

The Creative Process in Digital Design: Towards an Understanding of Women's Approach

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Abstract. The debate about the differences between men and women is quite old but still topical. Many researchers have been investigating the differences in users' gender while experiencing digital products. However, it seems that few studies have investigated gender differences related to the creative process in digital design. The aim of this paper is to try to understand whether there are gender differences in the creative process in digital design in Brazil. In addition, it discusses the possible influences that women have in the design process and their approach to user experience design. For that, interviews and questionnaires with Brazilian designers, both women and men, were carried out. This investigation points out some gender aspects that can make difference in the design of digital products and presents a discussion of the role of women designers.

Keywords: Gender · Women · Digital design · Creative process

1 Introduction

The debate about the differences between men and women is quite old but still topical. As recently as last year an advertisement explored the expression “like a girl” used to mean something bad and has shown how this phrase can impact on a girl's self-confidence. This ad has been seen more than 55 million times on You Tube, which shows the interest people feel in this subject [1].

Particularly in design, this debate is also old. As far back as 1986, Buckley [2] analysed women and design. She argues that although women have been involved in a variety of ways with design, their interventions are omitted in the literature of design history. She explains that the marginalization of women is a consequence of specific methods that are biased against women and serve to exclude them from history. She also argues that the few women designers that appear in the literature are accounted for within the framework of patriarchy, in which men's activities are valued more highly than women's. In this framework, women are defined by “their gender as designers or users of feminine products or they are subsumed under the name of their husband, lover, father, or brother.” She claims that women's role in design must be discussed both in relation to patriarchy and gender issues.

Even in HCI the gender debate is not new [3, 4]. According to Kannabiran [5], this topic has been investigated with different approaches such as domestic technology, product design, virtual online environments, and software engineering. Many researchers claim that gender difference in design is an important issue [6–8]. Despite this, it seems that gender is not explicitly considered in interactive design [9], as this topic tends to be seen as niched and peripheral [5].

The aim of this paper is to try to understand whether there are gender differences in the creative process in digital design in Brazil. In addition, it discusses the possible influences that women have in the design process and their approach to user experience design. For that, interviews and questionnaires with Brazilian designers, both women and men, were carried out. This investigation points out some gender aspects that can make a difference in the design of digital products and presents a discussion on the role of women designers.

2 Gender Differences

There has been a lot of theoretical, political, conceptual and cognitive discussion on gender, since the eighteenth century, with intensity in the twentieth century and continuing today. It is not part of this study to review the literature related to gender; instead, the intention here is just to highlight some aspects and discussions on the topic in order to help with the discussion on women in DUXU.

It is important to highlight that the differences between male and female can be divided into the differences that relate to sex and to gender [6]. While sex is usually associated with biological differences (e.g. anatomy), gender is associated with behavior, social and cultural differences (e.g. the use of pink for girls and blue for boys).

Daniel Stern [10] suggests that there is a difference in movement between boys and girls at birth. While girls need to expand their movements in order to reach the objects, boys need to control their movements, as they open their arms more and move more awkwardly than girls. Studies show that girls usually learn how to walk and talk faster than boys. These sex differences are observed in the first years of school, when girls usually learn faster than boys.

In the book “How the mind works”, Steven Pinker [11] approaches the differences between men and women from a cognitive point of view. Pinker rejects the thesis that biological definitions may be responsible for the differences between genders. Being a girl or boy ensures different treatment and education throughout life. According to Pinker, this difference, more than the biological and cognitive conditions, explains the behavior of each gender within society.

Nowadays, in Brazil, women stay at school for a longer time than men and also have more undergraduate degrees than men [12]. Despite this, there are fewer women than men in the labor market [12], and most top Brazilian scientists are men [13]. In addition, Brazilian women earn about 25 % less than men [14]. Unfortunately, this is also true beyond Brazil. A recent and major report on gender equality around the world,

by the World Economic Forum, showed that Denmark is the only country among 142 analyzed where, on average, women earn more than men [14]. This report also shows that Denmark is the country in which men spend the highest average time per day on unpaid work. This may indicate that when men and women share unpaid work, which is usually domestic work and looking after children, both have opportunities to have a high professional position.

Apart from the fact that women usually do more unpaid work than men and therefore can dedicate less time to their professional job, there are other reasons for the low percentage of women in leadership positions. Another reason may be differences caused by educational gender differences. In the design field, an example of the difference in gender can be illustrated by the Bauhaus pioneering school of design. Since the beginning, the school had women lectures and students, but women were teaching what were considered female subjects such as weaving and standardization, whereas typographic construction, furniture design and construction of objects were taught by men [15].

In the IT field, technology is considered one of the most powerful symbols of masculinity and it has been claimed that “technological competence has become an important aspect of hegemonic masculinity” [16]. Researchers in IT claim that differences in gender in IT professionals are related to the number of situations to which women are subjected throughout life. According to Natansohn [17], from childhood boys are praised when they dismantle their games, models and robots, being acclaimed as ‘engineers’, whereas girls do not receive the same feedback if they dismantle their dolls.

Although gender differences in experience design is considered an important topic by many researchers and there are some investigations on this topic, it seems that there still needs to be more research in order to understand the differences between males and females and to help designers create products that serve both genders. Some studies on user experience design and gender differences are discussed below.

3 Digital Design and Gender Differences

Studies on gender and experience design have indicated different aspects that can explain the differences between male and female designers. Some of these studies are summarized below in order to figure out possible gender differences that can interfere in the design development process and the final design solution.

Beyer et al. [18] investigated different variables that could explain the low number of females studying computer science in comparison to males in the US. Beyer et al. [18] did not find significant differences in gender in relation to quantitative ability, interest in computer science, stereotypes and knowledge of computer science. However, they did find a difference between male and female students in relation to their confidence on the subject. Male students were much more confident than female students. They explain that one of the causes of low female confidence is that they have a less relaxed and playful attitude towards computers. Another reason is the fact that they had less programming experience than males before going to university. The authors claim that women’s low confidence can affect performance. This is because “positive

self-perceptions of ability are intimately tied to aspirations, educational choices, preference for challenging tasks, intrinsic motivation, and persistence”.

Like Beyner et al., Burnett et al. [8] also investigated self-confidence in gender, among other aspects. Burnett et al. investigated gender pluralism in problem-solving software. By pluralism, they used the definition proposed by Bardzell [19], as “the quality of designing artifacts that resist any single, totalizing, or universal point of view”. According to them pluralism implies that more inclusive designs through sensitivity to marginal users can be produced. They found gender differences in feature usage, in tinkering, and in how confidence works with male and female. They also found that the gender differences did not suggest that males are better software users than females. They conclude that is important to consider gender differences when designing problem-solving software, and that doing this can help both genders.

Also observing designers during the development process, Oudshoorn et al. [16] made an investigation on two virtual cities. They analyzed the design phase of technology and the designer’s gender differences during the development of two electronic virtual cities in the private and the public sector, both in the Netherlands. They observed that the designers of both teams took their own preferences instead of assessing the interests and competencies of users. They explain this by the fact that most of the team was male and therefore a masculine design style was adopted. They argue that it seems likely that female designers can make a difference considering that there is a strong alignment between hegemonic masculinity and specific technological values. They concluded that the identities of designers are important in understanding the dynamics of technological development.

With a different approach to the studies described above, Okudan [20] conducted a study in order to investigate task domain gender orientation of a design task. Engineering students in the US were asked to answer four questions after completing a design project. Two different tasks were measured: rocket propelled grenade (RPG) countermeasure design and air velocity controller design. He found that these tasks were perceived differently by the participants. While RPG countermeasure design was perceived to have masculine overtones, the other was mostly seen to be gender neutral. He concluded, among other things, that the gender orientation of tasks can vary considerably from males and females. In addition, he argues that one of the reasons why female engineering students feeling undervalued by their male peers is related to the project domain gender orientation.

A more recent study also investigated the differences between male and female novice designers. Ng et al. [21] investigated the practices and attitudes of novice designers toward the stereotype production method for public symbol design. Forty-eight Hong Kong Chinese novice designers participated in this study. Half of them were male and half female. They found that the number of ideas generated varied in relation to the user suggestions incorporated into symbol design. Male designers were less positive than female designers toward user suggestions. For male designers the results showed a negative correlation between the acceptance of a given pictorial representation in the design and the number of design ideas for symbol representation. On the other hand, this correlation was not found for female designers. Female

designers rated the attribute ‘valuable for designing process’ of user suggestions for symbol design significantly higher than the male participants. Based on this result, the author recommended that attention must be given to male novice designers that are less positive toward user needs and preferences. This finding is in agreement with Oudshoorn et al. [16], which also argues that female designers are more sensitive to the needs of users.

Finally, it is relevant to consider the findings of the studies done by Schroeder et al. [22] on gender and technology. Through an analysis of the literature about gender related to technology use and perception they found that females have a sense-making through coherence, whereas males focus on individual needs and a detailed approach which means that their approach is about technology being meaningful in itself. They concluded that “there is a male gender bias in many tech-products”.

The literature review on gender differences, and more specifically gender differences in digital design, was the basis for building a survey that is described below.

4 Study on Gender Differences with Brazilian Designers

4.1 Method

The chosen methods for this study were semi-structured interviews and an online questionnaire. As the study aimed get the view of designers from different parts of Brazil, most of the answers were collected through the online questionnaire. The questionnaire was created, sent and analyzed using Google Forms tool [23]. The survey was available online from December 2014 to the beginning of February 2015. The participants were invited to collaborate with the research by email and Social Media design groups in Brazil. The questionnaire was applied in Portuguese and some questions and answers have been translated in this paper in order to illustrate the findings.

The online questionnaire contained 29 questions, with a combination of response format types: there were 20 structured and 7 unstructured questions. The unstructured response format was used in order to gain more understanding about the respondent’s feelings, experiences and perceptions. This type of question is important as they provide participants with a chance to answer the questions in their own words [24].

Sample of structured questions were:

Have you ever been in the position of boss in a design team?

- No, I have never occupied the position of boss.
- Yes, I have, but not for long.
- Yes, I have, for more than three years.

Samples of unstructured questions were:

- Explain your creation process. Do you divide the process into stages? How many stages and which ones?
- Do you believe that there are differences between genders in the creation process of digital products? Please explain.

Apart from the questions related to the topic investigated, there were also questions about the participants' personal and professional information, like gender, age, place of work, educational background, and their experience in the workforce as designers. These questions were important in order to understand the participants' answers and opinions better.

4.2 Participants

Forty participants took part of this study, half male and half female. They were from the five regions of Brazil, and from 10 different Brazilian states.

Participants defined their profession as: designers, graphic designers, editorial designers, web designers, interaction designers, interface designers, user experience designers, product designers, industrial designers, information architects, design thinkers, design teachers and design researchers. Both genders had approximately the same academic background, varying from non-graduates to those with a doctorate.

Most of the participants were aged between 21 and 40. Fifty percent of the female designers had been working in the field for more than 10 years, while 75 % of the male designers had been working for more than 10 years. According to the answers, more women than men research design for more than 10 years. Only 15 % of men said that they had researched design for more than 10 years whereas 40 % of women said they had researched design for more than 10 years.

4.3 Results and Discussion

The first questions were about being in leadership positions in the workforce. Sixty-five percent of women said that had been bosses in their offices, with 35 % for more than 3 years, while 80 % of men said that had been bosses, with 60 % of them for more than 3 years. This finding confirms studies that found that men have more leadership positions than women [12].

Most of the participants said they do not have gender preferences related to their bosses at work. Looking at the data by gender, the males and females that preferred a specific gender for bosses differ in the gender chosen. Half of the males that chose a gender said they preferred females and the other males. On the other hand, most of the female that chose a gender preferred to work with males. The reasons for that were not questioned in this study. One of the reasons may be because they are used to it, or another reason is that they prefer to deal with the opposite sex. As mentioned by a participant: "As a designer lecturer I have always liked men monitors to complement my vision of the work. Women monitors always had a similar vision to mine."

When asked about gender presence in their workplace, about half said that their environment had about the same number of men and women designers, 35 % answered they worked in a predominantly male workplace and only 12 % answered they had a predominantly female workplace (Fig. 1). This is also in agreement with the findings that there are more men than women formally working in Brazil.

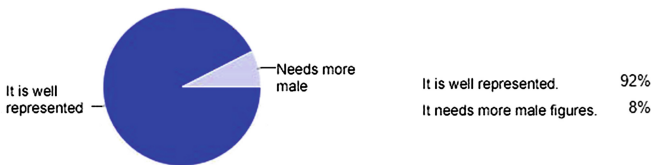


Fig. 1. Gender presence in the workplace

Most of participants thought that gender did not help them to achieve a professional goal. However, more men agreed with this greater (30 %) than women (20 %). In addition more women think their gender had been a problem in achieving something or presenting an idea (30 %), whereas only 20 % of men agree with that. The answers show a small difference, pointing out that being a woman could be slightly harder in the field when trying to present ideas. This finding is in agreement with the belief that women are thought to be more careful in expressing their opinions than men.

When asked about the presence of male designers in the market, 92 % of the participants answered that the market was well represented with male representatives and only 8 % believed there could be more men. In relation to the presence of female designers in the market, 62 % of the participants answered that the market was well represented with female representatives, while 38 % believed there could be more women (Fig. 2). Therefore, more participants had the impression that more women are needed in the market than men.

How do you feel about male representatives in the design field?



How do you feel about female representatives in the design field?

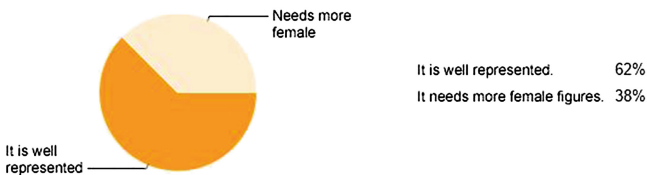


Fig. 2. Presence in the market

In relation to the creative process, both men and women answered in a very similar way. Half of them believe that there is no difference in the creative process between genders. Some of them argue that the difference is only about personal experiences, but not about gender. As a male participant said:

“I do not believe much in [gender] differences. I have worked with both genders for many years and I think what makes a difference is the knowledge in the area and the involvement with the project.”

The other half was divided: 25 % thought there was a difference and 25 % said they could not tell if there was a difference. A sample answer from a male participant that believes that there is a difference in creative process by gender:

“Yes. Males and females understand what reaches the public in different ways.”

In relation to the final solution of digital products most of the participants (60 %) believed that there is no difference related to gender of the designers. They explain that the differences are individual and not caused by gender differences. As a female participant explained:

“I think that gender is not the main factor influencing the product, it is a detail. The final result will depend on the profile (training, personality, skills) of the professionals involved.”

On the other hand, some participants argue that creative teams should have an equal number of women and men to guarantee the quality of the product. This phrase by a male participant illustrates this idea:

“I believe that the results tend to be more complete if projects are designed by collaborative teams made up of both sexes, as well as ages, disciplines, specialties, desires and needs. I believe in collaborative intelligence that brings multiple views on the issue to be solved by design.”

Some participants also mentioned a relationship between the gender of the product designer and that of the product user.

“Perhaps because of the influence of cultural and personal aspects, for example: a product that deals with a subject that men normally do not care about or that would be primarily used by women could be more complicated for a design group with men only.”

When discussed their own creative process, around 60 % of both men and women believed that their ideas were balanced between rational and emotional. Twenty-five percent of the female participants considered their ideas to be more emotional, while 30 % of the males considered their ideas to be more rational. All women and most men said that they preferred to work in groups without gender distinction. However, 15 % of male designers preferred to work with male designers in a team. None said that they preferred to work in a group with only women. Although this difference seems not to be representative, it is important to consider that no one preferred to work only with women. It may be reasonable to think that women may not show so much confidence in this subject as men.

In relation to code programming skills, 85 % of the male participants said they have knowledge on the subject, whereas the percentage of women that have knowledge in programming was 60 %. In addition, more male participants declared having a lot of

when working in groups; more women than men think their gender had been a problem in achieving something or presenting an idea; most of the participants did not have gender preferences related to their bosses at work; more participants had the impression that more women are needed in the market than men; half of women believe that there is no difference in the creative process between genders; most of the participants believed that there is no gender difference in relation to the final solution of digital products.

Finally, if on the one hand findings in general indicate that most Brazilian designer participants think that differences between men and women in designing do not affect the final solution of digital products, on the other hand half of them thought that there is a difference in the creative process between gender. In addition, the perception of some designers that it is good to have both genders within a design project indicates a need for equilibrium of genders in the creative process of digital design. This idea is in line with Oudshoorn et al. [16]. They claim that adjustment of gender identities is important for technological innovation. It is also relevant to consider that creative individuals, in general, have cross-gender traits beyond the traits of gender [26]. According to Csikszentmihalyi [26], studies show that creative women, such as artists and scientists, tended to be much more assertive, self-confident, and openly aggressive than average women, whereas creative men appear to be more sensitive than average men. Male and female characteristics and approaches when combined may be helpful to show a bigger picture of the project, and therefore can lead to more creative and innovative projects.

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