Challenges Women in Software Engineering Leadership Roles Face: A Qualitative Study

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Introduction

Software Engineering is not only about technical solutions but it is also concerned with organisational issues, project management and human behavior (Wohlin, 2003).

There are gender issues that can limit the participation of women in science and engineering careers (Frize, 2005).

We invited women in software engineering management roles to answer survey questions based on the empathy map canvas. We used thematic analysis for coding the answers and group the codes into themes. From the analysis, we identified seven themes that support us to list the main challenges they face in their careers.

Research Question

What are the challenges women in Software Engineering leadership/management roles face?

Background

Background

Diversity is being discussed intensively by different knowledge areas of society, and these discussions in Software Engineering are increasing as well.

Gender diversity often refers to an equitable or fair representation of people of different genders. It commonly refers to an equal ratio of men and women but may also include people of non-binary genders (Sytsma, 2006). Non-binary is a spectrum of gender identities that are not exclusively masculine or feminine, outside the gender binary (Usher,2006).

Background

There are serious gender issues that can severely limit women's participation in science and engineering careers. One main obstacle to women's retention or participation is that **women's contributions and abilities are less valued than men's, and women are generally ignored in mainstream history** (Frize, 2005).
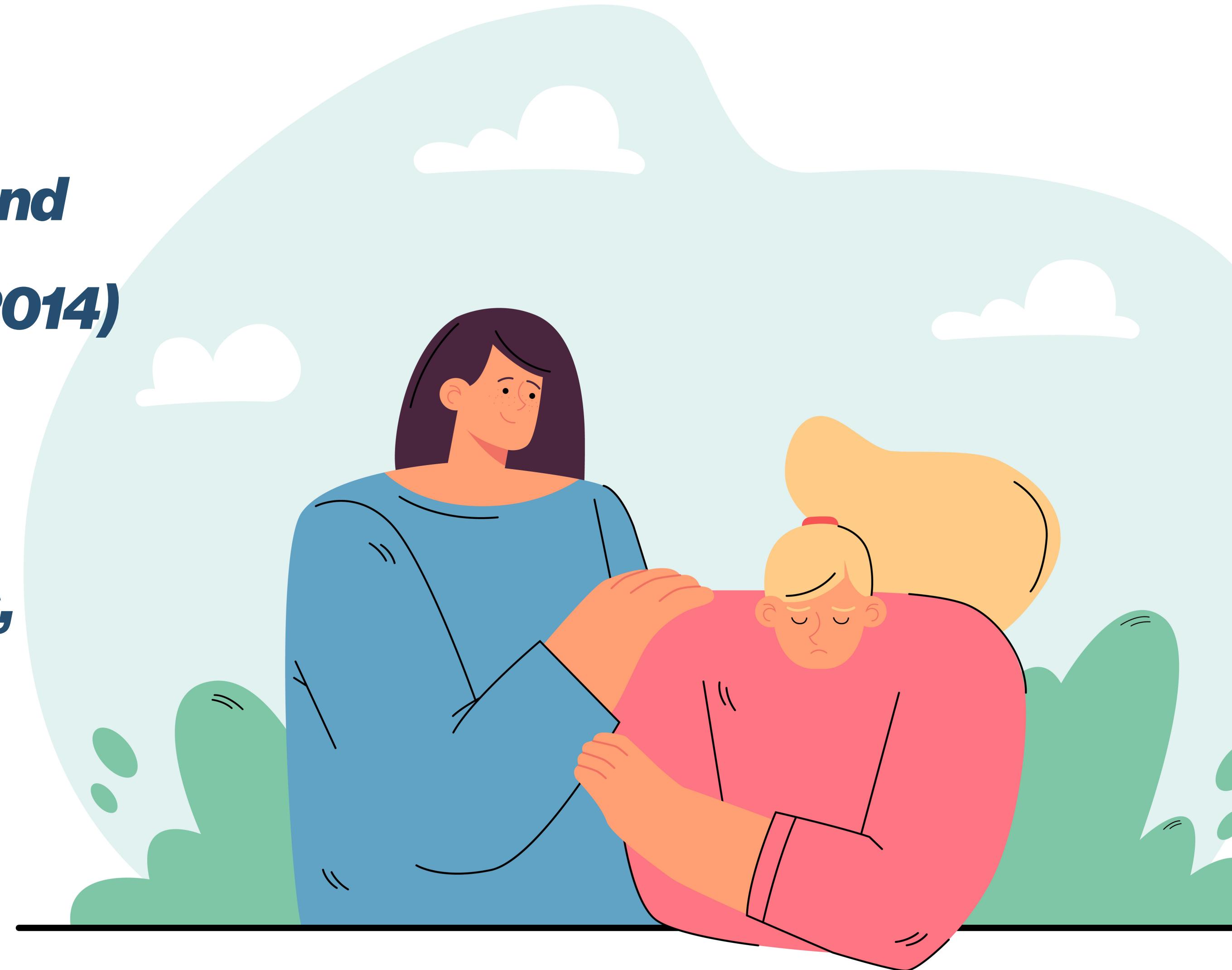
Leadership style has a significant impact on team performance and the achievement of organizational goals. A participative leadership style was positively related to highly functional teams and fostered team innovation. It is sometimes claimed that **women lead differently than men and are more collaboration-oriented, communicative, and less aggressive than their male counterparts** (Jetter, 2013).

The interest in the power of emotions stimulated efforts to study the link between emotions and developers' productivity and understand the triggers for emotions during software development and related activities, and assess the impact of emotions on the developers' well-being. They say that a team manager or the scrum master can benefit from understanding the developers' emotions (Novielli and Serebrenik, 2019).

Empathy

"Empathy is the ability to share in and understand others' experiences vicariously." (Decety and Cowell, 2014)

"Empathy corresponds to the ability to understand others' minds, feel their emotions outside our own, and respond with kindness, concern, and care to their emotions." (Henschel et al., 2020)

Empathy may not be easy — in many cases, particularly with strangers, it may require cognitive work. **Empathy may seem less taxing for loved ones or in environments that scaffold empathy with social rewards and may be selected rather than suppressed.** People m set the limits of empathy based on how hard the want to work. (Cameron et al., 2019)
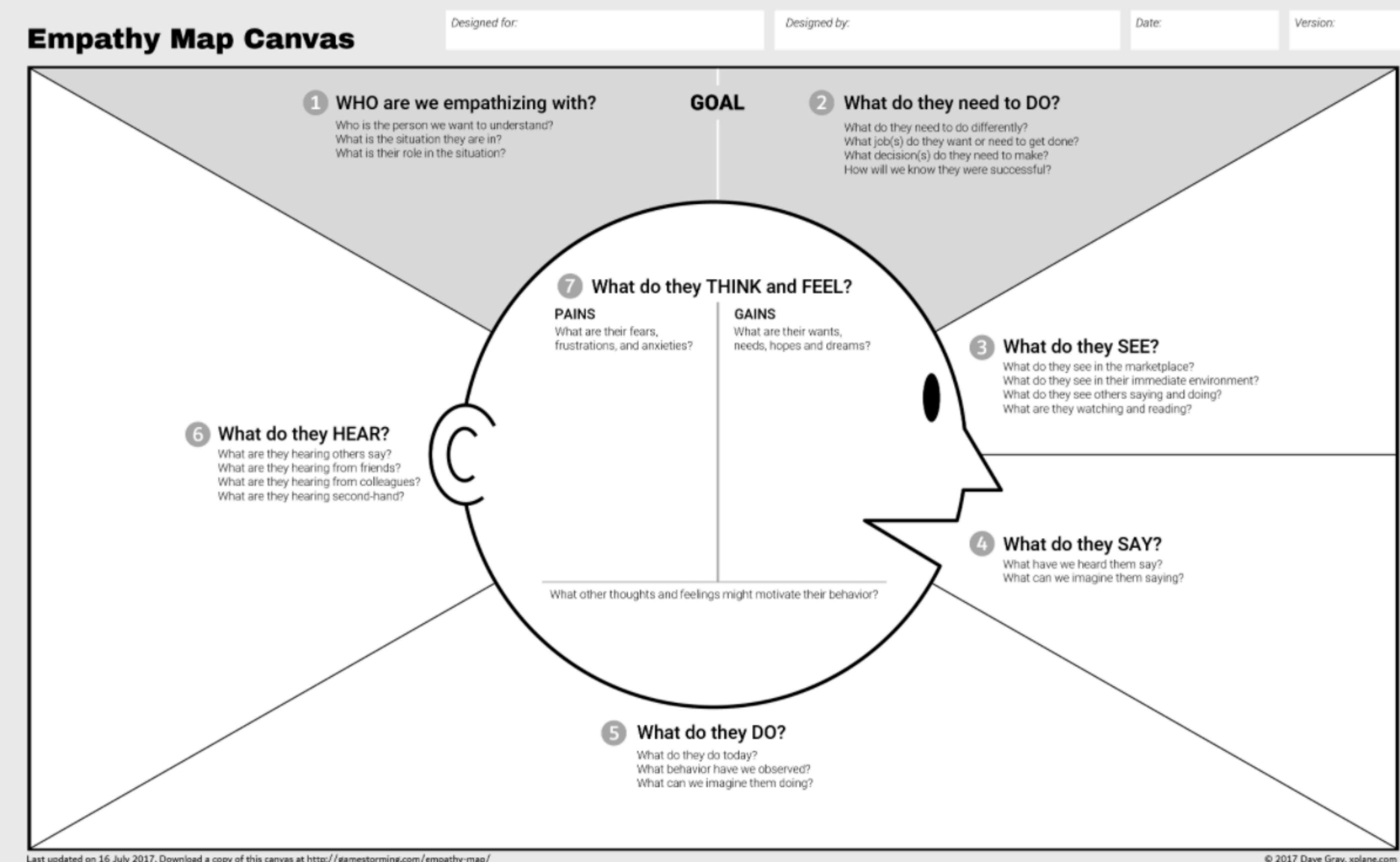
A study from Weisz and Zaki (Weisz, 2018) suggests that **people want to empathize with those most relevant to them**. This tendency goes beyond group membership; **people are motivated to empathize with those who look like them, those who are kin to them, and those close to them.**

Dave Gray created the **Empathy Map** technique in 2009 **to help teams develop deep, shared understanding and empathy for other people.** People use it to improve customer experience, design better work environments, etc.

In Human-Computer Interaction (HCI), empathy maps appears in different works as: studies around disability, as a tool to analyze Human-Computer Interaction in the elderly, as a combination of personas and empathy maps to enhance user experience, etc.

In the context of Software Engineering, we opted to use the technique experimentally in a different situation, so **we used the Empathy Map Canvas technique to collect the data** through our survey. **We consider it essential to connect with the participants' experiences and their emotions for this sensitive subject.**

Empathy Map Canvas

Designed for: Designed by: Date: Version:

1. **WHO are we empathizing with?**
Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?

GOAL

2. **What do they need to DO?**
What do they need to do differently?
What job(s) do they want or need to get done?
What decision(s) do they need to make?
How will we know they were successful?

7. **What do they THINK and FEEL?**

PAINS
What are their fears, frustrations, and anxieties?

GAINS
What are their wants, needs, hopes and dreams?

3. **What do they SEE?**
What do they see in the marketplace?
What do they see in their immediate environment?
What do they see others saying and doing?
What are they watching and reading?

6. **What do they HEAR?**
What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleagues?
What are they hearing second-hand?

What other thoughts and feelings might motivate their behavior?

4. **What do they SAY?**
What have we heard them say?
What can we imagine them saying?

5. **What do they DO?**
What do they do today?
What behavior have we observed?
What can we imagine them doing?

Last updated on 16 July 2017. Download a copy of this canvas at http://gamestorming.com/empathy-map/

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Study Design

Participants

Three women in Software Engineering leadership/management roles to answer our questions. They currently work in the same tech company in Brazil, but they have different career paths. They have worked for different companies and have different work and life experiences.

Answer	Age	Race/ Ethnicity	Years in IT	Years in Current Job	Role	Self Evaluation on Experience
#1	34	White	10	1	Scrum Master, IT Manager	Specialist (+3 years)
#2	43	White	19	2	Scrum Master, Product Owner, People Manager	Specialist (+3 years)
#3	35	White	16	2	IT Coordinator	Experienced (1-3 years)
AVG	37.3		15	1.7		

Qualitative Data Analysis

We performed a thematic analysis with open coding on the responses from the empathy map. We read and reread the data, looking for keywords, trends, themes, or ideas to outline the analysis. This analysis identified themes across the questions from the survey.

We identified 23 codes then we grouped them into seven themes. The themes helped us answer the research question proposed for this study.

Results and Discussion

Permission to Occupy Technology Spaces

Codes: Authorization, Deserve, Right, Positions

There are serious gender issues that can severely limit women's participation in science and engineering careers, and these are similar in many parts of the world(Frize, 2005).

One main obstacle to women's retention or participation is that **women's contributions and abilities are less valued than men's**.

Women want to **occupy positions that men traditionally occupied**, however, there is a sensation that **women can occupy those roles only when "authorized."**

"I see in the company I work, an exact sample of the market: women occupying "authorized spaces." It seems that I have been given the right to be where I am and that it is the part I deserve."

Recognition and Equal Opportunities

Codes: Recognition, Opportunities, Equity

The three managers reported their **desire for recognition**.

They want to know that what they are doing is significant and acknowledged by their peers and managers.

The recognition comes together with the **desire for equal opportunities to grow in their career as their men peers**.

"A plural and psychologically healthy professional environment that provides equity in career development."

Need to Go Above and Beyond

Codes: Beyond, Potential

The managers mentioned they feel like **they always need to put more effort and go beyond the men's peers**.

There is the sensation that the same work is praised when a man does it, and it is suspicious when a woman does. Again, **women mention the high effort to prove their work is good or even better than their male peers' work**.

"I often feel that I need to go beyond my peers in terms of training as if I was never competent enough to achieve the results expected from me."
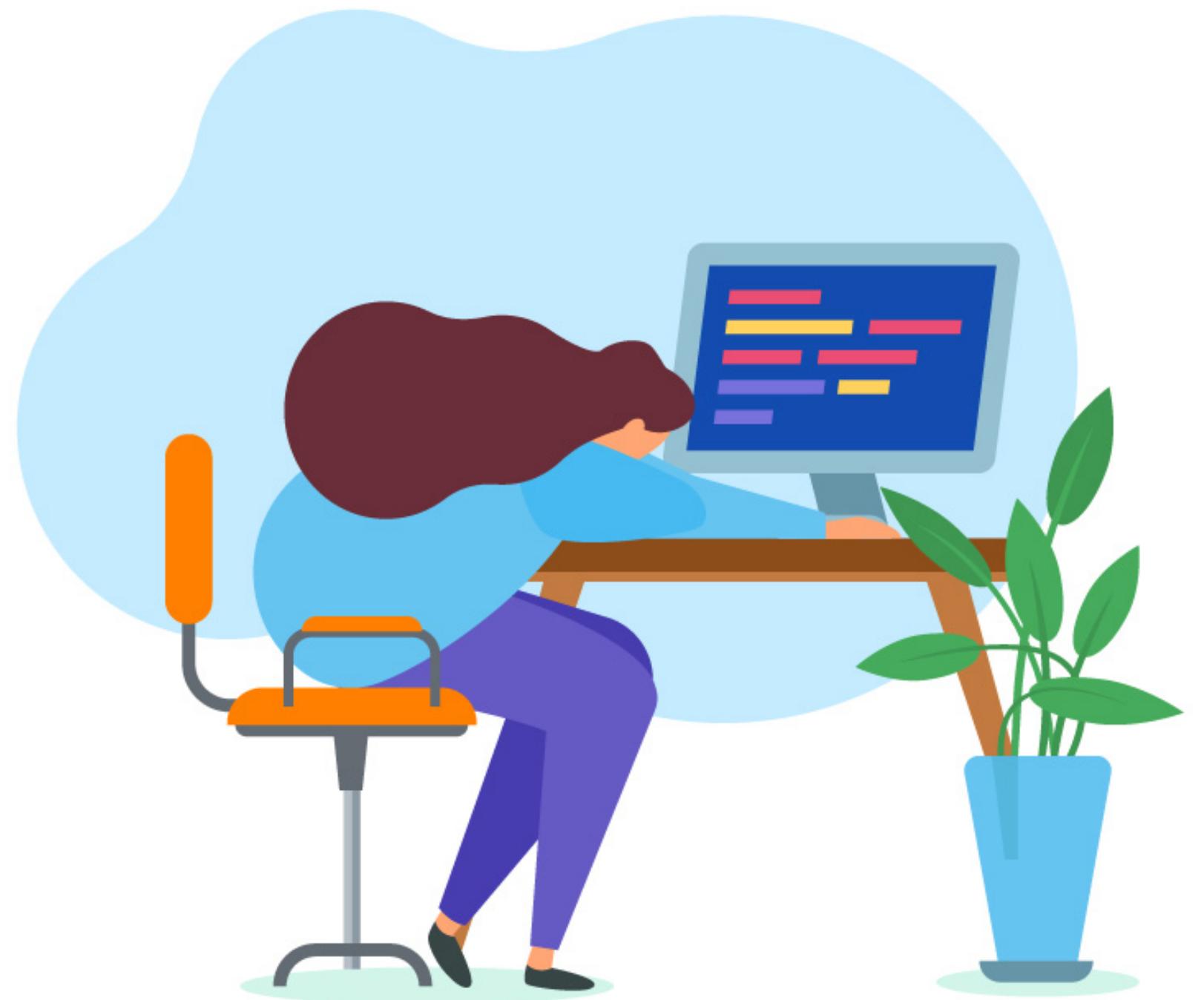
Mental Wear And Tear

Codes: Tiredness, Expectations, Prove Judgements

The **efforts for recognition** and the high energy put into achieving it leads them to **exhaustion**.

The managers mentioned **they feel tired** because **they always need to have a strong opinion and a solution for every problem shared with them**.

"As a woman and mother, I need to prove myself much more. If a man and a woman perform the same task and are successful, the man will be praised and promoted for it, while the woman will be criticized, and her outcome will be judged with suspicion."

Drama and Stereotypes
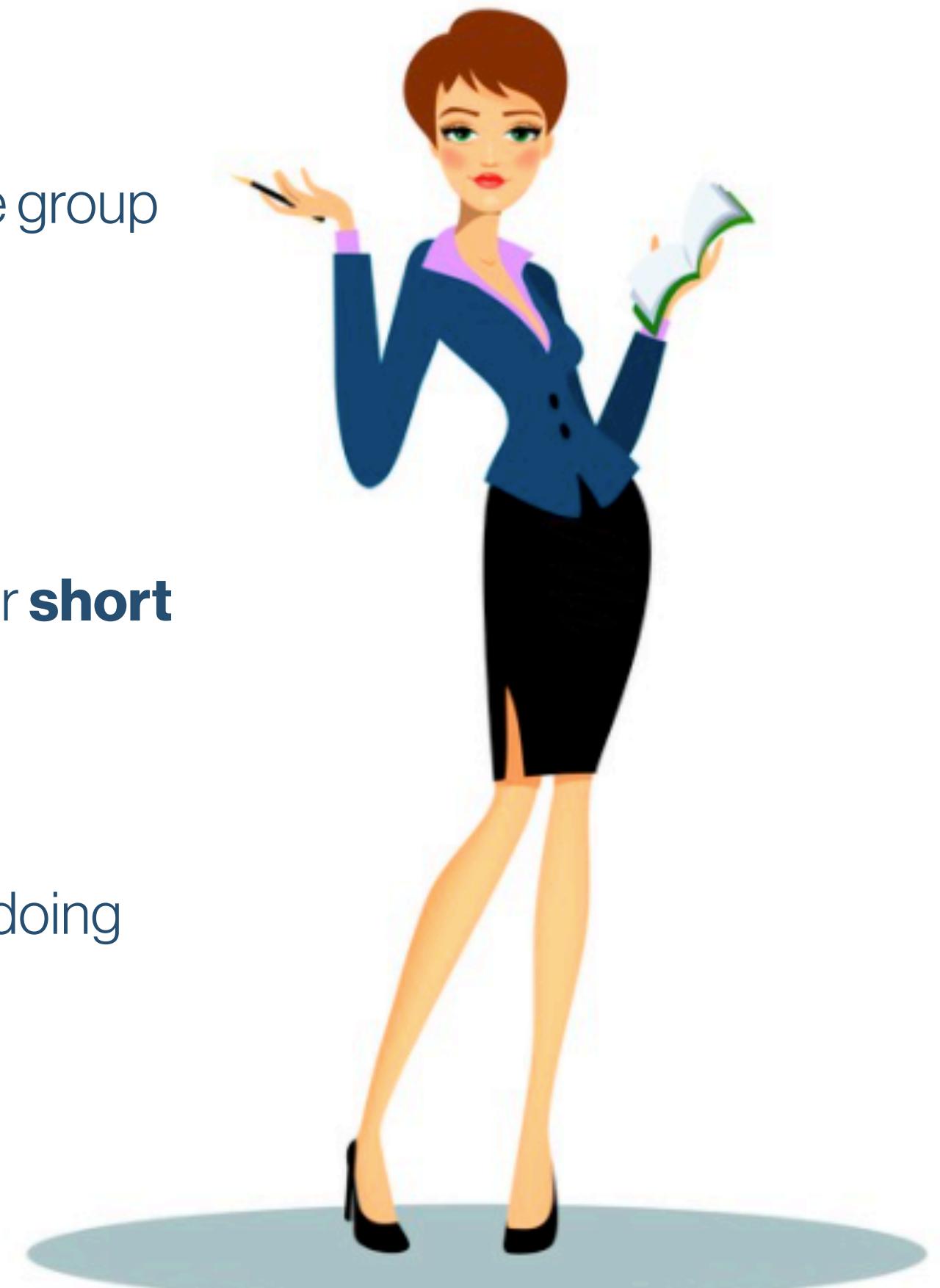
Prejudice consists of an unfair evaluation of a group of people based on stereotypical judgments of the group rather than the behavior or qualifications of its members (Eagly and Carli, 2003).

The managers mentioned **stereotypes about their physical appearance**.

They said **they are judged** by what they **wear**, by the **makeup absence**, and even for have opted for **short hair.**

Their **mental state is always put in check**. When sharing concerns about keeping a healthy and psychologically safe environment, they use to hear that look for it is an exaggeration and that they are doing "*drama.*"

"Women are dramatic and talk too much."
"Women with short hair are not women."
"That woman is crazy."

Obstacles And Fears

Codes: Male Protectionism, Masculinization, Sexism, Humiliation

The managers mentioned **structural sexism** in different parts of the survey.

Sometimes they are afraid of talking about it once their male peers or even their managers can scold them.

As a considerable obstacle, they see the brotherhood between men at all levels. They mentioned the perception of the existence of "***a network of male protectionism, which prevents women from advancing to strategic positions.***"

"A network of male protectionism, which prevents women from advancing to strategic positions (or advancing with great difficulty, requiring a certain masculinization for that)."

Hire and Education For Diversity

Codes: Hiring, Diversity, Education, Make Difference

Besides the heavy psychological load women carry out to conduct their daily activities, **they are still concerned about creating psychological safety for gender diversity.**

As hiring managers, **they use the opportunity to build more diverse and inclusive environments in technology**. With that, they **try to minimize the challenges to the next generations of women in leadership positions**. However, they report low support from peers and higher levels.

"When hiring, I seek diversity and bring diversity. I have a fortnightly meeting group with this diverse group where we seek a supportive and safe environment. But my goal behind this action is beyond that I want this diverse group to be the next generation of leadership. At the base, it is challenging to make the difference that needs to be made."

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Additionally...

... we considered the use of the empathy map in this study as a valid experience: Two respondents mentioned that the survey touched them deeply, and it got them thinking about their professional journey after answering.

Threats to Validity

The presented results are related to answers of **three women in roles of software engineering management working for the same company**, so the results are only valid in this context, and **we cannot generalize** them.

The **coding process is subject to researcher bias**, as the process of grouping the codes in themes. To minimize bias due to personal interpretation, the process was reviewed by a second researcher.

Conclusion

This work does not intend to be a complete analysis of women's situation in software engineering middle management roles. We also cannot generalize the results, and no intersectionality evaluation could be done once the three women reported being white women.

However, we intended to bring some initial insights from applying the empathy map technique to these women and raise awareness of what impacts their careers, the challenges they face, and show the distress they are exposed to.

This work is the initial step of a broader work where using empirical strategies; we aimed to understand if a software development team with greater gender diversity performs better than a homogeneous team and which factors may be the most impacted by this spectrum of diversity.
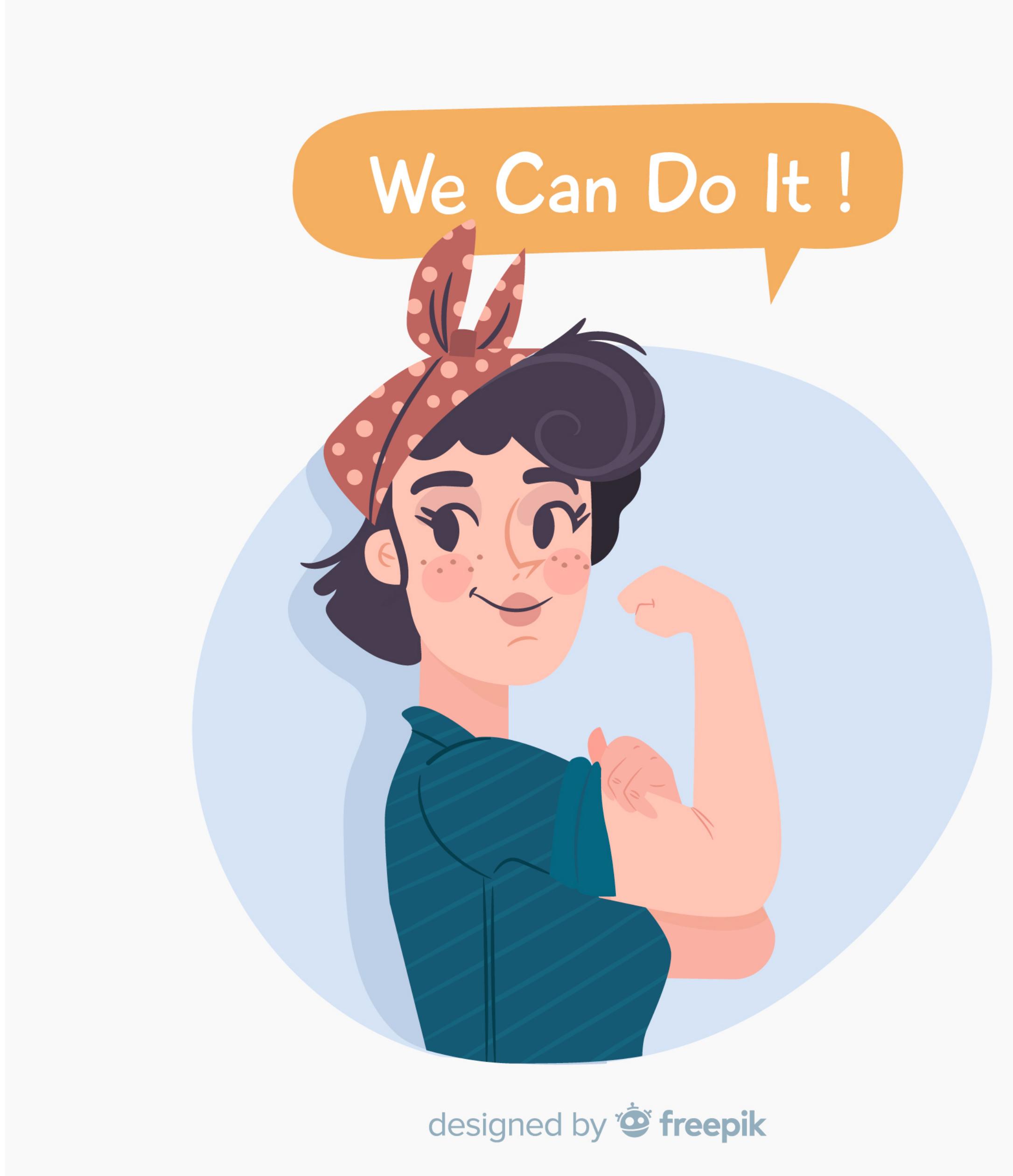
We expect to reach a broader number of women in different technology roles and from different races/ ethnicities, cultures, etc.

Thanks