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# Design Students' Challenges in Individual Brainstorming Using a Design Fiction Method

Lu Liu<sup>[0000-0002-5223-0030]</sup>, Tamara Hoveling<sup>[0000-0001-5389-398X]</sup>, and Panos Markopoulos<sup>[0000-0002-2001-7251]</sup>

Eindhoven University of Technology, Eindhoven, Netherlands  
{l.liu3,p.markopoulos}@tue.nl

**Abstract.** Design fiction (DF) is gaining ground as an approach that helps designers to explore possible futures. As a method founded upon critical attitudes and creative thinking, DF may be challenging for design students. In this study, we explore how design students use DF during creative design activities. Students engaged in an individual digital brainstorm and an in-depth, semi-structured interview about their experiences with the brainstorm based on DF. The results show that DF can be challenging for students who do not have a clear appreciation of what is technologically feasible for a particular time frame in the future and do not yet have the breadth of knowledge to argue about broader topics that DF is particularly attuned to into the discussion as, for example, economics and societal norms. This study contributes insights into how DF impacts the students' design thinking, as well as difficulties they had regarding their individual thinking process.

**Keywords:** Design fiction · Design thinking · Individual brainstorm · Design challenge · Design education.

## 1 Introduction

Design Fiction (DF) is a new, creative methodology that may improve design thinking [14, 5], and can be used to envision hypothetical products of tomorrow, by creating a speculative story-world told through designed artifacts [2, 8]. The ability to engage in DF practices can help designers to think free from commercial and real-world constraints [2], and is therefore an important competency for design students to acquire. Currently, design student's design thinking processes usually rely deeply on group work [13, 1], thus they seem to have difficulties overriding the boundaries of their own state of mind when brainstorming individually [13]. However, individual brainstorming can produce more original ideas than group work [10, 7]. DF could potentially be a valuable addition to current thinking tools of individual brainstorming.

This qualitative study set out to explore the difficulties in design students' thinking processes when brainstorming individually using a DF framework. Previous work shows that DF-methods know challenges in constructing and understanding the future-bound ethics of technology in one's mind [9], and in terms

of ethical vagueness, as the future concepts are not feasible and are difficult for design students to relate to [3].

## 2 Method

The study consisted of an online individual brainstorm and a semi-structured interview. The pre-study briefing and interview were done via Skype and the brainstorm session was done via mural.com [11]. The topic of this brainstorm was the appearance, functions, and uses of the interior of future self-driving cars.

The brainstorm session lasted approximately forty minutes and was based on the Approach of DF by the Near Future Laboratory [4]: a design company that specializes in the exploration of (unexpected) futures. Their prominence and impact in the field as evidenced by citations to their work motivated us to choose to use their method as a paradigmatic case. The brainstorm session consisted of the following four steps: 1) design brief with an explanation of the assignment and design challenge about self-driving cars, 2) participants were asked to write down their concerns, ambitions, fears and everyday needs of inhabitants of envisioned futures, with self-driving cars in mind, 3) participants were asked to consider all things that could change in the future with regards to, for example, law, norms, aesthetics, social and personal values, and habits, as changes in environmental factors might influence how suitable different design choices are, and 4) participants had to come up with different futuristic ideas or designs that would offer the possibility to discuss a different kind of future.

During the interview, participants were asked about their overall impressions, their feelings about different steps, the differences between DF and their regular design process in their design curriculum, the added value of DF in the future, and the ways in which DF helped them to look further ahead.

In total, ten design students were selected by means of purposive sampling [12]. The participants were bachelor (2) and master (8) students who are currently following different design curricula worldwide.

## 3 Results

The interview data were analyzed inductively, in a thematic analysis approach based on the guidance provided by Braun and Clarke [6]. To analyze and identify patterns in our interview transcriptions, themes within the data were developed bottom-up. We summarized and divided transcriptions into different data segments. By tagging the data segments, we generated initial codes and recognized common themes, to which we added other suitable codes. During the analysis, the themes were adapted repeatedly until all codes were combined into overarching themes: thinking from future, future potential, missing of external input, switching between steps, study setup, and thinking process.

The main challenges of the DF method itself are thinking from a future perspective and adopting DF in future projects. Most participants mentioned that

they struggled with thinking of futuristic ideas, especially with abstract concepts. Although thinking from the future perspective is hard, nine participants mentioned that the DF method can be helpful in future projects because of the clear structure and the inspirational perspective it stimulates. Regarding their assignment, participants found the setup of our sessions difficult without external input, such as other research or input from users. Besides, most participants saw a link between the steps, but could not switch fluently between them, probably because they had not yet internalized the DF approach. Such challenges derive from the study setup but are not derived from the DF as such. Participants emphasized on differences between the regular and DF thinking processes. About step two (inhabitants of envisioned futures), participants mentioned getting insights from the keywords, and looking from a personal perspective made it easier to imagine future scenarios. Additionally, participants mentioned that step three (future environment) helped them look at the bigger picture: the societal and economical perspective, but also at the impact self-driving cars may have.

## 4 Conclusion and Discussion

This study provided insights into the challenges that students face while engaging in DF. Almost all participants felt challenged to think with a future perspective, which is consistent with the notion that the future concepts of DF are not feasible and relatable to students [3]. Additionally, this study showed why students regard DF as hard to apply. Abstract concepts such as economic models or social norms are beyond most students' knowledge, thus participants thought they missed external input. Therefore, it is important that in future DF-based ideation sessions, students first engage in some preparatory work that will allow them to inject into the design process substantive knowledge on topics related to the design challenge. While useful insights have been obtained, the study setup constrained the way DF practices were applied. Similar studies in the future should strive for more flexibility and realism in the design challenge.

Yet, not only challenges were mentioned. Most participants thought that the DF method made it easier to imagine future scenarios, due to its clear structure with questions and keywords and the personal perspective of the assignment. Especially, the step concerning the future environmental factors was perceived as a difficult but essential tool for thinking in-depth about the future and for looking at the 'bigger picture' of the future environment and its inhabitants. Because DF was new for most of our participants, they thought DF helped them to broaden their ideation. To extend the results of the study, we need to investigate how students use DF in real-life projects of longer duration. This study assessed only students' self-efficacy about the DF brainstorm, but future research may assess how well students apply DF methods from an expert perspective.

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