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Provoking Conversation about Unequal Pay in a Work Environment Through Design

Women's Empowerment in HCI

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ABSTRACT

Women have for centuries been subject to systematic disadvantages, especially in regard to unequal pay [1] [8]. With the move to the third wave HCI, empowerment has become a central focus area and an interesting research aim for the HCI community [20]. Through studies with women, we learned that women experience gender inequality and feel non-empowered at their workplace [3]. We have engaged ourselves with this topic as an interest to investigate how we through a critical design can stay with the trouble [22] of unequal pay to provoke conversation and empower women in a work environment. Towards the end of the paper, we report on a field study and conclude by reflecting on staying with the trouble through conversations, how provocation helped the participants stay with the trouble of unequal pay, and the reliability of our guidelines for empowerment. With this paper, we contribute to research within women's empowerment in the work environment.

KEYWORDS

Interaction Design; Feminism; HCI; Research through Design; Critical design; Provocation; Unequal Pay.

1. INTRODUCTION

Women have for centuries fought for their voices to be heard, and even though over half of the global population are women, they continue to be subject to systemic disadvantages, especially in terms of unequal pay [1] [8]. The statistics from Denmark's Ministry of Employment of men and women on the labor market 2020 shows that men have, on average, a higher salary than women [8]. When looking at the standard hourly earnings, men earned on average 20,5% more than women in the regional sector, while the gross wage gap was 11,8 % more in the private sector [8]. The continuation of inequality in today's society marks women as a marginalized group in a patriarchal society, which puts a limit to women's access to resources and specific roles [5].

Working in the field of HCI, it is interesting to explore how feminism positions itself in HCI and looking at the transition from second to third-wave within the field. There has been a

shift from the workplace and into everyday life [6], and with the emergence of the third-wave HCI, there is a turn to new elements of human life, where culture, experiences, and human emotions are included [11]. Empowerment is a central focus area in the emergence of the third-wave and has become interesting research aims for the HCI community [20]. Michael Muller [16] addresses issues of power and privilege through "who" questions, "*Who speaks for women?*" Those who possess power in a setting can determine who gets to speak, and who remains silent [16]. Power is an underlying concept of empowerment, where Arendt states: "*Power is a something - anything - which makes or renders somebody able to do, capable of doing something* [20]." When looking at women's experiences with gender inequality and non-empowerment, the feeling of non-empowerment often occurs in the work environment. Women express feelings of non-empowerment as a central focal point towards the topic of unequal pay [3].

Our aim in this paper is to explore how a critical design can empower women and provoke conversation of unequal pay in the work environment through a Research through Design (RtD) approach [24]. Through our contributions to women's empowerment, we lean on the *feminist standpoint theory* [5], which states that women's viewpoints and knowledge are inevitable for social science research, and these types of knowledge should be recognized [5]. Moreover, we lean on *Staying with the Trouble through Design*, which advocates for anti-solutionist and responding to trouble, instead of creating a solution to a problem [22].

Our work is guided by the following research question:

How can we through a critical design stay with the trouble of unequal pay, and provoke conversation in a work environment to empower women?

We do not propose a solution to the problem but focus on staying with the trouble of unequal pay. We believe that if we through a design can stay with the trouble and learn to be

truly present, then it can respond better to the complexity of political, social, and cultural issues we face in society [22].

Our paper is structured as follows; Firstly, we present related work within empowerment in HCI, and a description of workshops conducted to understand women's experience with gender inequality and empowerment. Secondly, we present our critical design among how we have designed for empowerment. Lastly, an introduction to our field study and a discussion of our study in regard to staying with the trouble through conversations, how provocation helped the participants stay with the trouble of unequal pay, and the reliability of our guidelines for empowerment.

2. RELATED WORK

With the move to third-wave HCI, different aspects of interactions have positioned a focus in the HCI community [20]. The concept of *empowerment* is one of these aspects, and looking at existing research in HCI, empowerment is a recurring theme in HCI research. In this section, we will make a distinction between a more general view on empowerment in HCI to a more narrow view on women's empowerment in HCI.

2.1 Empowerment in HCI

Within the HCI community, there is an increasing interest in empowering individuals through technology [20]. There are different interpretations of the concept of *empowerment* and a substantial amount of research in this area. To back up our knowledge of existing research within empowerment in HCI, we lean on a framework conducted by Scheider et. al [20], which focuses on analyzing empowerment in existing HCI research.

Several of the related papers have taken a holistic approach to empowerment, which suggests that the parameters of *feeling*, *knowing*, and *doing* play into a successful empowerment process [20]. Scharin et. al [19] developed *The Vocal Chorder*, which according to the authors, empowers opera singers through the changing self-image (feeling), lets them take control over the pace of the rhythmic, and the overall aesthetic outcome of the performances (doing and knowing) [19, 20]. Similarly, Bickmore and Jack [9] designed a virtual nurse that eases the helplessness feelings patients in hospitals might have (feeling), and provides them with knowledge about their condition (knowing), which can result in the patients making better decisions regarding their condition and taking action (doing) [9, 20].

Looking at empowerment through a design mindset, users feel empowered by having their voices heard when being in the center of the design process [20]. Bossavit et. al [10]

empowers autistic teens by giving them specific roles in different design sessions. Through the assigned roles as "designers," "testers," and "users" etc, the teens cooperated with their teachers to develop educational games to improve skills within geography [10].

The main takeaway from these studies is that participatory approaches, where individuals get their voices heard can be considered empowering, and holistic approaches to empowerment emphasize the parameters of feeling, knowing, and doing as a crucial element in a successful empowerment process [20].

With this in mind, we seek a deeper understanding of women's empowerment in HCI, by exploring existing research within this area of focus. Empowerment of women seems to be a recurring theme within two research directions: *Empowerment through the body* and *Empowering marginalized women*. Five studies were identified within women's empowerment in HCI, and in the following sections we will explore existing research of women's empowerment in more detail.

2.2 Empowerment through the body

HCI has moved in the direction of designing for women's health and the intimate body [2]. Three studies were identified within the area of women's empowerment through the body. This work ranges from improving the experience of motherhood [14], to empowering women through an improved understanding of their bodies [2], and provoking discussion about the norms of the body and what is considered taboo in design [23]. These research papers are empowering towards women, since women are supported with knowledge of their body, and getting their voices heard as creators in the design process.

D'Ignazio et. al [14] explores the complex life phase of motherhood, through a participatory approach, with the goal of improving the breast pump. The concept of empowering women is emphasized in their participatory approach, by giving breast pump users the role as creators of ideas to improve the breast pump [14]. As argued in [20] users feel empowered by having their voices heard.

Almeida et. al [2] explores women's understanding of their intimate anatomy through *Labella*, which is an augmented system that supports knowledge of the body. Their findings showed that many of the participants found the interactive self-discovery through *Labella* empowering [2]. Another interesting factor from the research is the concept of breaking the taboos through awkward learning experiences. Within the awkward learning, the authors discuss that women's

reflection of the body being “funny” and “strange” seeks to strengthen the fact that humorous interactions revolving around the body can be lucrative in breaking taboos and encouraging conversations [2]. Labella empowers women through an improved understanding of their bodies and empowers the concept of ‘looking’ through embodied perception [2].

A similar study, PeriodShare, is a RtD case study conducted by Søndergaard and Hansen [23]. PeriodShare is a design fiction that speculates on a near future of menstruation, where transmitting data from a woman’s period to her social network would be considered a normal activity [23]. The authors have designed PeriodShare to critically explore the tracking of menstruation, and from a wider perspective provoke discussions and questions about the norms of the body and what is considered taboo in design [23]. An interesting discovery in this paper is the fact that some visitors at an exhibit considered PeriodShare “empowering” and “provoking,” which opened up for a discussion that was deeper than the authors initially explored in their research [23].

2.3 Empowering marginalized women

We were interested in exploring women’s empowerment in more detail through literature that has a main purpose of empowering women. Two studies were identified within *Empowering marginalized women*. These studies range from designing technologies that are empowering and supportive for women in crises [12], to recommendations for technological designs that empower women in developing countries [21]. Although the related work within this section focuses on empowering marginalized women in developing countries and low-income women in Australia, the research papers have an interesting focus on women with financial struggles. This was interesting for our study, since it was one of the few areas that were close to the scope of our research.

Capel et. al [12] focuses on generating ideas for technologies that are supportive and empowering for women in crises (financial struggles). The authors had female participants who all had financial struggles in order to explore common challenges amongst women. The authors identified three challenges: living conditions, social isolation, and stigma [12]. From the stories and experiences from the female participants, the authors discuss three implications for design that supports and empowers women in crisis: *Sharing accommodation*, *Engaging in social and community based activities*, and *Participating in an online creative community hub* [12].

Similarly, Schroff and Kam [21] present a design model for empowering women with low income in the developing world. The authors conducted 15 weeks of field study with NGO and challenged women, with the aim of channeling the learnings from the fieldwork to design recommendations [21].

With the knowledge of existing research, we discovered a gap within empowerment of women in a work environment, which therefore backs up our contributions of gaining knowledge and designing for women’s empowerment in a work environment.

3. UNDERSTANDING WOMEN'S EXPERIENCES WITH INEQUALITY AND EMPOWERMENT

Our process of understanding women’s experience of gender inequality and empowerment in a work environment was grounded in the *feminist standpoint theory* [5,6] and the *feminist interaction design qualities* [5].

The feminist standpoint theory advocates that women’s viewpoint and knowledge are inevitable for social science research, and these types of knowledge should be recognized [5]. This theory states that women produce different knowledge than men, and this knowledge should be recognized to reveal unexamined suppositions and avoid one-sided views of social life [5]. It does more than fleshing out a standpoint, it also proposes a strategy to achieve objectivity, where the theory introduces what is called *strong objectivity* [6]. With the focus on *strong objectivity*, one engages with the marginalized in two ways. The first way is to focus on the experiences of the marginalized, and the second way is to collaboratively decide what research to conduct by involving the marginalized actively [6].

To understand women’s experiences of inequality and empowerment, a series of workshops were conducted. Through these workshops, we gained insights into women’s experience with non-empowerment, empowerment, and gender inequality.

In the first steps of gaining insights for designing a critical design, we emphasized Bardzell feminist interactions design qualities; *pluralism*, *advocacy*, *participation*, *ecology*, *embodiment*, and *self-disclosure* [5].

Pluralism engages with nurturing the marginal and resists a universal point of view in designing. Moreover, this quality foregrounds cultural differences, engagement with diversity, and benefits to include the marginal in design solutions [5].

Advocacy engages with the dilemma of designers perpetuating harmful and regressive practices. When conducting needs analysis, designers are often working within the status quo and can run the risk of imposing their own values on users [5]. This quality forces designers to question and understand what an “improved society” is and how one can achieve it [5].

Participation values user involvement in both the creation phase and when evaluating designs. It encourages participation continuously and having ongoing dialogues between users and designers [5].

Ecology integrates an awareness of an artifact, and the effects it has in different contexts. It integrates awareness of the stakeholders and how the design artifact affects all stakeholders [5].

Embodiment urges to push the field of HCI in the direction of human sexuality, gender differences, emotion, and gender commonalities [5].

Self-disclosure refers to which extent software affects subjects by rendering visibility. It focuses on attracting the user's awareness of what the software is trying to make of them, by introducing a distance between interactions and the user [5].

These qualities were considered when conducting our study, and we operationalized several of the feminist interaction design qualities throughout our study with women. *Participation*, to give women a voice and gain insights into their experiences and create a path to creation in cooperation with women [5]. *Pluralism*, to nurture the marginalized and engage with diversity, by listening and understanding women and including their view in order to stay with the trouble [5]. When involving women in our study, we were aware of the quality of *Advocacy*, since we wanted to be careful not to run the risk of imposing our values on the participants [5]. These three feminist interaction design qualities have followed us in all the aspects in the process of understanding women's experience of inequality and empowerment.

3. 1 Workshop A – Understanding inequality and non-empowerment

In our previous study *Feminism and HCI: Exploring gender inequality with women* [3] two identical workshops were conducted. The purpose of these workshops was to understand women's experiences with non-empowerment and gender inequality. Before the workshops, we asked women to send us anonymous stories, describing situations where they felt non-empowered and inequality. The

participants were also encouraged to watch a video [15] that addresses inequality in today's society.

3. 1. 1 Demographics

The two workshops were conducted with nine women in the age group of 23 to 35 years, with different nationalities. Six of the participants were students, whereas the rest had full-time jobs. The workshops were conducted online at Zoom over two days and lasted for one and a half hours.

3. 1. 2 Process

We received a total of 33 anonymous stories from women, and at the beginning of the workshop, we handpicked a number of these stories to read aloud to the participants. The stories were used as a foundation for an in-depth discussion of the women's experiences, and opinions towards it.

After discussing the stories and their general thoughts on gender inequality, the participants were asked to sketch. We gave them two options; a) Sketch a technological solution that would empower you at the moment based on one of the stories you have heard today or b) Pick one of the stories you have heard today and sketch a technology that would provoke men in order for them to understand there is a mismatch of power. Each participant presented their technological ideas and their thoughts at the end of the workshop.

3. 1. 3 Outcome

The results from these workshops indicated that the majority of the women had experienced gender inequality and felt non-empowered at their workplace. There was a clear indication of sensibility around this topic, and a lot of energy was put into discussing this area. Moreover, looking at the anonymous stories that were sent to us indicated a clear frustration concerning non-empowerment and gender inequality at the workplace:

“Situations occur at my workplace, where I feel non-empowered. For example, I am the one to show new employees around the company and introduce them to everything. When they are meeting me for the first time, I get introduced as the CEO's wife. Every time this happens I feel “non-empowered,” because I need to work harder to prove my worth.”

“My male colleague is getting paid 10-15.000 DKK more than me every month, even though we are the same value for the company.”

The findings showed that women experience degradation because of their gender, trouble with equal pay, and stereotyping at the workplace (for more details see [3]). The

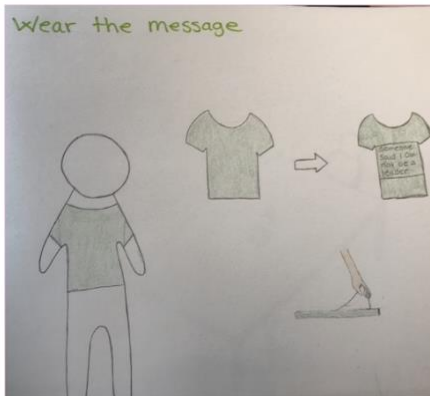


Figure 1: Wear the message. A wearable shirt that expresses the experiences women have had during their workday to gain reactions.

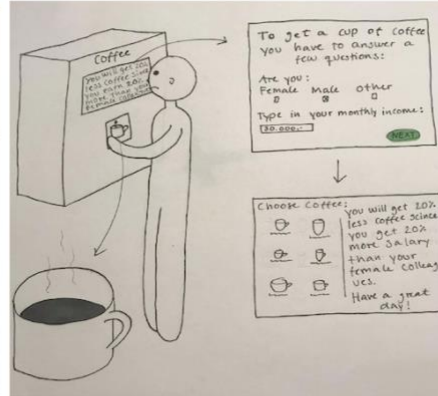


Figure 2: Judging coffee. A coffee machine that fills up your coffee mug depending on how much more salary you get compared to other genders at the workplace. If a man earns 20% more income than the women at the workplace, he will get 20% less coffee.

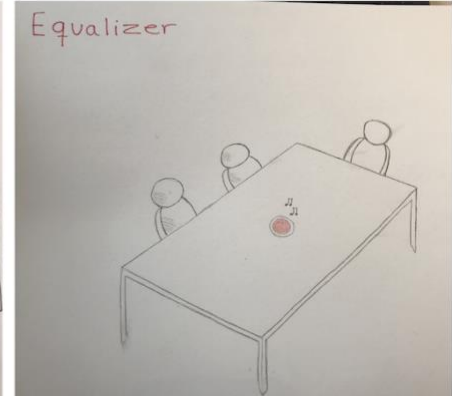


Figure 3: Do not interrupt. A "Buzzer" that will make a loud noise and say: "Please, do not interrupt the woman" if anyone interrupts a woman in the meeting.

findings from these workshops helped shape the direction for our further study, by providing us with the knowledge of women's experience of non-empowerment and inequality in a work environment.

3. 2 Workshop B – Understanding what empowers women

For the third workshop, we gathered participants for a design critique session to explore three design ideas. We wanted to dig deeper into the area of empowerment in the work environment to understand how a design can empower women and provoke conversations.

3. 2. 1 Demographics

Participants were recruited through our network at LinkedIn were women who had an interest in the area of gender inequality, volunteered for the workshop. This resulted in four female participants who all had a say in the topic and a personal interest to improve the current situation of gender inequality at the workplace.

3. 2. 2 Process

At the beginning of the workshop, three critical design ideas were presented to the participants to gain insight into their thoughts on our ideas, and to understand their opinions of provocation without neglecting the empowerment of women, see figure 1, 2, and 3. The design ideas emerged from the findings in Workshop A, where we conducted several sketching phases anchored in the participant's personal stories. The three ideas presented were anchored in women's experience of degradation because of their gender,

trouble with equal pay, and stereotyping at the workplace. The designs were presented along with questions that addressed the designs effectiveness in provoking conversation and empowering women.

As a part of the workshop, we asked the participants to sketch design ideas with the focus on provoking conversation and empowering women in the workplace. The participants were given three focus points for the sketching session based on the outcome from our previous workshops: Trouble with *unequal pay*, *stereotyping at the workplace*, and *degradation because of their gender*.

3. 2. 3 Seven guidelines for empowerment

The outcome of the workshop resulted in seven guidelines to consider when designing a critical design with the purpose of making women feel empowered in the work environment. These guidelines emerged from the participants' ideas and were anchored in their opinions and reactions to the presented critical designs. The seven guidelines are:

G1: Don't want too much attention

Do not make the design create too much attention towards women. Instead of feeling empowered, it could make them feel like a victim where all the negative attention goes to them.

G2: A passive-aggressive punishment

The design should be provocative but, in a passive-aggressive way that gives men a little punishment but still has a sense of humor. By doing that, the participants believe that it will create awareness and conversation among colleagues.

G3: Use something that's already there

Provoke through something already present at a workplace that they cannot avoid using every day.

G4: Not a given on "us against them"

The design must not create a "us against them" state, but more a general idea that involves everybody. The critical design needs to address the overall issue.

G5: Be aware of the side effects

It is important to be aware of the side effects when using the critical design, to ensure that it does not give an unintentional benefit.

G6: Don't point to a specific person

The critical design should not point out one specific person. It goes for all genders. It should focus on a group of people or a gender.

G7: Shouldn't affect the work

The critical design should not affect how they do their job or make them less productive.

4. THE EMPOWERING CUPS

The Empowering Cups were designed to empower women and provoke conversation of unequal pay in a work environment. With the seven guidelines in mind, we designed The Empowering Cups, which consists of four cups with different shapes that gradually evolve from feminine to masculine, see figure 4. Through shifting statements revolving around unequal pay, we intend to provoke conversation about the given issue. The Empowering Cups are to be used at workplaces where employees will use them as a normal coffee cup and take them to meetings, their workplaces, canteen, etc.



Figure 4: Empowering Cups

The Empowering Cups acted as our artifact in our RtD approach [24]. In RtD, design artifacts are outcomes that can change the world from a present state to a more preferred one, and transfer knowledge through the artifact to research [24]. We want to stay with the trouble of unequal pay, and therefore, we do not propose a solution to the problem with the design [22]. We believe that if we through a design can stay with the trouble and learn to be truly present, then it can respond better to the complexity of political, social, and cultural issues we face in today's society [22].

When creating a critical design, the concept of provocation is a centralized focal point, since it "challenges the status quo," and thereby, seduces the viewer into a world of ideas rather than objects, by sparking debate, raising awareness, and provoking action [4]. Provocation was an important element to include in the design of The Empowering Cups since we aimed to provoke conversation of unequal pay in a work environment, empower women, and challenge the way things presently are by staying with the trouble of unequal pay.

We explored ways provocation can be defined in a design, and according to Bardzell et al., interaction designs can be categorized into *conceptual*, *functional*, and *aesthetic* provocation [7]. Conceptual provocation is about understanding the concept that needs to be challenged through a design. Functional provocation deals with how the design works, and how far from the norm it operates. Lastly, Aesthetic provocation being the design's overall visual look, and how far from the norm the visual look deviates [18].

In the following sections, we will present how The Empowering Cups characterizes as conceptual, functional, and aesthetic provocative.

4.1 Conceptual provocation

In relation to conceptual provocation, we decided to challenge the idea of unequal pay between genders. The focus of challenging unequal pay was given by two factors: A) Our studies with women showed that unequal pay was a reason as to why women feel non-empowered in the work environment [3]. B) The statistics show a wage gap in the Danish society when looking at the standard hourly earnings [8]. Men earned on average 20,5% more than women in the regional sector, while the gross wage gap was 11,8 % more in the private sector [8].

The Empowering Cups takes up this issue, through the four different cups that gradually evolve from feminine to masculine and 16 different statements that each represents unequal pay. A flexible display was placed at the center of

the cups, where three different statements will run in a loop, see figure 5.



Figure 5: Display at the center of the cup

The Empowering Cups were inspired by coffee cups in work environments, since guideline 3 (G3) from our studies with women, suggested using something already present at the workplace. This was an interesting idea to us, since it is something that most people cannot avoid using during their workday. Moreover, we needed to ensure that the design does not disturb or affect individuals' work, as presented in G7. Therefore, the cup became the basis of the design, since we believed it would create a minimum distribution to the individual's work.

From our studies with women, we learned that the design should not point to a specific person, as suggested in G6. We took this into consideration and instead of only having a male and a female cup, we decided to be inclusive to all genders. Therefore, we created a stand for the cups to represent different genders. The stand was created with a female sign on the right side and a male sign on the left side, whereas the middle represents the genders in between, see figure 6.



Figure 6: The stand for The Empowering Cups

There were many considerations in regards to the purpose of the design, and who the main target group should be. One of our main focuses was empowerment and designing for women, but we did not want the risk of ghettoizing women [1], as if they are different from others in the society. This goes hand in hand with G1, which states that women do not want too much attention with a design, because instead of feeling empowered, they would feel victimized. Therefore, we decided to move The Empowering Cups in the direction of including everybody, as G4 suggests, it's not a given on "us against them," but still having the focus on supporting and empowering women in the area of unequal pay.

4. 2 Functional provocation

The Empowering Cups operate far from the norm by having a far more extreme expression in the shapes that makes them difficult to hold, and the fact that there are shifting statements that address unequal pay between genders.

The functional provocation was forced by provocative dilemmas, as according to Ozkaramanli and Desmet [17] can be through *Embodied Symbols*: Clues that can represent conflicting concerns. The Empowering Cups forces a provocative dilemma to the individuals, by having statements (clues), which represents conflicts between a female and a male viewpoint on unequal pay. The purpose of the statements was to provoke conversation on the topic of unequal pay. The individuals can take ownership of the statements, by selecting three out of the 16 statements based on which view of unequal pay they want to represent. The reason for this choice was that we wanted to create an interaction for the individuals. The three statements were running in a loop to give the option to reach a broader perspective on unequal pay, depending on individuals' viewpoints, and to provide different areas to discuss during conversations.

The statements displayed on the cups were anchored in facts of unequal pay, or on what provokes or empowers according to the participants of the workshops. We wrote down 16 different statements the participants could choose from in our field study. The statements were divided into statements from the male, female, and gender-neutral points of view, where there were both provocative, motivational, and general statements of unequal pay (see Appendix 1).

4. 3 Aesthetic provocation

The aesthetics of The Empowering Cups deviates from the normal visual look of coffee cups, by having different shapes, and a display showing statements. The Empowering Cups were designed with different shapes to represent different

genders. There is a clear difference in the aesthetics between the four cups to indicate that we are not equal. The shapes go from aggressive with spikes (masculine), to a softer expression with round shapes (feminine). We shaped them according to stereotypical associations of male and female, by making the feminine cup curvy and soft, and the masculine cup hard and pointy.

The masculine cup was designed with spikes for a more aggressive view towards men, and was shaped to make it difficult to hold, see figure 7. Men are the ones with the advantages in relation to income [8], and therefore the masculine cup was designed with a little disadvantage as G2 suggested about provoking through a passive-aggressive punishment pointed towards men.



Figure 7: The masculine cup

The shapes of the feminine cup gradually get more comfortable to hold and softer in its expressions. The shape of the feminine cup was inspired by the round shapes of the female body to create an advantage for women when holding the cup, see figure 8.



Figure 8: The feminine cup

4. 4 Constructing The Empowering Cups

The Empowering Cups were created from hard plastic cups with a removable metal inside where the bottom of the plastic

cup was extended 3 cm to fit the electronics. The shapes of the cups were formed in paper and attached to the outside of the plastic cup with gauze, and for a more ceramic look, we used clay to finish off the cups. At last, we painted the four cups with white spray paint to give them a blank finish that was easier to clean and wipe off. After creating the cups, we assembled them with the electronics. The flexible display was taped on the inside of the plastic cup to fit into an opening created for the display. The rest of the electronics were carefully placed into the bottom of the plastic cup, see figure 9.



Figure 9: Inside of The Empowering Cups

The hardware used for the cups was a flexible e-paper display (1), e-paper driver hat (2), an Arduino Nano (3), and a battery (4). The e-paper display was connected to the e-paper driver hat, to control the display. The driver hat was connected to the Arduino Nano controller board through an SPI interface, see figure 10.

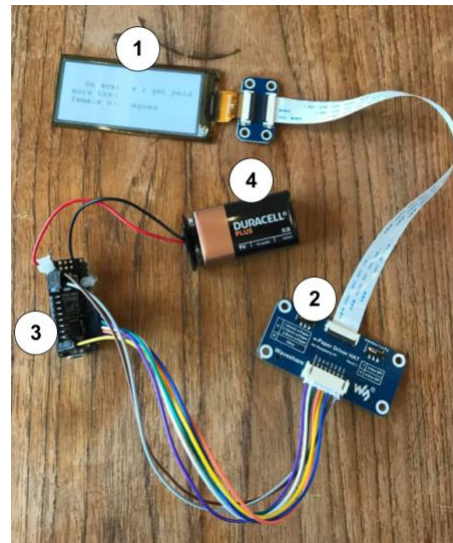


Figure 10: Empowering cups hardware

We programmed the Arduino Nano in C through Arduino Genuino, where an amount of the code was open-sourced. The flexible e-paper display was programmed so the statements selected by the participants would run in a loop with a delay of 15000 ms. The 16 statements were placed in the beginning of the code and acted as a pointer to a void pointer declaration with information about the rotation, color, and font of the text and display (for more information on the code, see Appendix 2).

5. FIELD STUDY

The following subsections provide details on our participants, the process we followed, the data collection methods, and the procedure for our field study.

5. 1 Our study

The Empowering Cups are not considered an end-solution, but a research strategy to provide knowledge about a given situation. Through our field study we explored if The Empowering Cups provoked conversation of unequal pay and empowered women in a work environment.

Women were considered a central focal point in our study, so our research questions are, therefore, anchored in *Staying with the trouble through design* [22]. We had the aim of clarifying two research questions through our study:

1: How can the design itself communicate staying with the trouble of unequal pay in a work environment?

2: How can a design affect the experience of staying with the trouble of unequal pay and provoke conversation in a work environment?

5. 2 Deployment

Our research was conducted at an IT department of a large company in Denmark for two days. We chose this company as a setting for the deployment since advocating for diversity and inclusiveness has become a high priority for them, and since they have a group called "Women in IT." Through this group, they are interested in empowering their female employees in and outside the company¹.

5. 3 Participants

Five participants were recruited to voluntarily participate in our field study; three self-identified women and two self-identified men. The participants will be referred to as P1, P2,

P3, P4, and P5. The gender and job positions of the participants are P1: female senior consultant, P2: female UX consultant, P3: female IT engineer, P4: male UX consultant, and P5: male product owner. The participants were all from different nationalities.

We were interested in hearing their opinions on unequal pay and if they considered it an important topic. It was clear that all the participants, both women and men, thought that unequal pay was an important topic to address. However, it was clear that the women were a lot more dedicated to the topic and leaned a greater deal into the discussion with us by sharing personal stories about unequal pay.

5. 4 Data collection

We used interview and observation as our data collection methods, to understand if The Empowering Cups could empower women and provoke conversation of unequal pay in a work environment. It was important for our study to use qualitative methods since our study mainly revolves around personal experiences, opinions, and reactions.

The evaluation was structured in three parts:

1. An initial interview with a focus on the first impression of The Empowering Cups,
2. The participants using a cup for as long as possible, to afterward report back to us,
3. A second interview around their experience and if it created conversation among colleagues when using the cup.

The interviews were structured after the two research questions, where the first research question served as a basis for the first interview, and the second research question served as a basis for the last interview.

5. 5 Procedure

At the end of the initial interview, the participants were asked to choose a cup and three of the 16 statements. After the participants had chosen a cup and three statements, the participants were asked to use The Empowering Cups as they would with any other coffee cup at work. We did not give them any other instruction other than to use the cup for as long as they were interested. When the participants had used the cup, they returned to us and we conducted the last interview.

¹ We do not have any data about the wage gaps at the company, but we conducted our exploratory study here to see if we could provoke conversations of unequal pay.

The interviews were all audio-recorded and transcribed to make sure we had a natural conversation without disruptions or delays. Since it is a sensitive topic, it was important for us to be physically present in the conversations and create a sense of empathy.

Through the observation, we wanted to see if the cups provoked conversation and gained reactions. The cups were placed at a table near us, where people would pass every time they went to the coffee room or to meetings.

5. 6 Analysis of the data

The data were analyzed through thematic analysis, to closely examine and identify common themes from the participants' opinions, experiences, and knowledge [13]. The quotes from the transcribed interviews and the observations were clustered to emerging patterns and themes.

6. FINDINGS

The findings are structured after the two research questions, as presented in the previous section. Firstly, we present facts from our study, including which cup the participants choose, how long they used the cup, and which types of statements they choose. Secondly, we will present a detailed description of the findings in order to answer the two research questions.

Two participants, P1 and P5, choose the cup with big spikes (masculine), two participants, P3 and P4, choose the cup with small spikes, and one participant, P2, choose the cup with small curves (feminine). The majority of the participants did not select a cup based on their gender but based on the look of the cup. However, there was a case where a participant chose a cup based on gender, since one of them could identify with the femininity of the cup.

On average the participants used the cups for approximately 2 hours, where the minimum amount of time spent using the cup was 20 minutes, and the maximum amount was 4 hours and 45 minutes. The cups were mainly used at the participants' workstations, in meeting rooms, and in the coffee room nearby. Only P2 brought the cup downstairs to another department.

All the female participants choose statements from a female point of view, and the male participants choose statements from a male point of view. Examples of statements from a female and male point of view:

Female: *"I deserve the same salary as my male colleagues"*

Male: *"I don't deserve more salary than my female colleagues"*

Three of the participants, P2, P3, and P4, chose motivational statements, where P4 chose a motivational and two provocative statements. An example of a motivational statement: *"Women are worth the same as men."* Two of the participants, P1 and P4, choose provocative statements. An example of a provocative statement: *"I'm more valuable than my female colleagues."* One participant, P5, chose general statements, and an example of a general statement: *"On average I get paid more than my female colleagues".*

There was an interest in pushing the boundaries, however, not to an extreme. Three of the participants, P2, P3, and P5, wanted to ensure their statements were based on facts. P2 and P3 mentioned that they wanted motivational statements since they were not sure if there were problems with unequal pay in their department.

In our findings, there are several mentions of the term "viewer," which we refer to as people who observed and talked to the participants.

6. 1 How can the design itself communicate staying with the trouble of unequal pay in a work environment?

It was important for us to evaluate the design itself for two reasons. Firstly, to understand if the design itself communicated the message of unequal pay, and secondly, to understand which aspects of the design provoked the participants.

6. 1. 1 The design itself does not clearly communicate the message

There was not a clear indication that the design itself communicated the message of unequal pay. There are several variables that play into this aspect, where the first one being the shapes of the cups, and the second one being the statements. The majority of the participants did not notice the shifting statements at first glance, however, P2 noticed the statements, and understood the messages behind them, by referring to them as: *"The inequality we face today with different wages."* P2's comment was a stand-out and referred to the design exactly as we intended. However, the findings were not significant enough to draw a conclusion as to whether or not the cups clearly communicated the message of unequal pay at the first sight. The participants were curiously drawn to the shapes of the cups, and quickly noticed a connection between the gender-based signs on the table, and the cups. From this, the participants drew a conclusion to the design being gender-based, however, they did not refer to it as revolving around unequal pay.

Two of the participants, P2 and P5, thought the shapes communicated inequality. This was interesting since P5 and a viewer had a very philosophical view of the shapes. This view revolved around the cups having a different look on the outside, but inside they were all the same, referring to the state that: *"We are all equal, even though we are different on the outside."* - P5. It was clear from our data, that the participants thought the shapes of the cups attracted attention, where the statements communicated the message: *"It is not the first thing I think of when I see the cups. I think it is a question of attracting attention. I think the shape attracts attention."* - P4.

6. 1. 2 The statements communicate the message

The majority of the participants believed the statements communicated the message of unequal pay: *"I think the quotes are quite good: I like being provocative, and I think the cups invite conversation because the design is quite bold and outlandish looking."* - P1. The participants' overall view was that the statements represented unequal pay, but not in detail: *"Yes, I actually think they (the statements) deliver the message at the overall level. They do not go into detail, but I really think they deliver the message"* - P5. There were several participants indicating that the statements were too provocative, and discussed if it is easier for women to carry the statements than men: *"I think that it may be easier for women to carry the female statements than it is for men to carry the male statements... The female statements are really for the empowering and provoking but for the male statements you kind of have to take some ownership and blame."* - P1.

The provocative side of the statement affected P4 since he hoped that his choice of statement would not have a negative effect on him: *"I think they are good to start a little discussion... the discussion is more important than the statement, and then I hope that people don't put the statement on me."* - P4.

6. 1. 3 Provoked by the shapes, statements, and gender signs

Our data showed that participants were provoked by the shapes, statements, and gender signs. The shapes of the cups were a provocative factor since the cups gradually became more aggressive in the shapes: *"It is the shapes that provoke me, it creates like interests and curiosity and also some playfulness with it almost."* - P1. P2 mentioned that the female cup had a female body form, whereas the male cup was far more aggressive in its expression. This leads over to P5 and his view on being provoked by the cups being in stalls based on the gender signs on the stand. One participant, P4,

did not express any provocation towards the cups. He explained the cup being more of a fun gimmick, and the cup with small spikes was comfortable to hold due to the spikes fitting in between the fingers.

6. 2 How can a design affect the experience of staying with the trouble of unequal pay and provoke conversation in a work environment?

We were interested in understanding the participants' experience of staying with the trouble of unequal pay in their work environment, moreover, understanding if the cups provoked conversation between colleagues.

6. 2. 1 The cups provoked conversation to some extent

As staying with the trouble suggests, the artifact can facilitate conversation and bring forth discussions [22]. An artifact can both provoke, inspire and talk back to the audience. When an artifact is able to do that, it can initiate conversations that may make people wonder how they experience the world and perceive themselves [22]. Trouble is something that should be engaged with continuously, to make us wiser of each other and the world. In this way, we can reflect on ways of seeing and being in the world [22].

Our findings showed that the cups to some extent created conversations with colleagues known and unknown to the participants. There were only a few occasions where the conversation took the step further to have an in-depth conversation about unequal pay. One of these situations occurred for P2: *"We are very close friends, and we know how much we make, and we get the same salary. We are both consultants, so we get the same salary. He said, 'look at us, why is this a problem?' For him it was more like, I don't think it is a problem. He doesn't think this exists."* - P2.

It occurred twice that participants who both had an Empowering Cup started conversations with each other. The conversations mainly revolved around the design and their statements, and why they chose these specific ones: *"I had a conversation with P4. But it was like, he didn't say, or I think that I started that conversation because I asked him about his cup and what he chose."* - P1. This participant mentioned that in her conversation with P4 the power dynamic made the conversation a bit shallow, and her male colleague was shy to talk about the topic. There was however an interest from P1 to bring the cup to a meeting with her boss, since she would enjoy having a conversation about unequal pay: *"I would really like to have the same kind of conversation with someone who is not reporting to me. So even if it were my boss who is the one, I report to, I think it would be really fun to have this and bring the cup."* - P1.

We learned that a few viewers asked the participants about the cups. This occurred twice, but the cups attracted a lot of attention from the viewers. P5 stated: *"I walked with the cup and people I knew commented on them. "Wow, what is it?""*

The conversations the participants had with viewers did not bring another view to the participants about the topic of unequal pay. The conversations were shallow, since it mainly revolved around the design and statements, which indicated that the participants did not fully engage with the trouble of unequal pay. P2 mentioned that she does not have the knowledge to back up these conversations and could not have an argument with her male colleague: *"I didn't have much knowledge to back up the conversation. I couldn't really argue with the folks, and one of them was like "Is this really an issue, this is unfair if that's the case.""* - P2. The participants had a general interest in explaining the message, and provoking conversation with their colleagues, to take the conversation about unequal pay to a deeper level.

6. 2. 2 Viewer's considered the topic a taboo

When looking at the viewers' experience with the cups, it was clear that people at the department thought it was a heavy topic and even considered it taboo. The feedback we received from the participants showed that the viewers distanced themselves when the message behind the cup was delivered. P4 said: *"You do not know what to say or do. I think everyone knows how to deal with it, but not how to talk about it."*

This coincides with staying with the trouble, since it is easy enough to ignore the uncomfortable so it does not disturb the assumptions, we might have about equal pay. However, if we go against the rules, and point to the wrong of unequal pay, it is possible to make trouble and disturb the order [22]. When we transgress the line of what is allowed to talk about and design for, we also consider what is judged as too private [22].

By making the participants the ones that stay with the trouble, they also experience being the ones that have to take the uncomfortable conversations with their colleagues.

6. 2. 3 Women do not feel very empowered

Our data indicated that women do not feel very empowered when using the cups. There was instead an indication of excitement since the female participants enjoyed the idea behind the design and what it represented. In asking them what factors should play into their empowerment, the female participants showed an interest in gaining more reactions from the viewers: *"I would have felt empowered if someone would have asked me about the statements."* - P3. This was

a general issue since our findings showed that viewers did not notice or read the statements, where P4 mentioned: *"I do not think people discovered the different statements on the cups. I had to explain and show them what the individual statements were."*

However, P1 mentioned that the statements gave her a feeling of empowerment and provocation: *"Because for the female statements it is really for empowering and provoking..."* - P1.

6. 2. 4 Some male participants had a skepticism towards the cups

Our findings showed that some men had more skepticism while using the cup than the female participants. P5 said: *"Well, it was something ... What to say .. Different? The one (cup) I had chosen was a bit extreme."* However, it was clear that skepticism was the main concern from the male participants, which was interesting, given the fact that they choose their own statements to represent their view on unequal pay. The male participants chose very provocative statements since they wanted to start dialogue and discussions amongst their colleagues. Nonetheless, when walking around with the cups, they experienced awkward situations when conversing with other male colleagues: *"It got a little awkward in the end when we stood two men. I did not know how to take the conversation further from there."* - P4.

P2 also expressed that her male colleagues felt a bit "attacked" when telling them about the purpose of the cup: *"They felt a bit attacked. I wanted to see how they would react."* - P2. She purposely sought a reaction from her male colleagues, because she had a presumption that men would be defensive towards this topic. P2 stated: *"I kind of expected the reactions I got. I was kind of expecting that some people, men, would be a bit more defensive towards that. Because I have seen it when it comes to equality they [men] take it the wrong way. They take it as if women want to push them down, and treat them badly."*

6. 2. 5 Unequal pay was a sensitive topic for some men

During our observations, it was clear that unequal pay was a sensitive topic. This unfolded when a man walked by and asked about the idea behind the cups. When explaining it to him, he put his hands up in the air and said: *"It's none of my business,"* and kept walking away from us. It was clearly a topic that he did not want to talk about. After a while, he went back and said: *"I get it now! The inside is the same, but the outside is different!"* He explained situations where he had felt unequal pay between another male colleague, and he wished he never knew his colleague's salary since he got a feeling of injustice. We observed that he continued the

discussion with his colleagues and explained our design. Several people were involved in the conversation, and started to discuss the area of unequal pay, and what they would do if they were in the situation he was in, back then.

As Haraway [22] argues, telling stories can be used as a way of making trouble, especially when it is the ordinary stories that never get told, which include contrast and conflicts. By telling and listening to stories you increase trouble, but you also get involved in each other's lives [22].

7. DISCUSSION

Our discussion revolves around reflections on how our participants engaged with the trouble of unequal pay through conversations, how provocation helped the participants to stay with the trouble, and reflection upon the reliability of our seven guidelines for empowerment. Among these, we also discuss the limitations we met during the study and how those implications may have affected the outcome.

7.1 Engaging with the trouble through conversation

As staying with the trouble suggests, we must continuously engage with trouble and when pointing to the wrong or even pointing to taboos, it is possible to make trouble and disturb the order [22]. This is emphasized in our study, since the participants from the field study engaged with the trouble of unequal pay, by to some extent conversing with other colleagues. However, the conversations about the trouble of unequal pay did not expand to deeper conversations about the given issue, which was an interesting aspect to us. It raised a question as to why the participants did not fully engage with the trouble? There can be several factors that play into this, however, we believe the most dominant factor is taboo. Unequal pay is a sensitive topic, and for some even considered taboo, as our study showed. We believe that when individuals are being confronted with a taboo, it becomes too private for people to talk about, and therefore withdraws from the conversation. There might be a chance that addressing an issue as unequal pay creates a barrier for people since salary and pay is not something we talk openly about. Moreover, when inequality is added to the issue, there is a chance it creates an extra barrier for people since it can easily become a given on "us against them."

We knew that by pointing to the taboo of unequal pay, we would cause trouble. However, we believe that by pointing to taboo and staying with the trouble, we can learn to be truly present and respond better to the complexity and societal issues we face in today's society [22].

An interesting aspect to argue is if we made the right people stay with the trouble of unequal pay. There could perhaps have been a change in the conversations of the trouble if we had targeted people higher in the hierarchy of the company since they are the ones with the power to change the company's value set. What if the trouble of unequal pay came from the leadership instead of the individual contributors? Then the participants might find it more appealing to talk about the trouble.

It can be a vulnerable situation for individuals to point to wrong, or even be exposed to the wrongs [22]. It can therefore be argued how we can make individuals commit to the trouble of unequal pay, and make them fully engaged in conversations about trouble. Søndergaard [22] argues that feminist humor can be used to talk about tabooed topics, and we found this an interesting aspect to consider in order to provoke conversation about the trouble of unequal pay [22]. With humor, you can keep the topic at a distance, and not fully engage with it, and can even act as an "icebreaker" as a way to open up a conversation [22]. Ahmed argues: "*Humor is such a crucial technique for reproducing inequality and injustice*" [22], and when using humor, we create a space to laugh about tabooed topics, however not in an uncomfortable way, but in an empowering way, since we can relate and empathize with each other [22]. This correlates with the existing research, Labella, as mentioned in section 2.2 *Empowerment through the body*. The authors talk about breaking taboos through awkward learning experiences by stating that humorous interactions can be effective in breaking taboos and encouraging conversation [2].

We must, however, be aware that there might also be downfalls when using humor to address sensitive and tabooed topics. There is a fine line, since using too much humor can easily portray the project as being too unserious, which might imply that one is not treating the topic with respect [22].

Using humor as a part of our design might have had an influence on breaking the barriers of taboo and opening up space for the participants to engage fully in the conversation and staying with the trouble of unequal pay.

7.2 Provocation

It was clear that all aspects of the design were provocative, from the statements to the shapes of the design itself. However, it can be discussed if provocation was successful in making participants stay with the trouble and provoke conversation of unequal pay.

Using provocation in the design helped the participants stay with the trouble of unequal pay and to some extent provoke conversation between colleagues. We believe the aesthetic provocation was the most dominant in making the participant stay with the trouble since it initialized the first contact between colleagues by having an aggressive and outlandish-looking design. The aesthetic of the design created attention and curiosity which to some extent provoked conversation and made the participants stay with the trouble. However, it can be argued that the functional provocation put a barrier up in regards to the participants completely staying with the trouble of unequal pay. As mentioned in the previous section, the participants stayed with the trouble by walking around with it, however, they did not fully engage with the trouble when conversing with other colleagues. The functional provocation (statements) was provided in the design to provoke conversation about unequal pay, however, the outcome was not as we had intended, and individuals withdrew from the conversation and did not engage completely with the trouble. A reason for this could be that some of the statements were very provocative which made people uncomfortable and caused the participants to have a hard time staying with the trouble of unequal pay.

In order to break this barrier and adjust the functional provocation, we could have let the participants write their own statements. By doing so we could have created a greater feeling of customization and let the participants choose to which degree they would provoke the audience with the trouble. This will perhaps create an easier path to conversations about the trouble since the statements would be on the "owners" terms and could create a less harmful transgression of delivering the message of the trouble. Moreover, it can be argued that the design lacked some functional provocation. It raised a question: *"What if we had moved the passive-aggressive punishment into the functionality of the cup?"*. For example, by providing men with less coffee, or playing with senses such as giving them cold coffee since men get a higher salary than women. This consideration may give a bigger punishment that would create more conversation about the trouble.

7. 3 Our view on the guidelines for empowerment

From the field study, we learned that The Empowering Cups did not empower women as much as we had hoped. There might be several factors that play into this. It can be discussed if the guidelines extracted from our study with women were complex enough to facilitate the process of creating empowerment. Even though we used the guidelines and carefully ensured to consider all aspects, the guidelines did not succeed in facilitating a fully empowering design. It

can, however, be argued to which degree we used them. The guidelines could have been used in more explicit terms or in more extreme ways. An example could be to create a more extreme passive-aggressive punishment, instead of just having a cup that is difficult for men to hold, for example as mentioned in the previous section.

Another aspect of the guidelines is their reliability. The guidelines were based on only four women's opinions and ideas for designs, so for the sake of the guideline's reliability, there should probably have been a larger number of women involved to understand the empowering aspect of a critical design. The guidelines may not have provided a clear direction for empowering women, however, they provided a good basis for us when designing. By following the guidelines, we considered what was important for the women in our study when staying with the trouble through a critical design.

7. 4 Limitations

During the field study, we met different limitations that may have affected the outcome of our study. These are in regards to the Covid-19 situation, how much time the participants were available, the number of functional cups, and the duration of the field study.

7. 4. 1 Covid-19 situation

Due to the Covid-19 situation, not many people were physically at the office when conducting our field study since many employees worked remotely. The employees that were present at the department were encouraged to stay in their offices and not mix with too many people outside their team. When the participants used our cups, it therefore meant that they would not talk to many people outside their teams, whereas in one situation there were not any colleagues from a participant's team. The cups, therefore, may not have gotten the exposure that would have been ideal to provoke conversation of unequal pay.

7. 4. 2 Availability of the participants

When being in a work environment people's time is valuable and they get paid for during their job. It was therefore difficult to recruit participants that could spend time using the cups since they were busy taking care of their job. We had to be flexible with the participants' time, to fit it into their small breaks between work and meetings. This also resulted in some participants only using The Empowering Cup for 20 minutes.

7. 4. 3 Number of functional cups

Due to technical limitations, we only had two fully functional cups with shifting statements during the field study. Since the electronics were very fragile, one of the displays broke on the second day of deployment. We were therefore left with only one fully functional cup on the second day of deployment. This has limited the insights gained into what the shifting statements brought to the design. To make a “quick fix” we printed paper statements so that the participants could choose a statement for the cups that did not have a functional display.

7. 4. 4 Duration of the field study

If we had deployed The Empowering Cups for a longer period and had more participants, we would properly also have experienced another effect on how well the participants stayed with the trouble of unequal pay. Since the cups were only deployed for two days, the word of The Empowering Cups did not reach the whole department and understanding if the cups provoked conversation was limited in the few participants we had.

8. CONCLUSION

Through our studies with women, we learned that women feel non-empowerment in the work environment, and with the statistics showing a wage gap between genders in the Danish society, we decided to take up this issue [8].

How can we through a critical design stay with the trouble of unequal pay, and provoke conversation in a work environment to empower women?

In response to this, we designed The Empowering Cups to empower women and provoke conversation of unequal pay in the work environment through seven guidelines provided to us based on our studies with women. Through our field study, we learned that The Empowering Cups to some extent provoked conversation between colleagues in the company. However, the participants did not fully engage with the trouble, since they withdrew from the conversation when the message of unequal pay was delivered to them. We learned that the design was provocative in all its aspects and that the aesthetic provocation helped the participants to stay with the trouble of unequal pay, since the design of The Empowering Cups sparked their curiosity. In regard to women’s empowerment, our findings showed that women were not very empowered by the design, however, there was a motivation and enjoyment by staying with the trouble of unequal pay, since it was considered an important topic by the participants.

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REFERENCES

- [1] Almeida, T., Balaam, M., & Comber, R., *Women-Centered Design through Humanity, Activism, and Inclusion*, 2020.
- [2] Almeida, T., Comber, R., Wood, G., Saraf, D., & Balaam, M., *On Looking at the Vagina through Labella*, 2016.
- [3] Als, N. K. & Mikkelsen, J. C., *Feminism and HCI: Exploring gender inequality with women*, 2020.
- [4] Bardzell, J., & Bardzell, S., *What is “Critical” about Critical design*, 2013
- [5] Bardzell, S., *Feminist HCI: Taking Stock and Outlining an Agenda for Design*, 2010.
- [6] Bardzell, S. & Bardzell J., *Towards a Feminist HCI Methodology: Social Science, Feminism, and HCI*, 2011.
- [7] Bardzell, S., Bardzell, J., Forlizzi J., Zimmerman, J., & Antanitis, J., *Critical Design and Critical Theory: The Challenge of Design for Provocation*, 2012.
- [8] Beskæftigelsesministeriet, *Mænd og kvinder på arbejdsmarkedet*, 2020.
- [9] Bickmore, T., Pfeifer, L., & Jack, B., *Taking the Time to Care: Empowering Low Health Literacy Hospital Patients with Virtual Nurse Agents*, 2009.
- [10] Bossavit, B. & Parsons, S., “*This is How I Want to Learn*”: *High Functioning Autistic Teens Co-Designing a Serious Game*, 2016.
- [11] Bødker, S., *When second waves meets third-wave HCI*, 2006.
- [12] Capel, T., Vyas, D., & Brereton, M., *Women in Crisis Situations: Empowering and Supporting Women through ICTs*, 2017.
- [13] Caulfield, J., *How to Do Thematic Analysis* [online] Scribbr, Available at: <https://www.scribbr.com/methodology/thematic-analysis/>, 2020.

- [14] D'Ignazio, C., Hope, A., Michelson, B., Churchill, R., & Zuckerman, E., *A feminist HCI approach to designing postpartum technologies: "When I first saw a breast pump I was wondering it is was a joke*, 2016.
- [15] Harvard Business Review, *When Will We Reach Gender Equality?* [Video]. YouTube [youtube.com/watch?v=HchyqPO8K0I](https://www.youtube.com/watch?v=HchyqPO8K0I), 2019.
- [16] Muller, M., *Feminism asks the "Who" questions in HCI*, 2011.
- [17] Ozkaramanli, D. & Desmet, P., *Provocative design for unprovocative designers: Strategies for triggering personal dilemmas*, 2016.
- [18] Raptis, D., Jensen, R. H., Kjeldskov, J., & Skov, M. B., *Aesthetic, Functional and Conceptual Provocation in Research Through Design*, 2017.
- [19] Scharin, C., Scharin, Å., & Höök, K., *The Vocal Chorder – Empowering Opera Singers with a Large Interactive Instrument*, 2014.
- [20] Schneider, H., Eiband, M., Ullrich, D., & Butz, A., *Empowerment in HCI - A Survey and Framework*, 2018.
- [21] Shroff, G. & Kam, M., *Towards a design model for women's empowerment in the developing world*, 2011.
- [22] Søndergaard, M. J., *Straying with the trouble through design - Critical-feminist Design of Intimate Technology*, 2018.
- [23] Søndergaard, M. J., & Hansen, L. K., *Period Share: A Bloody Design Fiction*, 2016.
- [24] Zimmerman, J., Forlizzi, J., & Evenson, S., *Research through design as a method for interaction design research in HCI*, 2007.

RESUME

Women have for centuries fought for their voices to be heard, and even though over half of the global population are women, they continue to be subject to systemic disadvantages, especially in terms of unequal pay [1] [8]. The statistics from Denmark's Ministry of Employment of men and women on the labor market 2020 shows that men have, on average, a higher salary than women [8]. When looking at the standard hourly earnings, men earned on average 20,5% more than women in the regional sector, while the gross wage gap was 11,8 % more in the private sector [8]. The continuation of inequality in today's society marks women as a marginalized group in a patriarchal society, which puts a limit to women's access to resources and specific roles [5].

Working in the field of HCI, it is interesting to explore how feminism positions itself in HCI and looking at the transition from second to third-wave within the field. There has been a shift from the workplace and into everyday life [6], and with the emergence of the third-wave HCI, there is a turn to new elements of human life, where culture, experiences, and human emotions are included [11]. Empowerment is a central focus area in the emergence of the third-wave and has become interesting research aims for the HCI community [20]. Michael Muller [16] addresses issues of power and privilege through "who" questions, "*Who speaks for women?*" Those who possess power in a setting can determine who gets to speak, and who remains silent [16]. Power is an underlying concept of empowerment, where Arendt states: "*Power is a something - anything - which makes or renders somebody able to do, capable of doing something* [20]." When looking at women's experiences with gender inequality and non-empowerment, the feeling of non-empowerment often occurs in the work environment. Women express feelings of non-empowerment as a central focal point towards the topic of unequal pay [3].

Our aim in this paper is to explore how a critical design can empower women and provoke conversation of unequal pay in the work environment through a Research through Design (RtD) approach [24]. Through our contributions to women's empowerment, we lean on the *feminist standpoint theory* [5], which states that women's viewpoints and knowledge are inevitable for social science research, and these types of knowledge should be recognized [5]. Moreover, we lean on *Staying with the Trouble through Design*, which advocates for anti-solutionist and responding to trouble, instead of creating a solution to a problem [22].

Our work is guided by the following research question:

How can we through a critical design stay with the trouble of unequal pay, and provoke conversation in a work environment to empower women?

We do not propose a solution to the problem but focus on staying with the trouble of unequal pay. We believe that if we through a design can stay with the trouble and learn to be truly present, then it can respond better to the complexity of political, social, and cultural issues we face in society [22].

Through our studies with women, we learned that women feel non-empowerment in the work environment, and with the statistics showing a wage gap between genders in the Danish society, we decided to take up this issue [8].

In response to this, we designed The Empowering Cups to empower women and provoke conversation of unequal pay in the work environment through seven guidelines provided to us based on our studies with women. Through our field study, we learned that The Empowering Cups to some extent provoked conversation between colleagues in the company. However, the participants did not fully engage with the trouble, since they withdrew from the conversation when the message of unequal pay was delivered to them. We learned that the design was provocative in all its aspects and that the aesthetic provocation helped the participants to stay with the trouble of unequal pay, since the design of The Empowering Cups sparked their curiosity. In regards to women's empowerment, our findings showed that women were not very empowered by the design, however, there was a motivation and enjoyment by staying with the trouble of unequal pay, since it was considered an important topic by the participants.