a reliable lifespan. If the prototype were to be cast in resin, the batteries would not be accessible anymore. During the build of the prototype, several batteries were drained in the process. When the prototype was not getting enough power, its functionalities would diminish and perform less than optimal to the point where it would not perform satisfactorily at all. The reason for this was cheap and unreliable batteries. As soon as the cheap AA batteries were replaced by more expensive batteries this problem was solved. However, normal batteries should not drain as easily as the cheap batteries did. In combination with the unreliable nature of the batteries, a fault in the electrical work causing it to drain the batteries faster than normal would add to the reasons the batteries were not behaving the way that was expected. Without the time to test out this hypothesis, and with user testing in mind, it was a safer choice to not create an epoxy resin prototype.

When the choice to not make an epoxy resin prototype was made, a new plan for the exterior of the prototype was made. To keep things as sustainable as possible, mostly recycled materials were used to make the exterior of the wristband.

6.1.2 Feedback meeting with client

During a feedback meeting with the client, the client suggested to addition of an app to the wristband. They were wondering if a competitive element would positively add to the experience of the surfer. Gamification has become an increasingly chosen option element of design to encourage engagement in

users. Adding game elements to a context that originally contained no game elements, however, needs careful consideration to achieve the desired benefits of gamification. [Lounis et al., 2014]. Many of the tools that are available to surfers at this moment contain an element of competition. Measuring distance, counting how many waves a person has caught, and then being able to share and compare this data with friends are common elements of current surf smartwatches. [Daw, , Gla, , Nixon, 2020, Tra, , Sur,] Though not all of them would have the element of gamification, they are aimed towards the want for competition in the user. For these applications of smartwatches in the surfing community this element of comparison works excellently, however, these elements of performance comparison and competition between surfers are some of the exact elements that withhold female surfers from enjoying the surfing community. It is therefore interesting to look into how gamification could be implemented in such a way, that it benefits the design of the tool, without bringing the unwanted elements of performance comparison and competition into the design.

6.2 Final prototype of bracelet

After careful consideration of the electronic components, the final prototype was created. The electronics were soldered together and the elements were placed on a bracelet. The button to press was placed on the user side of the forearm as this was expected to be an intuitive placement to press. The LEDs were placed on the top side of the bracelet so they would be easily visible when the bracelet was worn.



Figure 6.2: Final prototype with buttons, LED strip and wireless communication

6.2.1 Materials

The prototype is built of the following components:

- Arduino Nano
- Battery pack with 3 AA batteries
- LED strip
- HC-12 module
- 100 uF 50V capacitor
- momentary make switch
- fabric and leather
- plexiglass cover for electronics

6.2.2 Design

The prototype contains two small pouches to hold the batteries in place. The rest of the electronics are inside the bracelet. The electronics are attached to the bracelet and covered with a plexiglass cover that was heated and bent to shape. The button sticks out through, and is secured to, the plexiglass cover. The LED lights are covered by a thin almost sheer fabric, covering the electronics, while still leaving the light of the LEDs through.

Chapter 7

Evaluation

A user evaluation was conducted to gain more insight into the usability of the bracelet, as well as its ability to promote an encouraging environment for the users who wear the bracelet.

Initially, the goal of the realisation phase was to create a prototype that allowed for an in-water user evaluation. Testing the prototype in the setting it was designed for, the water, would provide the research with valuable information on how the tool would behave in a surfing setting and how the experience of the user would be in the desired setting. Due to time constraints and technical limitations, the prototype did not reach a waterproof state, unfortunately. It was therefore decided to conduct user evaluation out of the water.

7.1 User evaluation

7.1.1 Variables

The goal of the user evaluation is to determine whether the users of the bracelet feel a sense of togetherness when using the bracelet. This element of togetherness can be felt in many different scenarios and is not unique and limited to in-water sports like wave surfing. Though the focus of this graduation project lies with wave surfing, to test the effects of the bracelet on connectedness and togetherness, the options for a user evaluation are not limited to in-water testing. encouragement

7.1.2 User Evaluation Target group

The participants of the user evaluation were all female surfers or had experience with a similar individual male-dominated sport like snowboarding. Limiting the participants of the user evaluation to solely female surfers aligns with the target group the bracelet is designed for. Gaining insight into how the intended users interact with the tool is valuable to future iterations of the design of the prototype. To maintain the anonymity of the participants in this research

project, the participants will not be mentioned by name. If an instance occurs where their behaviour or answers will be specifically referred to, they will be referred to by their test number and participant number.

7.1.3 Evaluation Set-up and Process

The tests took primarily place in the Design LAB, a creative work and design facility on the campus the the University of Twente. One of the tests took place in a similar work and design facility located at the Saxion University of Applied Sciences.

The user test process consisted of a testing element with human participants and an interview. The test was conducted with two female participants. The two participants were asked to sit apart from each other, while still staying in each other's eyesight. They were asked not to communicate verbally for the duration of the test. Preferably, the test was conducted in a slightly noisy environment taking away the accidental ability to communicate with the other participant through oral communication.

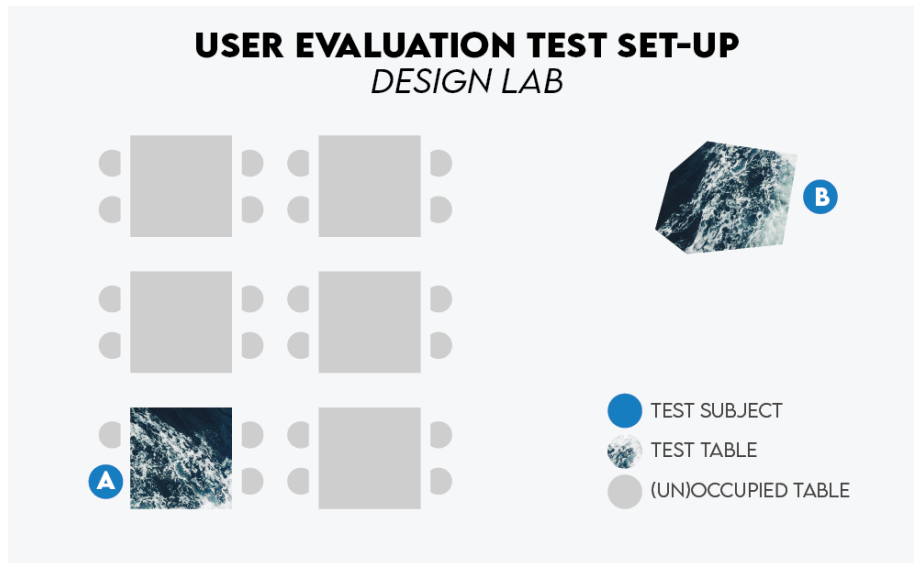


Figure 7.1: User Evaluation Test Set-Up Design LAB

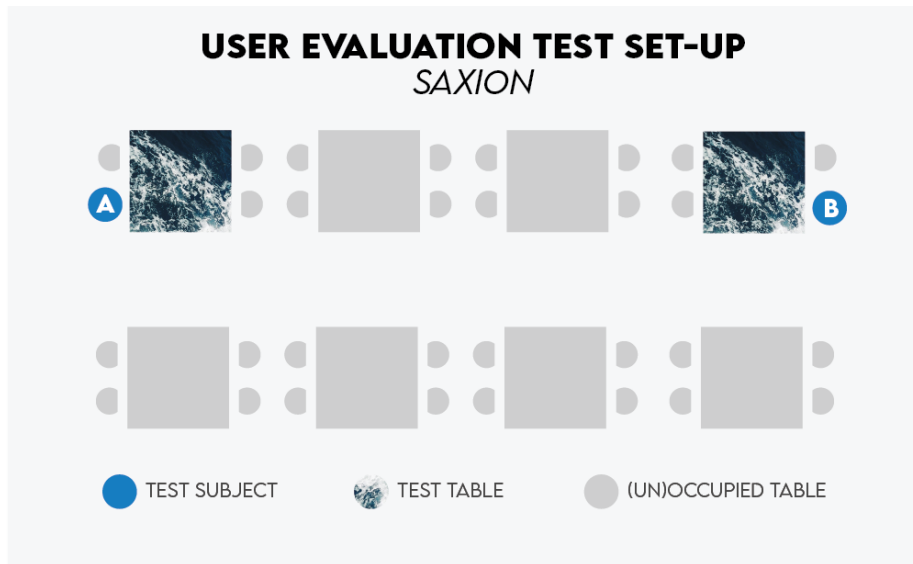


Figure 7.2: User Evaluation Test Set-Up Saxion

During the test, the participants will be wearing the bracelet around their forearm. Prior to the start of the test, the participants are informed about the functionalities of the bracelet. They are informed that whenever they press the button on their own bracelet, LEDs will flicker on the opposing participant's bracelet.

Both of the participants are asked to follow the instructions to an origami tutorial. Each participant is provided with a large square piece of paper. They get 15 minutes to perform the task. By asking the participants to go through a task that both allowed them to have clear success moment when finishing the easy steps and challenging them with more difficult steps, the participants were expected to go through a range of emotions. In this process they have opportunities to encourage the other participant, applaud the other's achievements and share their own progress.

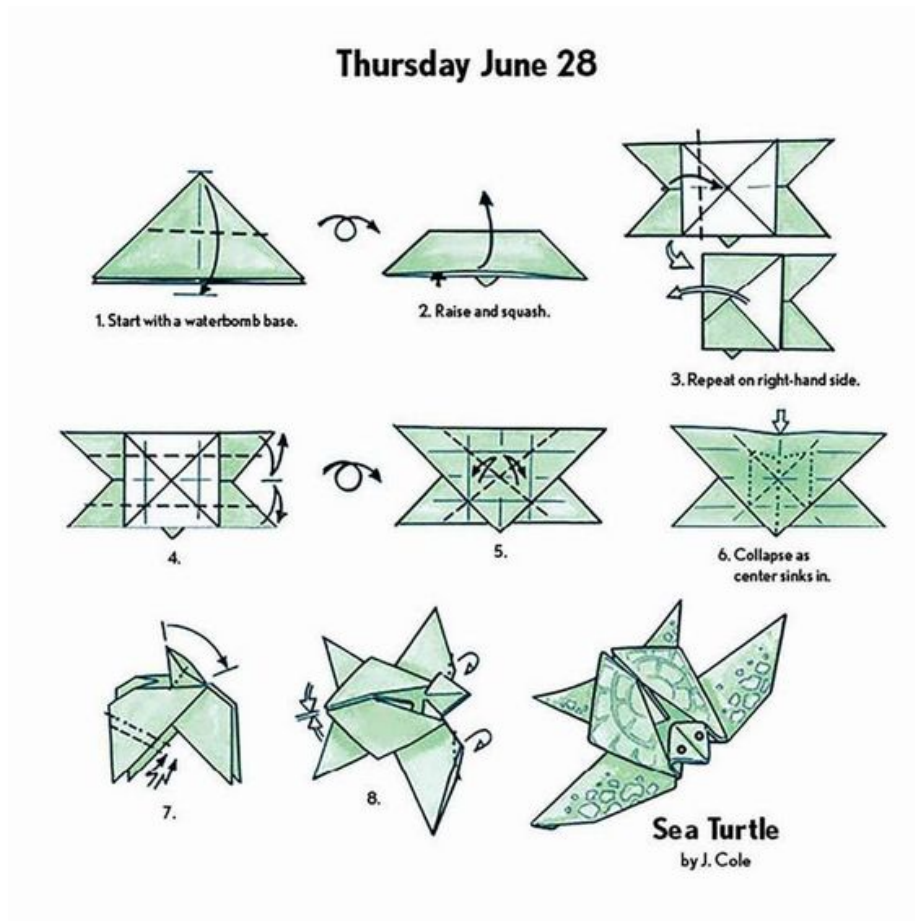


Figure 7.3: Origami Tutorial

After the test, each of the participants will be interviewed on their experience using the bracelet. During these interviews, an audio recording and written notes were made. Audio recordings were transcribed and can be found in appendix.

The information letter that was given to the participants can be found in appendix. The consent form that was signed by all participants can be found in appendix.

During the user testing phase, four tests were conducted with a total of eight people. The audio of one of the recordings was inaudible, therefore there are nine recorded and transcribed interviews as a result of four tests.

- Test 1 - Participant 1.1 - Participant 1.2
- Test 2 - Participant 2.1 - Participant 2.2
- Test 3 - Participant 3.1 - Participant 3.2
- Test 4 - Participant 4.1 - Participant 4.2

7.2 Findings from the user evaluation

7.2.1 Observations during user evaluation

During the user evaluations, observational notes were made. Notes were taken on clear emotions the participants portrayed, difficulties they encountered and the solutions the participants came up with to overcome these difficulties. During the test both participants were observed at the same time so even when they did not notice certain events themselves, they were observed and taken note of. Coincidentally, events like this occurred regularly and this brings up the first overarching observation.

One of the observed issues that occurred when testing the wristbands was when a participant sent out a message, and the other participant did not notice the message. The sending participant was noticeably disappointed when they could not get the attention of the receiving participant. In most cases the participant receiving feedback was too focussed on their own task to notice the flickering light on their arm. Sometimes the wristband had shifted a little bit so that the LEDs were more on the outside of their arm, rather than on the inside or on top, making it harder for them to see. Sometimes the wristband also shifted a little down the participants arm, moving the LEDs outside of the vision of the participant. In either scenario did the wristband move slightly out of their immediate vision. The participants would only see the LEDs when they intentionally brought their focus to the wristband. In some cases, the participants were focussing on what was on what their next steps were in the origami tutorial, taking their focus away from their hands and arms, towards the origami tutorial. This also caused them to potentially miss the flickering lights. In some other cases, the wristband did not significantly shift on the participant's arm and was still placed correctly, however, the participant would still not notice the changing LEDs. They appeared to be so focused on their task at hand, that they did not notice the flickering lights on their arm.

The second observed issue the participants ran into was the size of the wristband. The prototype is quite bulky in size and several times hindered the movement of the arm for several participants.

Another observation was that most of the time a participant pressed the button, the participants established a connection through eye contact.

Some of the signals that were sent out were when a person was in need of a connection. Because the participants could somewhat see what the other participant was doing, they had a difficult time judging whether the other participant needed encouragement or appreciation. Therefore, many of the connections that were established, took place out of a need for connection from the participant sending the signal. Sometimes this need for connection was because they needed encouragement from the other participant, whereas other times, it was a need for appreciation expressed by the other participant. During one of the tests, the participants came up with light signals they could give each other indicating different messages. Though this worked for a while, eventually they forgot or lost track of the light signals and resorted to random light signals.

7.2.2 Usability and Intuitiveness

The participants were asked how intuitive they thought the design of the bracelet was. The answers to this question were resoundingly positive. The participants identified the minimalist user interface of one button and LED lights as easy to use and as having a clear function.

The bracelet was either placed on the participant's arm or they were instructed to put the bracelet on their arm, the positioning was clear to most participants by default. One participant, however, noted that without help or clear instructions, the placement of the bracelet was not self-explanatory, and could have been easily mistaken.

The button and the placement of the button were both considered intuitive by some participants and considered not intuitive by other participants. The participants who considered the button to be intuitive thought it was easy to press the button given there was only one button to press. Some participants liked the fact they got to press a button because it brought them joy to do a simple and fun task. Some participants also commented on the colour of the button, red, making it easy to identify and press. All participants seemed to be able to find and use the button as designed. Though some participants were enthusiastic about the button and its placement, some raised some concerns. Some thought the low placement of the button was difficult to press as they could not directly see it with their arm in a relaxed state. Some also commented on the small size of the button. Some participants also struggled with the placement of the button as they accidentally pressed the button on the table, sending unwanted and accidental signals to the other person.

Regarding the feedback modalities, several participants were enthusiastic about the use of lights in the design and saw it as a festive way of encouraging, as if someone was clapping for them. The primary use of light, however, also confused some participants. This stemmed from participants not being able to focus on the lights and on the task at the same time. One participant suggested adding additional feedback modalities like a vibration or a sound. In their opinion, by adding a more intrusive type of feedback modality, the problem of missed signals could be avoided.

Some participants mentioned that they were unsure what messages they should, or could send. Because they could only send one signal, they found it hard to relay significant messages. Though they found the simplicity of it intuitive, they also expressed their want to send and receive clearer messages.

7.2.3 Overall experience

The responses from the user evaluation were generally quite positive. When the participants were asked to give their experience of the user test they could all recall what they had done and explain it in clear words. Some already started to talk about the positive and negative experiences they had, whereas others took a more descriptive approach and talked through the steps they had gone through during the evaluation.

Though they were distinctly told it was not a competition, some participants still displayed some sense of competitiveness. One participant distinctly mentioned that even though she knew it was not a competition, getting updates on how the other participant was doing, motivated her to work even harder. When she was stuck at an earlier step than her fellow participant, she felt like she needed to catch up and when she was ahead of her participant she wanted to keep her head start and stay in the lead. Either way, it led her to an increased motivation to follow through with the difficult tasks.

When the participants were asked whether they felt like they were *playing* together, there were mixed answers. Though most participants recognized that they were not doing the task together, they felt like they had shared an experience with the other participant. The factors that led to this feeling of togetherness were primarily the fact that they were able to see each other and that they could establish a connection using the bracelet.

7.2.4 Receiving feedback

The responses to giving feedback were relatively positive. Most participants answered that they felt seen by the other participant to an extent. Because the other participant did not always see the message they were sending them, in return, the participant sending the message sometimes felt like the other participant did not see them. Though they received feedback themselves, sending unanswered feedback led to a substantial amount of disappointing unreciprocated interactions. Whenever they felt like they were not seen by the other participants it made them feel disappointed. When they did feel seen, however, they expressed feelings of togetherness and increased motivation. They primarily felt seen through an established visual connection, meaning they locked eyes and shared a moment of connection.

Through observation and the answers to the questions, it became clear that most participants had a positive experience when they received feedback. They felt an increased sense of encouragement when they saw they received feedback through their bracelet. They mentioned that they felt more motivated knowing someone was encouraging them.

The majority of the participants reported that by being encouraged, they felt like they were sharing the experience with the other participant, which made them more motivated to continue their task.

Some participants expressed that they were significantly more motivated because of the encouragement they received, making them more likely to succeed in the task they were given. Some participants, however, also recognized that they were more distracted by the added task of giving feedback.

7.2.5 Giving feedback

The responses on receiving feedback were very positive. Most participants reported they enjoyed giving feedback. The participants were relatively aware of the other participant, though they were simultaneously focussed on their own

task. The participants mentioned that they felt like they encouraged the other participant by giving them feedback. They did this by pressing the button whenever they felt like the other participant was in need of encouragement. After they had established a visual connection they would show each other their progress and share their feelings of confusion with each other. They determined the other participant was more motivated after these interactions by their smile. In return, this made them feel like they had seen the other participant, connected with them, and encouraged them.

Many participants recognized that they were very happy to see the progress of the other participant. They wanted to see how far the other participant had gotten and were happy with their achievements.

Not all participants of the tests felt completely seen by the other participant, however. The primary cause of this was the fact that the participants did not always notice the flickering of the bracelet. This made the participant sending the encouragement feel less connected and like their encouragement was not received.

Most of the participants thought the act of giving feedback did not influence their performance on the origami task. One participant thought this was not possible, while most participants thought the act of giving feedback itself did not increase their origami skills, however, the sense of togetherness they felt did play a big role in how willing they were to continue trying.

7.2.6 Quantity of feedback

In all tests, there were moments when someone did not notice the feedback they were receiving. In most tests, this happened to both participants.

In some of the interviews in which participants expressed they felt a significant gap in the amount of feedback they gave and the amount of feedback they received, a follow-up question was asked about the ratio of feedback. Some of the participants responded that they felt like the ratio of feedback should be equal, not wanting to make anyone feel less than, or not appreciated enough. Some participants, however, held the opinion that it would not change the experience in a negative way if the ratio of feedback was not equal.

7.3 Conclusion

To answer the research question of this thesis, the user evaluation has to give insights into whether the bracelet lowers the barriers of entering the surfing community. The user evaluation shows that the participants had a positive response to receiving feedback from others. They recognized that they were more motivated to continue with their task when the task got difficult when they knew someone was cheering them on. Their response was also very positive on their ability to give feedback to others. They felt very connected whenever they made their fellow participant happy by sending them encouraging signals. Overall, the bracelet increases the sense of togetherness in the participants. They felt

like they were more connected through the bracelet, as if they were not alone in their quest to complete the task. The participants also gave useful insights into how the bracelet can be improved. They recommended a larger button, different signal modes to make the communication clearer, and to consider some type of feedback on when a message is send, and received.

Chapter 8

Discussion and Future Work

The following chapter of this thesis will shed light on the quality of the completed research by evaluating the design process and the use of the Design Process for Creative Technology [Mader and Eggink, 2014] and looking into the significance of the findings from the evaluation. In a later segment of this chapter, recommendations for future work will be made. Insights into what could have been done differently or what still is yet to be done will provide any possible future research into this, or a similar topic with valuable insights based on the findings of this research. To structure the following chapter, the chapter will be divided into two sections. In the first section of the chapter the process of designing and evaluating the prototype will be discussed, and in the second section recommendations regarding future work will be discussed.

8.1 Discussion

In this graduation research project, the tool that was designed was tested by a small sample size of ten female surfers. Though this gave useful insights that added to the evaluation of the prototype, a larger sample size of female surfers would have led to a more accurate evaluation. A larger sample size would potentially lead to a better represented and more diverse test audience, providing the research with a wider range of experiences to build upon.

The variables that were tested in the user evaluation were togetherness and encouragement. Both of these terms could be considered vague, hard to describe, and especially difficult to test. One of the reasons for this might be that they are experienced differently by everyone. What might be encouraging for some, might not feel the same for someone else. Careful consideration of the evaluation process might therefore be valuable to the research. Finding more suitable variables and metrics to test the effectiveness of the prototype would be beneficial.

During the user testing, there were several instances in which the control environment slightly changed, allowing for differences in the evaluation outcomes. The first instance that requires consideration is the location. Four out of five tests were conducted in the same location, namely the DesignLab, and one test took place in a similar space at Saxion University of Applied Science. Though this could have potentially led to different evaluation results, the locations were similar enough to not consider those factors in the conclusions of the evaluation.

8.2 Recommendation for future work

Based on the work that was done during this research project, several recommendations for future work or research can be made. These recommendations are based on shortcomings in certain areas of the research, for example, money, time or executive skills. Some recommendations are also based on discoveries that were made during this research but were outside the scope of this graduation project which deserve additional research.

8.2.1 Physical recommendations

Any future research on the topic of female empowerment within the wave surfing community using a type of wearable technology would benefit from creating a waterproof prototype. Having access to a prototype that can withstand the harsh conditions of cold and salty water would open up a world of opportunities ranging from more extensive usability testing to testing the long-term effects of using a community-building tool.

In order to improve the functionality of the bracelet, more in-depth feedback modality testing is recommended. As was brought up in the user evaluation, additional feedback modalities should be considered and tested to create a tool that is both attention-grabbing, while not distracting and intrusive to the user.

Exploring a feedback loop to confirm a user has received a certain message would also be recommended. One possibility would be when a message is received by a wristband, a return message is sent to the sending wristband. When the sending wristband does not receive a return message, it could show an error message to let the sender know that the other user has not received their message and is not just ignoring them.

The bracelet could potentially also benefit from different communication modes, like different signals for different messages. This would allow the users to create a clearer line of communication between them and take away potential confusion on what the light signal is bringing across. A way of customizing the bracelet to fit a more diverse range of users would also be recommended to consider. This would allow the user to customize feedback modalities and message modes to their liking.

The last physical recommendation for the bracelet would be to explore the ability to create a network of more than two users. The HC-12 module already

allows for a network of different channels. The biggest challenge at this point in the research is thinking of a way to address the messages to a specific user.

8.2.2 Evaluation recommendations

Whether the prototype would be waterproof or not, future research would benefit from testing the prototype on a wider range of test subjects. An increased number of test subjects would lead to a more accurate representation of the community the prototype would be used in. Increasing the sample size would lead to a more diverse range of perspectives. A wider range of ages, surfing experience levels, and general experiences of the current surfing community would significantly increase the validity of the conclusions made in future research. It would give more insights in accidental findings, outliers and common patterns.

Though the user evaluation using the prototype of the wristband while performing a task gave some valuable insight into how connected and encouraged users feel when they are given the option of visual communication with each other when they verbally cannot, testing the prototype in the actual setting it would be used in is crucial. This means testing the bracelet in a surfing setting with female surfers.

It would be recommended to research the long-term effects of using a community-building tool within the female wavesurfing community. The prototype of this bracelet was designed, realized and tested within six months. There has not been an opportunity to test the prototype in a surfing setting, let alone in a surfing setting over time. To gain an understanding of how this bracelet could impact the female surfing community, as well as the surfing community as a whole, in-depth long-term testing would be necessary. This way, potential gradual shifts within the surfing community would be able to be detected and evaluated.

8.2.3 Ethical recommendations

I recommend looking into the ethical side of creating a tool for just women

I would recommend looking into inclusivity concerning gender and physical abilities. I would recommend looking into the environmental impact of the wrist band. I would recommend looking into the safety of the bracelet regarding the technology and water submersion.

I would recommend looking into the different forms female wavesurfing communities exist around the world and explore the options of customization.

8.2.4 Tool implementation recommendations

I recommend finding ways to implement the wristband in different types of individual male dominated sports like kitesurfing, windsurfing, wakeboarding, snowboarding, and other extreme sports.

Chapter 9

Conclusions

A prototype of a tool was created to lower the barriers to entering the surfing community and to create a strong and encouraging surfing community. The bracelet can be worn on the user's forearm, and through a simple push of a button, the user is connected to their fellow surfer. A press of the button causes the LED lights on the fellow surfer's bracelet to flicker, indicating encouragement, appreciation or enthusiasm.

Through personal experience, the experiences of the clients at Hart Beach Surfing, and by exploring the related literature on this topic it was discovered that female surfers experience several constraints that keep them from enjoying the art of surfing to the fullest. They are in need for an improved surfing community. They experience localism and face aggression and sexism, primarily from the large male surfing community. Many times, female surfers are the minority in the water. Receiving an increased amount of support and tolerance in the water only reinforces the proof the female surfing experience can be condescending and devalidating. To battle these constraints, many female surfers look for empowerment and support from all-women surfing communities. Within these groups of passionate female surfers, they can feel like their journeys are worth their time and that their strengths are celebrated, rather than looked down upon. These female surfers are coming together in and around the water, looking for connection. Before and after surfer, it is relatively easy to connect through text messages, online groups and physical meet-ups. Feeling a true connection to other female surfers in the water, however, can be quite difficult to achieve due to the loud sounds of crashing waves washing voices away and the large physical distance that can be between them. To provide these women with an extra line of communication, the bracelet was designed. Through a push of a button, the women wearing the bracelets can encourage and applaud each other from a distance. In an iterative and user-centered design process, the input of the user is necessary throughout the design process. Through a user evaluation on land using the tool to test togetherness and encouragement, it was shown the tool is successful in creating an encouraging environment in which female surfers feel seen and connected. The participants

enjoyed receiving feedback and reported being more willing to continue when the test got more difficult. They also liked the element of sharing their successes with others. Slightly unexpectedly, the women who used the tool were also really eager to give feedback. This goes to show that there is a need for an encouraging community and that there is much encouragement ready to be given to the community. To test the full effects of the bracelet on the surfing community, however, a waterproof version of the prototype should be made and tested in a surfing setting. Changes to the physical design of the bracelet should be considered in future projects, like a larger button, different signal modes, and miniaturization of the bracelet. A way of confirming a message has been sent, or received would improve the prototype of the bracelet. Female surfers are finding their way in the surfing community and they have come a long way already. This graduation research project will add to all the ripples and waves that make up this changing tide within the surfing community. By creating an encouraging and uplifting environment for female surfers to thrive in, this bracelet make the surfing community in Scheveningen as strong as ever.

References

Bibliography

- [Gla,] Glassy Wearable Surfing Technology.
- [Sur,] Surfline Sessions — Apple Watch Surf App.
- [Daw,] The Ultimate Surf Tracker — Apple Watch Surf App.
- [Tra,] Trace Kickstarter.
- [Anderson, 2014] Anderson, J. M. (2014). Exploring the space between words and meaning: Understanding the relational sensibility of surf spaces. *Emotion, Space and Society*, 10:27–34.
- [BrownGirlSurf, 2023] BrownGirlSurf (2023). Home - Brown Girl Surf.
- [Comley, 2016] Comley, C. (2016). "We have to establish our territory": How women surfers 'carve out' gendered spaces within surfing. *Sport in Society*, 19(8-9):1289–1298.
- [Couture, 2020] Couture, J. (2020). Reflections from the 'strava-sphere': Kudos, community, and (self)-surveillance on a social network for athletes. *Qualitative Research in Sport and Exercise*.
- [Dejan, 2022a] Dejan (2022a). Arduino and HC-12 long range wireless communication module.
- [Dejan, 2022b] Dejan (2022b). NRF24L01 – How it works, Arduino interface, circuits, codes.
- [electronics, a] electronics, B. HC-12 Long Range Serial Module.
- [electronics, b] electronics, B. NRF24L01 module.
- [Fendt and Wilson, 2012] Fendt, L. S. and Wilson, (2012). 'I just push through the barriers because I live for surfing': How women negotiate their constraints to surf tourism. *Annals of Leisure Research*, 15(1):4–18.
- [Franken et al., 2023] Franken, R., Bekhuis, H., and Tolsma, J. (2023). Kudos make you run! how runners influence each other on the online social network strava. *Social Networks*, 72:151–164.

- [Guy, 1977] Guy, R. (1977). Aotearoa Womens Surfing Association.
- [Knijnik et al., 2010] Knijnik, J., Horton, P., and Cruz, L. O. (2010). Rhizomatic Bodies, Gendered Waves: transitional femininities in Brazilian surf. *Sport in Society*, 13(7-8):1170–1185.
- [Lisahunter, 2017] Lisahunter, L. H. (2017). The long and short of (performance) surfing: tightening patriarchal threads in boardshorts and bikinis? *Sport in Society*, 21(9):1382–1399.
- [Lounis et al., 2014] Lounis, S., Pramatarı, K., and Theotokis, A. (2014). GAMIFICATION IS ALL ABOUT FUN: THE ROLE OF INCENTIVE TYPE AND COMMUNITY COLLABORATION. *European Conference on Information Systems (ECIS)*.
- [MacLean, 2000] MacLean, K. (2000). Designing with haptic feedback. In *Proceedings 2000 ICRA. Millennium Conference. IEEE International Conference on Robotics and Automation. Symposia Proceedings (Cat. No.00CH37065)*, volume 1, pages 783–788 vol.1.
- [Mader and Eggink, 2014] Mader, A. and Eggink, W. (2014). A design process for creative technology. *DS 78: Proceedings of the 16th International conference on Engineering and Product Design Education (EPDE14), Design Education and Human Technology Relations, University of Twente, The Netherlands, 04-05.09.2014*, pages 568–573.
- [Nixon, 2020] Nixon (2020). Ultratide.
- [Olive, 2019] Olive, R. (2019). The trouble with newcomers: Women, localism and the politics of surfing. *Journal of Australian Studies*, 43(1):39–54.
- [Olive et al., 2015] Olive, R., McCuaig, L., and G. Phillips, M. (2015). Women’s recreational surfing: a patronising experience. *Sport, Education and Society*, 20(2):258–276.
- [Schmitt and Bohuon, 2021] Schmitt, A. and Bohuon, A. (2021). When women surf the world’s biggest waves: breaking gender barriers. *Sport in Society*, 25(10):1924–1939.
- [Spowart et al., 2010] Spowart, L., Burrows, L., and Shaw, S. (2010). ‘I just eat, sleep and dream of surfing’: When surfing meets motherhood. *Sport in Society*, 13(7-8):1186–1203.
- [SwellWomen, 2023] SwellWomen (2023). Global Experiential Yoga, Surfing and Wellness Retreats.
- [Thomas, nd] Thomas, D. (n.d.). Aotearoa Womens Surfing Association.
- [Waite, 2008] Waite, G. R. (2008). ‘Killing Waves’: Surfing, space and gender. *Social and Cultural Geography*, 9(1):75–94.

[Wheaton and Thorpe, 2018] Wheaton, B. and Thorpe, H. (2018). Action sports, the Olympic Games, and the opportunities and challenges for gender equity: the cases of surfing and skateboarding. *Journal of Sport Social Issues*, 42(5):315–342.

9.1 Use of external sources

This project made use of several sources related to AI.

9.1.1 Grammarly

This project was spellchecked by Grammarly.

.1 Information Brochure

The following text was given to the participants of the user evaluation.

.1.1 Information Brochure

Women's Surfing Community in Scheveningen

Marije Kok, s2634090

I am Marije Kok and I do research at the University of Twente. I will explain the study below. If you have any questions, please ask me to clarify any parts that are unclear to you.

This information brochure is on the user testing of the prototype of a wearable device that can be used during wave surfing by female wave surfers. This research is conducted as part of a bachelor's Graduation Project led by me, Marije Kok, in collaboration with the surfing school Hartbeach Scheveningen. This user testing process will consist of testing the prototype with users and an interview. During the test, the participants will be wearing a bracelet around their forearm. The person wearing the bracelet can send out encouragement to any other participant wearing a bracelet. The participants each perform a task. Each participant will be asked to perform a success scenario, like standing up on their surfboard or catching a ball. During the test observational written notes will be taken. The test will not take longer than 20 minutes. After the test, each of the two participants will be interviewed on their experience using the bracelet. These interviews will not take longer than 20 minutes per participant. During these interviews, an audio recording and written notes will be made. Audio recordings will be transcribed, and any accidental personally identifiable data will be deleted from the transcript. The recorded audio and transcripts will be securely stored on a University of Twente OneDrive and will be deleted as soon as the research project has been completed, by the latest at the end of April 2024. Only Marije will have access to the stored audio recordings and transcripts. Participation in this study is completely voluntary. Participants can stop at any time and would not need to provide any explanation.

If participants have any questions about the study or your privacy rights, such as accessing, changing, deleting, or updating your data, they can contact me.

Name: Marije Kok
Phone number: +31612274044
Email: m.b.kok-1@student.utwente.nl

.1 Informed Consent Form

The following is the Informed Consent Form that was used during the user evaluation.

width=!,height=!,pages=-

.1 Women's Surfing Communities User Evaluation Test 1 Transcript

Location: Design Lab University of Twente

.1.1 Observational notes

.1.2 Interview questions Test 1

General experience

Walk me through the experience of using the tool during this user test.

Nou hij deed het niet altijd. Dus dat was wel jammer want dan moet je oogcontact maken voor dat je wat doet, en je kijkt wat sneller naar je arm dan naar de andere persoon. Toen ik niet uit mijn schildpad kwam, voel ik me wel heel erg gesupport door Participant 2. Op het knopje drukken was makkelijk. En dan ging ie zo wie wie doen (flickering of light).

On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

knopje 10

lichtjes 2

What factors contributed to this?

Het knopje is wel heel intuïtief want er is maar 1 knopje maar er moet wel uitleg gegeven worden wanneer je het knopje gebruikt en wat het betekent als de lichtjes gaan knipperen en dat is niet (heel intuïtief).

Knopje is intuïtief want er is 1 knopje en hij is rood

On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other Participant?

3

Dat niet heel erg. Ik denk dat het meer een apart proces was maar we probeerde wel elkaar te supporten. En vooral Participant 2 mij (supporten) omdat Participant 2 al klaar was.

What factors contributed to this?

Naja als je samen doet dan zit je naast elkaar. Maar ik denk dat het tijdens het surfen wel anders is. Verbale communicatie.

Receiving feedback

Tell me about your experience receiving feedback.

Nou toen dat dus ging keek Participant 2 heel blij naar mij en ik wist dat ik naar Participant 2 moest kijken en toen werd ik minder gefrustreerd dat het niet lukte.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other Participant?

Als het niet werkte: 4

Als het wel werkte: 7

What factors contributed to this?

Nou ook een keertje niet, want de lampjes deden het niet. En ik wilde mijn mooie vouwwerk latern zien maar Participant 2 keek niet. Sad story. Nou dan was ik heel hyped en dan kon ik het niet laten zien.

Als het af en toe wel werkte dan wel 7. Of ik kon het wel laten zien en dan mocht ik ook die van Participant 2 zien.

How did the aspect of being seen make you feel?

Als Participant 2 me wel zag, nou dan goed, want Participant 2 is leuk om naar te kijken.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel encouraged by the other Participant?

Tijdens test: 6

toen Participant 2 klaar was: 8

What factors contributed to this?

Toen zij klaar was en ik aan het strugglen was, wel, maar tussendoor, niet, want toen had zij ook gewoon nog een doel. Het was meer van kijk hoe ver ik al ben, maar niet van go you weet je wel.

Op het begin was Participant 2 ook gefocust op zich zelf en dat ik blij kon zijn met haar accomplishments. Maar daardoor ging het aangemoedigde gevoel wel minder. Tis gewoon meer van wow wat leip dat je dit al hebt, maar niet success met de volgende stap.

How did the aspect of encouragement make you feel?

Goed!

On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did the received feedback affect your performed tasks?

-

What aspects contributed to this?

Nou dat misschien niet. Met mijn gevoel wel, maar mijn daadwerkelijke opdracht is nog steeds niet gelukt. Naja ik ben gewoon niet capabel in origami en dat gaat dit niet beter maken. En met de surf trip hadden we elkaar ook aangemoedigd en daar werd ik echt niet capabeler door.

Giving feedback

Tell me about your experience giving feedback.

1 keer wilde ik zien wat Participant 2 had maar dat kon niet want hij deed het niet. En verder heeft zij mij vooral feedback gegeven en dan gaf ik terug feedback.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you notice the other Participant?

Nee ik was ook wel met mijn eigen ding bezig want dat was best moeilijk. Dus ik denk dat ik de andere persoon wel een 4

Maar dat is prima want het moet ook niet te veel

What factors contributed to this?

Nou ik had ook gewoon zelf een doel wat volbracht moets worden en dat is nog steeds niet gebeurt. Dus toen kon ik me niet alleen maar bemoeien met Participant 2 haar werk.

waarom is het dan geen 1?

door dat ding was je toch wel een beetje afgeleid weet je wel. Afgeleid door de origami. En het is nieuw, dus een soort van speeltje weet je.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel like you encouraged the other Participant?

2

What factors contributed to this?

Niet heel erg. ja volgens mij ging het bij haar al best wel goed. Ze liet me zien hoe ver ze al was, en dat was ik zo van go you, en dus niet succes met de volgende stap. Snap je?

How did the aspect of encouraging make you feel?

Niet echt een gevole bij denk ik.

On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did giving feedback affect your performed tasks?

Ja nee niet. Nul. 1

What aspects contributed to this?

kan mijn performance beter worden als ik iemand anders succes wens. Ja, tja, dat kan niet.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel connected to the other Participant by giving them feedback

Ik voel me sowieso al connected to Participant 2. ja wel iets meer door giving feedback, omdat tje met hetzelfde bezig bent. Dus je zit in hetzelfde schuitje. Ik denk een 5

Women's Surfing Communities User Evaluation

Test nr:

Participant 1: Amber Participant 2: Myrna

Date: Location:

Additional notes:

Observational notes:

General experience:

- Walk me through the experience of using the tool during this user test.

Ik heb ge-origamied, en ik heb op knopjes gedruk als ik dacht oy, lekker bezig, maar voornamelijk als ik dacht wat de fuck! En om de vibes een beetje te checken was het allemaal wel nice. De vibes werden ook terug gechecked.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

Ik denk dat een kleuter dit ook kan gebruiken, very intuitive. 8

- What factors contributed to this?

Makkelijke controls. He tis gewoon 1 ding en dat is het. En duidelijke vormgeving. Het is een armband er zitten daar lampjes en er zit daar een knoppie. Aight. Het is gewoon.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?

Yes. We could share in the suffering of origami. Nu zouden we elkaar kunnen verstaan maar tijdens het surfen kan je hebben zo van ja iemand doet iets. Juist in het water zeker omdat het ook lampjes zijn, dat kan wel een fout gaan, maar als je hebt afgesproken wat dat betekend, kan dat nooit meer fout gaan qua interpretatie.

- What factors contributed to this?

Actie reactie. Dat je in iedergeva liets zag van mekaar en dat je (er) dan een manier een reactie op kon geven zeg maar.

Receiving feedback:

- Tell me about your experience receiving feedback.

Dan dacht ik:Ahh! I'm not alone . Je kan iet echt diepe messages relayen maar wel gewoon de vibe van de mensen met zn tweeen en gewoon letterlijk we do be vibin.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other participant?

Wel maar je kon niet echt makkelijk elkaars aandacht trekken. Wel als je blijft knippen maar het was meer geweest als je een trilling ofzo. Stel je staat zo dan let je misschien iets minder op de lampjes.

- What factors contributed to this?

Geknipper en ik knipper back.

Als ik iets doms deed en ze keek niet meteen op wat logisch is want ze is bezig en daarom wat het op het water, je ben t opzich gewoon met je eigen shit bezig totdat je even pauze neemt en om je heen kijkt. Om iemand aandacht te kunnen trekken moet je wel iets meer dan (alleen knipperende lampjes)

- How did the aspect of being seen make you feel?

Nice als ik weer was van wat de fuck, een soort van reassurance van idk lekker man, of van ja i'm trying. En dan was zij zo van ja en nu?

Als ik gefrustreerd was zen ze zag me wel dan was ik zo van ja okay!! It's okay, we kijken gewoon ff nog een keer op het plaatje zeg maar.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel encouraged by the other participant?

Yes very encouraged.

- What factors contributed to this?

De lampies. iets knipperends geeft iets vrolijks. Zo van yee!

- How did the aspect of encouragement make you feel?

Gucci gang! Ja alsof ik het weer aan kon.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did the received feedback affect your performed tasks?

Not a lot. Het is niet heel erg met doorzettingsvermogen wat surfen juist wel heel erg is. Als in, nu, in mijn eentje had ik sneller opgegeven, en had ik gehad van ja prima, maar ik denk dat he tnog meer impact heeft op het water, want dan heb je heel veel snellen van weet ik veel, of het lukt niet, weet je wel. Ik denk dat het dan meer impact kan hebben. Dit is een hele finite task. en met surfen is het gewoon een learning process. Dus ik denk dat dat meer helpt want voor een heel process heb je meer encouragement nodig dan iets vouwen.

- What aspects contributed to this?

Giving feedback:

- Tell me about your experience giving feedback.

Fucking leuk! Knopjes drukken. Fucking nice! Ik kan iets klikken en ik zie dat er iets gebeurt en dan zie ik dat zij zo aaah doet en dan zie je de ander blij zijn!

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you notice the other participant?

jaa wel een beetje. Dat ik dan zo keek van ze is heel druk aan het vouwen.

- What factors contributed to this?

Lampies. Mijn lampies en haar lampies. Als ik dan naar mijn eigen lampies ging kijken, dan ging ik ook naar haar lampies kijken en dan deed ik lampie.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel like you encouraged the other participant?

I think I did. Whene I did the lampies, she looked up en was so van yeayy lampies of dan zo van wee en dan ging ze weer door. Very positive.

- What factors contributed to this?

- How did the aspect of encouraging make you feel?

Nice! I felt like I could do something, like I'm helping.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did giving feedback affect your performed tasks?

Dat denk ik niet heel veel. Het is nice maar voor hoe ik het doe, volgensmij niet heel veel. Of niet dat ik actief over na heb gedacht. Niet perse. Ik vond het leuk als ik iets terug kreeg, op die manier. Dat was meer encouraging dan zelf feedback geven. Het was niet echt afleidend. Ik ben standaard al afgeleid dus ja. Ik kan het me wel voorstellen maar voor mij niet.

- What aspects contributed to this?

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel connected to the other participant by giving them feedback?

yes. Solid 7. Gewoon. Niet dat je directe feedback kan geven maar wel zo van hier kan ik iets mee.

Quantity:

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?

Een piessie. We had our moments of gewoon bezig en dan waren we weer even zo van weee, dus niet heel vaak maar je bent ook gewoon iets aan het doen.

- Are you happy with the amount of feedback you received? Why?

Ja. It just was right. Als het gewoon meer was en we waren er ook meer bezig ermee dan was het meer beter geweest of als ik meer gefocussed was dan was meer ook (goed geweest) maar het klopte gewoon met de tast at hand zeg maar. Zo van, beetje rond de zelfde moment waren we van wat de fock, en dan werkt het ofzo.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

About the same.

Are you happy with the amount of feedback you gave? Why?

Op knopjes klikken is leuk en ik wilde gewoon op knopjes drukken. Ik denk het wel. Het was voornamelijk gewoon een beetje heen en weer en dat de een iest deed en de ander niet.

Participant 2:

Women's Surfing Communities User Evaluation

Test nr:

Participant 1: Amber Participant 2: Myrna

Date: Location:

Additional notes:

Observational notes:

General experience:

- Walk me through the experience of using the tool during this user test.

Nou ja we gingen dat vouwen. En als ik er dan zo op drukte dan keek die ander meteen op naar je toe en dan werd je eigelij kmeteen aangekeken dus dan had je direct. Zonder dat je eigelijk geluidhoeft te maken en dat is wel heel erg leuk. Alleen dan soms als je dan geconcentreerd bezig was dan zag degene het niet altijd. En he tis een beetje lastig om met alleen licht aan te geven wat je eigelijk wil zeggen dus dat is wel een beetje van: help, het lukt me niet. Verschil in signalen of kleur was anders geweest. als je iets over kon brengen want nu kon je alleen maar licht sneller laten knipperen en dan weet je nog niet echt wat het over brengt.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

8

- What factors contributed to this?

He tis 1 knop en het is licht. Dus ik denk dan wel een 8. Want je weet nog niet echt wat je ermee wil zeggen.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?

6

- What factors contributed to this?

Ja, deels. Omdat we allebei wat anders aan het doen waren en je wel een beetje kon zien wat de ander aan het doen was maar je kon de ander niet echt om hulp vragen.

Omdat je niet echt een (duidelijke) boodschap over kon brengen.

Receiving feedback:

- Tell me about your experience receiving feedback.

Ja dat was wel leuk! Wel een stuk leuker want je bent ineens... Je praat niet tegen elkaar maar er gebeurt wel wat en dat was wel heel leuk.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other participant?

8

- What factors contributed to this?

Ook wel een 8. Ja best wel. Met dat licht trek je de aandacht van mekaar en als jij een licht signaal stuurt dan kijkt 1 meteen naar jou en andersom ook 1 had wel een aantal keer dat ze jouw (signaal) niet zag.

Ja. Hoe voelde dat?

Misschien is dat omdat het iets verder weg was dan bij mij.

- How did the aspect of being seen make you feel?

Als ze me niet zag dan was het wel een beetje teleurstellen. Dan dacht ik, nu mag er best wel een trilling bij komen ofzo dat je dan de aandacht kan trekken.

En als ze me wel zag dan is hdat leuk en dan begin je samen gewoon meteen te lachen.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel encouraged by the other participant?

Ja wel meer. Meer dan als je het niet zou hebben. Dan zit je een beetje zo van ja help, het lukt niet. Maar nu heb je een signaal en kun je zien dat het samen gewoon niet lukt.

- What factors contributed to this?

Omdat je toch een beetje meer doel... iemand ander die je dan aankijkt en seint van ga lekker door zo. Meer dat je inderdaad gezien wordt.

- How did the aspect of encouragement make you feel?

Gemotiveerd. Je wil wel doorgaan.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did the received feedback affect your performed tasks?

Niet echt want ik had meer zoiets van ik snap het gewoon niet eens. En niet dat ik om hulp kon vragen dus op dat gebied... Je moest gewoon een stuk meer kijken.

- What aspects contributed to this?

Nou ja het lukte gewoon niet. En je ahd niet echt de mogelijkheid om om hulp te vragen.

Giving feedback:

- Tell me about your experience giving feedback.

Ja leuk. Een beetje aanmoedigen is leuk.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you notice the other participant?

Ja. Zij had wel het scherm ervoor dus ik kon niet heel goed zien wat ze allemaal deed.

- What factors contributed to this?

Dat zij ook gewoon... Als je op keek dan zag je haar al gewoon zitten en als je lichtjes naar je toe krijgt dan wist je ook gewoon dat je er samen mee bezig was.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel like you encouraged the other participant?

- What factors contributed to this?

Net zo veel als dat amber mij aanmoedigde. Je moedigd elkaar wel aan maar je kan niet echt de boodschap overbrengen.

Ja dat je licht en dat je het snelle kon indrukken en dan kreeg je een beetje het gevoel dat je echt iets zo van je bent goed bezig kon over brengen dus dat is wel heel erg leuk.

- How did the aspect of encouraging make you feel?

Ja ook leuk. Dan moedig je elkaar aan. Al had ik soms wel wat meer willen aanoedigen. Je had natuurlijk die lichtjes die je sneller kan laten knipperen maar daar houdt het dan ook wel weer bij op. Misschien met verschillende emoties op zo'n beeldscherm ofzo.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did giving feedback affect your performed tasks?

Niet heel veel voor mij zelf maar ik vond het wel gewoon leuk van de samen-horigheid. Dat is wel leuk.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel connected to the other participant by giving them feedback?

Ja wel meer.

Quantity:

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?

Veel. Wel een stuk meer. Ik vond het wel leuk want je had iets meer contact.

- Are you happy with the amount of feedback you received? Why?

Ja. Was leuk.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

Ja denk ook wel elke keer als amber mij ook feedback gaf dan gaf ik feedback terug en andersom was het ook wel een beetje. Dus dan als ik of amber feedback gaf dan was het ook meteen weer terug.

Are you happy with the amount of feedback you gave? Why?

Ja.

Women's Surfing Communities User Evaluation

Test nr:

Participant 1: Julie Participant 2: Lena

Date: Location:

Additional notes:

Observational notes:

General experience:

- Walk me through the experience of using the tool during this user test.

well I had a bracelet around my arm and I could look at the lights and see if I can communicate with participant 2. But i don't know if its so much about the bracelet or a way of communicating like we agreed on like 1 light would be not great, and 3 lights was like keep going, you're doing an amazing job so maybe I was a bt confused about wat we agreed so maybe that didn't help. I think in general the lights were pretty nice because you can really see them clearly. The only thing I noticed was that I was doing the origami thing and then I was looking at my arm I just couldn't see both at the same time. I guess it could be nice to see both at the same time, otherwise I have to stop what i'm doing.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

6

- What factors contributed to this?

I don't know if it is me who is not used to it, but the location of the button but I found it a bit uncomfortable. It is just not the most intuitive location. But I don't know how you could improve. But maybe the way you press it. But the lights I really like them because you can really see them.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?

8

- What factors contributed to this?

Yeah, I felt quite connected to participant 2. If we had a better way of communication I think that would have been better but i think that is just on us.

I think because I could see her. And because it is like the lights were not here to communicate but more to bring the attention of the person. So once you like play with the lights I would look at her, otherwise I would just be focused on my origami. Now I was like stop working look up at participant 2.

Receiving feedback:

- Tell me about your experience receiving feedback.

If im just focussed on my thing, I won't see the lights, or i won't see how many times they blink. I see the lights but I don't see the message. I see that I should look at it but I don't see the message.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other participant?

7

- What factors contributed to this?

I know but I already said it. Once you focus on your origami, if she was doing a difficult step, she won't really see the lights.

- How did the aspect of being seen make you feel?

Well its always a little bit sad when the other person doesn't see you but I could see her really focus on her origami and that made me smile so I think it was a good thing. So then the lights are only here when the other person is not doing great. If she is into her thing than she don't need the light. But when she is a little sad, than we can communicate. I think it's nice that when you are doing good you don't need the other person, but when you are like shit, somethings is wrong, you can call the other one. LIke a phone

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel encouraged by the other participant?

8, I felt quite encouraged

- What factors contributed to this?

I thikn I could also see how far she got with her origami so she could show me her work because at the start I felt so slow but then I knew that she was going great, but I also saw her struggling.

- How did the aspect of encouragement make you feel?

Well I think in general when you struggle you feel like I'm stupid and I struggle alone but when you see other people struggle they encourage you and they tell you yeah you are fine, its fine. Then I get less stressed and I can continue and keep moving.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did the received feedback affect your performed tasks?

- What aspects contributed to this?

I think it helps with not overthinking. So then it brings you back to a state of: let's just focus on the task becaues you know you have a connection with someone and then you know you are good and you can continue what you are doing. Not feeling alone I guess.

Giving feedback:

- Tell me about your experience giving feedback.

I think I never knew when I should give feedback because I want to help her and encourage her but if she is already doing a good job and she wants to be a bit on her own, I don't want to disturb her so I don't know when to do it.

Did Participant 2 sometimes disturb you?

I din't feel disturbed but I felt maybe a bit stressed that I would not see her message. Because it's not like the phone where you can check it out later. If she would send me a message and I missed it, I would miss it forever. So I was constantly checking my bracelet.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you notice the other participant?

9, I think a lot

- What factors contributed to this?

Then I guess it's that thing, what I said before, I know that I have the bracelet, but I don't want to miss the message so I constantly check my bracelet and think about participant 2.

I would say for a short experience it was really nice, because it felt like you were doing it together, but if you are doing it for a long time when surfing, over a couple of hours, that that would be almost like stressful

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel like you encouraged the other participant?

9

- What factors contributed to this?

I felt like I encouraged her.

So at first I was confused about the messages I was supposed to send like blinking lights, but yeah I was like its one and three so try to stick to that because she knows. I was also cautious of when I should send the lights. Participant 2 is someone who is really expressive so you can really see her face and how she reacts with a big smile so I could see she understood.

- How did the aspect of encouraging make you feel?

You can really see when she got the message or not and I think she is a funny character so it was funny to do with her.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did giving feedback affect your performed tasks?

I don't think it disturbed me, I just think the button and its location or maybe how you press it or me being confused but that was like a bit disturbing. But otherwise it was fine.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel connected to the other participant by giving them feedback?

9

- What factors contributed to this?

Participant 2 reactions. When she showed me how far she got and then I was oh wow, she got so far!

Quantity:

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?

- Are you happy with the amount of feedback you received? Why?

I think it was good, but her SOS message was a bit too much, but I just didn't understand.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

Are you happy with the amount of feedback you gave? Why?

I think if I had given more, it would have been disturbing, so I'm satisfied

If I had given less I would feel like oh I'm just focussing on my thing, and not focussing on participant 2

How happy are you with the ratio of feedback?

I think if she gave me less feedback (than I gave her) it would have been okay. If she gave me more feedback (than I gave her) I would have been stressed

Women's Surfing Communities User Evaluation

Participant 2

Test nr:

Participant 1: Julie Participant 2: Lena

Date: Location:

Additional notes:

Observational notes:

General experience:

- Walk me through the experience of using the tool during this user test.

You put the thing around me and Julie went away and I figured out I cannot put my hand here (on the table). And then I did my stuff and every time I felt like I should communicate now because I did something but then I felt like I'm showing off the whole time so I should send her some encouragement. Then I was sad because I couldn't go further and I did sad ones but she didn't always notice so I did a lot of sad ones.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

- What factors contributed to this? Well, once after you explained it quite intuitive. I mean I did not like on my own. I wouldn't have thought it would be light. Could also have been a sound with, like, I wouldn't have known.

But once you use it, it's quite good. So I guess could have been like a seven or eight. It's not like I immediately knew how it works obviously. I mean the red button is quite good. Because, you know, you have to press it.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?

- What factors contributed to this? I would give that ..No I felt more like oh we are doing something together. We are not doing the same origami together because we couldn't talk about oh this is not working. So it was more like, oh, where you at right now? Okay, I really don't get where you are stuck right now. Because it looks really weird. Like a six then but I was still connected. We played together, right? No because I wanted to battle her but I couldn't see where she was.

Receiving feedback: - Tell me about your experience receiving feedback.

I feel like I didn't receive that much feedback from Julie, but maybe I didn't see, um, And if it was more to get her my attention so that she can tell me by signing what she thought, But that was nice. That gave the connection again. We're doing this. Weuuu!

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other participant? Ah I felt seen So, A lot. I would say, nine nine. - What factors contributed to this? Well, I could make her see me. Okay because I could get her attention. Okay. Look what I did. It. She even understood my slow pressing. For sadness.

- How did the aspect of being seen make you feel? I felt more connected, so like I didn't feel we did the thing together but we had the experience together.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel encouraged by the other participant?

- What factors contributed to this?

Okay, it felt more encouraged because I wanted to win. I don't think it was because of the light. So I did feel encouraged but I don't know if that's But by

me communicate here and see that she wasn't as far as i am, i knew i was like, oh, i can still do this better. No, so maybe i would give it then maybe a six. It would maybe be different if you do something else. Feel like because we had the same thing. I wanted to be quicker than her.

- How did the aspect of encouragement make you feel?

It didn't feel as encouragement but more as a connection. But that made me feel nice.

Were there any points where he didn't feel encouraged or connected?

Another thing is that she cannot see my accomplishment. So i feel like if she would have seen oh i just solved this. Yeah, then she maybe would have said yeah. Oh like, oh no. But by like just getting attention and then hold it up I though that was a bit odd. I didn't feel encouraged in the sense of. Oh, i did something cool which everyone saw. I had to show off in order to to be encouraged.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extend did the received feedback affect your performed tasks?

- What aspects contributed to this? I don't think it really affected my task. I mean the staying in contact maybe did help to not give up because you could always show again. There's another way too much to competition. I don't know not that much. Like a four.

Giving feedback: - Tell me about your experience giving feedback.

I didn't really give feedback on what you did because i didn't see. So, i gave feedback on what i did. So when i was happier personally I pressed quickly and when i was sad because i didn't work I pressed slow. But i didn't feel like i was encouraging her in what she was doing. I tried that too sometimes but then she didn't see because she was really focused on her work. I had to intens stare at her Could be now been nice if it vibrates and she would have noticed.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you notice the other participant?

- What factors contributed to this? 8, i did notice because i wanted to talk to her. Because i wanted to see how far she is and i wanted to show how far i am. And we did talk about it before, like one means this and two means this and i think I already forgot, we didn't remember anymore what it was, but if you have like a press pattern then it is fun to communicate, it's like as If you know morse code, you know, maybe a secret language, all right.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel like you encouraged the other participant?

- What factors contributed to this?

A six, maybe. And they maybe not. i did not discourage her with doing it. But because we stay connected I feel like you didn't didn't give up and continue with 15 minutes so that i'm sure we can see where we both end up.

- How did the aspect of encouraging make you feel? I'm not sure about the encouraging part because i don't know if i encouraged her. It made me feel nice that we were connected during it.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extend did giving feedback affect your performed tasks?

Maybe seven eight, because I had a point to give my frustration or my happiness out and it's like i was a frustrated right now. I'm gonna try again so that i can be happy but i didn't i wasn't happy in the end.

- What aspects contributed to this?

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extend did you feel connected to the other participant by giving them feedback?

Nine nine. Yeah, because you can talk about your feelings and see. Oh, what are you at like? I would love to have like a question (on the wristband): What are you at? And then she could show hers. Like communication, even though we were far apart.

Quantity: - On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?

I think it is a good Like six. I felt like if she did it I always noticed too late or i was more showing off. Maybe i didn't see them. - Are you happy with the amount of feedback you received? Why?

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

Well, always during the step not much because now it's pretty simple. In between the steps I feel like, i gave a lot and also like a lot more than she thought she saw . I think she often gave feedback my laying her arm down. That also made me unless aware of real feedback, i think because she is just laying her arm down again.

Are you happy with the amount of feedback you gave? Why? Yeah i think i gave more but then i was also not stuck so long at one thing. So i could always after every step i had more steps that i just re-did or did not finish them.

Then six. I think I did way more and then there was imbalance so I did lessain.

Women's Surfing Communities User Evaluation

Test nr:

Participant 1: Anouk Participant 2: Fee

Date: Location:

Additional notes:

Observational notes:

General experience:

- Walk me through the experience of using the tool during this user test.

Nou in het begin ging het aanbrengen best makkelijk, met de klipjes. En toen we een maal bezig waren toen vond ik het wel een leuke ervaring dat je elkaar zo signalen kon sturen zeg maar. Het was soms kreeg ik wel lichtjes terwijl ik niet wist waar het vandaan kwam. Toen was zij nog bezig en ik weet niet. En verder.. Ik vond het wel leuk om zo met elkaar te kunnen signalen.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

7

Het gebruik sprak wel voor zichzelf. Het was wel makkelijk met de knop. Je kreeg duidelijk signalen met het licht. Het was wel duidelijk wanneer ik een signaal ontving van Participant 2 en zij had ook meteen door wanneer ik haar signaal gaf en dat was ook wel leuk. Ik merkte wel echt dat het werkte zeg maar. En qua hoe het zat, het zat wel prima. Het is wel een beetje een lompe ding maar verder van gebruik werkt het wel goed.

- What factors contributed to this?

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?

8

- What factors contributed to this?

Het voelde wel echt alsof we samen bezig waren en we konden wel echt met mekaar communiceren zonder dat we met elkaar aan het praten waren echt. Je bent toch wel op een manier met elkaar verbonden. Je bent dan toch wel signalen naar mekaar aan het geven en een beetje zo van Oh ja het gaat goed of ik weet niet zo goed hoe en wat.

Receiving feedback:

- Tell me about your experience receiving feedback.

Wanneer ik het signaal kreeg dan ging ik wel meteen naar haar kijken om te zien wat ze wilde melden. En ik voelde wel toch wel een soort van verbonden dat je met elkaar, ook al zit je niet, praat je niet echt met elkaar, kon je toch wel communiceren. Vond ik wel leuk.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other participant?

Dat weet ik niet helemaal. Op zich afentoe als zij aan het twifelen was of als zij dacht dat het goed ging. Dan is het cijfer denk ik een 6. Ik weet niet of het door de origami kwam en zij was dan best druk bezig en af en toe keek ze naar mij maar ze was niet echt bezig met wat ik aan het doen was. Alleen misschien om af en toe te kijken om te kijken hoe gaat het bij jou.

Ik denk als je het tijdens het surfen draagt akn je niet altijd met elkaar te praten maar het is wel leuk als je elkaar een soort van hype te geven als het goed gaat. En dan kijk je misschien ook iets sneller naar mekaar als de een bezig is en de ander niet. Maar nu met het origamien was je vooral bezig met je eigen projectje. En dan had ik ook het idee dat zij niet heel veel naar mij keek perse.

- What factors contributed to this?

- How did the aspect of being seen make you feel?

Nou dat voelde toch wel een beetje verbonden en leuk. Dat ze me zag.

maar het voelde dat ze soms niet echt keek maar dat maakt ook niet zo veel uit maar het was prima als ze niet keek en met haar eigen ding bezig was maar als ze wel keek dan was het toch wel leuker, leuk contact.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel encouraged by the other participant?

7 want wanneer ik het even niet wist of wanneer het slechter ging dan gaf ze wel een signaal van Oh lekker bezig! ofzo.

- What factors contributed to this?

- How did the aspect of encouragement make you feel?

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did the received feedback affect your performed tasks?

5

- What aspects contributed to this?

Het voelde aan de ene kant omdat ik haar kon zien, wist ik ook dat zij bewust van mij was maar aan de andere kant sta je er wel alleen voor dus hoe ik het uitvoerde had ik niet het idee dat zij er heel erg aan bijdroeg.

Giving feedback:

- Tell me about your experience giving feedback.

Dat vond ik wel echt leuk! Ik vond het wel leuk om haar te aanmoedigen met Kom op je kan dit! en ik vond het wel leuk om signalen te geven als ik ook niet goed wist hoe het moest dat ik dan haar kon signalen van ! En als ik wel wist hoe het moets of als het wel beter ging dan kon ik haar ook signalen dat vond ik wel een leuk element in plaats van dat je alleen op afstand zit zonder wearable.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you notice the other participant?

8

- What factors contributed to this?

Ik denk dat je toch wel samen bezig bent met hetzelfde en omdat ik wist dat zij ook die band had wist ik dat ik haar ook een beetje in de gaten kon houden en haar signalen kon geven als ik zag dat het goed ging of minder goed ging. Dus ik lette wel meer op haar omdat ik dat ding om had.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel like you encouraged the other participant?

7

- What factors contributed to this?

Ik had wel het idee dat ik haar wel probeerde aan te moedigen. Dat deed ik dan door haar dan een signaal te geven als ik haar bezig zag en af en toe op die manier contact te zoeken.

Op welke momenten ga je deze signalen?

Ik gaf ze op momenten dat ik dacht dat ze ze nodig had en ook wel als ik zag dat ze lekker bezig was met het vouwen en dat ik acht van nu kan ik wel ff supporten. En ook wanneer ze het liet zien. Wanneer ze aan het surfen zou zijn en ik zou dat zien dan zou ik wel een soort van melding geven van Lekker bezig!

- How did the aspect of encouraging make you feel?

Dat voelde wel goed. Ik vind het sowieso leuk om aan te moedigen. Ik weet niet zo goed wat ik nog meer kan zeggen :)

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did giving feedback affect your performed tasks?

4

- What aspects contributed to this?

Het is wel met elkaar bezig maar toch ben je heel individueel bezig dus het is niet dan mijn performance veel beter werd wanneer ik haar aanmoedigde maar wel dat we er samen voor staan. Maar niet dat het aanmoedigen mijn performance beter maakte ofzo.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel connected to the other participant by giving them feedback?

8/9

Ik voel wel echt een beetje verbonden dat ik haar kon aanmoedigen en dat zij mij kon aanmoedigen.

Quantity:

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?

Misschien aan de weinige kant. Ik denk een 4 of een 5

- Are you happy with the amount of feedback you received? Why?

Ze gaf wel afentoe feedback maar niet heel vaak. En misschien had ik het wel leuk gevonden als het wat meer feedback was maar ik snap ook dat je bezig bent met je eigen ding

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

6 of 7

Are you happy with the amount of feedback you gave? Why?

Ik vond het wel leuk om feedback te geven dus daar ging ok ook wel vaak mee bezig maar ik weet niet hoe zij dat zelf vond dus dan kon ik niet zeker weten of dat dan goed was en of dat haar dan hielp of juist niet.

What did you think of the ratio of feedback?

Het hoeft niet perse gelijk te liggen. Ik denk dat de een daar wat ander in werkt dan de ander en dat het ook een beetje verschilt met wat je aan het doen bent en hoe het gaat.

Women's Surfing Communities User Evaluation

Test nr:

Participant 1: Anouk Participant 2: Fee

Date: Location:

Additional notes:

Observational notes:

General experience:

- Walk me through the experience of using the tool during this user test.

Ik heb net een schildpad proberen te vouwen van origami, uit een papiertje, en daarbij had ik een armband om die ik met iemand ander die ook die schildpad ging vouwen op hetzelfde moment et wie ik kon communiceren. Of dat een beetje goed ging en of we elkaar konden supporten daarin.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, how intuitive did you find the tool's design?

5

- What factors contributed to this?

Nou als je op het knopje klikte dan maakte het geen geluid of gevoel dus je moest echt contunie naar dat ding kijken of de ander je een seintje gaf. Dus soms dan was ik aan het seinen maar dan had ze niks door want je moet echt focussen op die armband wil je het meemaken en ook het was nu gewoon een lomp onhandig device wat afleidde van wat je aan het doen was en al helemaal als je gaat surfen dan is dat geen mogelijkheid natuurlijk.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, did you feel like you were playing together with the other participant?

Ja dat was wel nice. 7.5

- What factors contributed to this?

Wel dat je elkaar op een afstandje kon zien en je hebt toch niet het gevoel alsof je het helemaal alleen doet, al kan je niet helemaal communiceren, toch met een klein signaal. Je bent toch samen ofzo.

Receiving feedback:

- Tell me about your experience receiving feedback.

Het was wel leuke elke keer als dat ding af ging, maar ook wel een beetje vaag, want dat lampje gaat, maar dan wat? Dus het is leuk maar je hebt geen concrete feedback. Maar dat maakt het ook wel weer een beetje geining zo van we communiceren iets maar we weten niet wat.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel seen by the other participant?

6

- What factors contributed to this?

Omdat ik denk ik ook 40 procent had ze niet dor dat ik signalen gaf.

De keren dat ze me wel zag dan was het wel ff lachen en dan lieten we elkaar ff onze stuggles zien, dan zagen we elkaar wel en gingen we signalen naar elkaar geven.

- How did the aspect of being seen make you feel?

Als ze me niet zag, voelde ik me een beetje alleen, left along, okay jongens is er iemand die mij kan helpen, en als ze me wel zag dan kreeg ik wel weer positieve moed daarvan.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel encouraged by the other participant?

7

- What factors contributed to this?

Omdat het elke keer dat je contact had dan kreeg je wel weer positieve energie om nog weer een poging te doen omdat je dan ook wel het gevoel hebt dat je niet alleen bent en zeker als die andere persoon voorloopt op jou en laat zien hoe het wel moet.

Lukte het om te laten zien hoe het wel moet?

Nee, maar het motiveerde me wel omdat ik dan dacht, als zij het kan dan moet ik het ook kunnen.

- How did the aspect of encouragement make you feel?

Sociaal. Dat je niet het gevoel hebt dat je iets in je eentje aan het doen bent maar dat je het samen doet.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did the received feedback affect your performed tasks?

7

- What aspects contributed to this?

Het had niet daadwerkelijk gelukt of beter gegaan maar mentaal stond ik er wel positiever in. Als ik het in mijn eentje had gedaan, had ik wel eerder opgegeven.

Giving feedback:

- Tell me about your experience giving feedback.

Ik wist niet echt wanneer ik signalen moets sturen want ik kon niet echt zien wat zij deed dus ik wist niet wanneer ik moest zeggen Aight je doet het goed! want ik had geen idee waar ze mee bezig was. Dus het was gewoon een beetje random, om de zo veel tijd dacht ik ik ga even op het lapje klikken.

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you notice the other participant?

5.5

- What factors contributed to this?

Moelijk om te zien wat zij aan het doen was. Omdat die armband dus geen geluid of trilling gaf

- On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel like you encouraged the other participant?

7

- What factors contributed to this?

Dat je toch ff lacht naar mekaar en dan zeg maar niet echt fysiek contact maar uitbeeldend contact hebt. Dat je non-verbaal contact hebt en dat je dan positieve feedback als ze lachtte.

- How did the aspect of encouraging make you feel?

Vrolijk zeg maar ook. Het had een positieve invloed op het process.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, to what extent did giving feedback affect your performed tasks?

Vrij neutraal. 6

- What aspects contributed to this?

Omdat het niet echt hele concrete feedback was dus je kwam er niet daadwerkelijk verder mee maar omdat je wel iets van contact had gaf het wel de moed om niet op te geven.

On a scale from 1 to 10, with 1 being not all, and 10 being completely, to what extent did you feel connected to the other participant by giving them feedback?

7.5

Quantity:

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you receive from the other participant?

- Are you happy with the amount of feedback you received? Why?

Het was voor origami was het prima, was het goed, ik denk dat als je wil surfen dat het dan wel minder kan zijn.

- On a scale from 1 to 10, with 1 being not all, and 10 being a lot, how much feedback did you give to the other participant?

Ik probeerde het gelijk te houden zeg maar. Alleen ik denk dat ik vaken naar die armband keek dan anouk

Are you happy with the amount of feedback you gave? Why?

What do you think about the ratio of feedback?

Je moethet wel een beetje in balans houden anders is het wel een beetje lullig tegen over de ander, alsof die het niet goed doet. Zeker omdat je niet concreet kan communiceren.