

# Insights for Educational Practice from a Thematic Analysis of Student Experiences with Speculative Design Mini-Projects about Personal Issues

Kay Kender, Peter Purgathofer

Human Computer Interaction Group, Institute of Visual Computing and Human-Centered Technology, TU Wien, Argentinierstraße 8, 1040 Vienna, Austria

**Abstract.** In 2020, we gave a large-scale first-year informatics course an assignment to speculatively design hypothetical solutions for issues they were experiencing due to social distancing measures during the COVID-19 pandemic. In this paper, we present a speculative design mini-project, then analyse student feedback and present insights about applying speculative design mini-projects around personal issues and in a large-scale technology education context. Our findings indicate that students had strong emotional experiences throughout the process and gained deeper insights into both design and the issues they were engaging with. Through peer reviews, students found new perspectives and feelings of relatedness in the face of shared hardships. From this, we summarise learnings for teaching practice about 1) peer review as a tool for feedback loops and discussions, 2) safety and student well-being when addressing personally experienced issues, 3) abridged design processes for trans-disciplinary competency, and 4) fostering safe spaces for creative vulnerability.

**Keywords:** Speculative Design Education, Student Well-Being, Distance Learning

## 1 Introduction

The novel Coronavirus (COVID-19) pandemic has challenged our infrastructures and resources on global, societal, and personal levels. It is the very definition of a so-called “wicked problem”, a term used to describe complex, multi-layered issues which by nature require a cooperative, trans-disciplinary, flexible and never straightforward process to address: a wicked problem often seems impossible to solve, overwhelming, and entangled with too many factors and systems to possibly find a solution to [1]. Along with other disciplines, wicked problems are inextricably linked with design processes – the similarly complex and messy process of designing, the focus on the future, and the type of out-of-the-box thinking associated with creative work, is often seen as essential in approaching wicked problems.

It then comes as no surprise that design as a method has gathered momentum in the last two decades, with movements such as design thinking, which took the

corporate world by storm in the 2000s [2], or the introduction of speculative design courses in higher education [3], [4]. Global issues in an increasingly connected world have led to growing interest in future imaginations and speculative design, not only in the field of design itself – design education, industry, and research – but also in both secondary and higher technological education, such as computer science and informatics, which have a long-standing tradition of technical, functional and industry-focused design education. Increasingly, there are efforts to focus on equipping students in these disciplines with the means of engaging with their subject more critically, and connecting it to the wicked problems of the world their work will be situated in, the future they are creating, and thus, the responsibility they bear.

With the social distancing restrictions in place during the winter semester of 2021/2022 in Vienna, Austria, the TU Wien (Vienna University of Technology) was forced to improvise distance learning in most courses for most of the semester. In one such course, aimed at first-semester informatics students, this led us to create a particular assignment that led students through a superficial version of a speculative design process. This mini-project had them ask questions and design possible answers for social distancing-related issues they themselves were immediately and palpably experiencing.

In the following, we present our insights into student experiences with designing social distancing solutions in an abridged speculative design process, throughout which we were all enduring social distancing. We first describe the course and our understanding of speculative design in an educational context, then showcase the assignment and steps of a thematic analysis. Finally, we present our results and insights for applying speculative design as an educational method to engage issues students are experiencing.

## **2 Background**

### **2.1 Speculative Design in Computer Science Education**

Creative methods for acquiring knowledge are considered an important learning tool at all age groups: by processing a given subject creatively, students often engage with the material more purposefully, synthesising it to achieve a desired deliverable [5]–[7]. This opens up new perspectives, highlights areas of conflict, and leads to the raising and answering of questions that may not have emerged within a non-creative learning process. Among creative methods, design is applied increasingly in education, especially in technological education, as design-based learning [8], since it offers a more structured and well-defined creative process and a plethora of guiding concepts and theories, which can take the edge off more “free” creative processes, especially for those new to them or very used to rigid rules and linear processes.

Speculative design specifically is greatly valued in research and education as a way to encourage students and participants to engage not just creatively, but critically with their environment, especially around questions regarding technological futures [9]. While usually centred around technologies, thus making it particularly relevant to computer science and engineering, what speculative design explores is not technologies themselves, but their impact. The term emerged from critical design

around the turn of the century to challenge normative design within the design community; that is, emancipate design from its industrial context by exploring the role of design in moving towards a preferable future by designing for alternative realities or possible futures [ibid]. While initially targeted at design practitioners and researchers rather than the broader public, it has since made its way into education and research, and even, to a certain degree, become commercialised itself. It goes hand in hand with design fiction, which may loosely be defined as imaginary design artefacts in an imaginary or real-world context [10]: in one definition, “Design fiction is the deliberate use of diegetic prototypes to suspend disbelief about change [11].”

The line between speculative design and design fiction is blurry, and the words are often used interchangeably. For the context of this work, we differentiate between the two: speculative design claims more plausibility, that is, speculation in the sense of the word, and aims to create a certain level of realism in order to ground the experience of an alternative present or possible future in the here and now [12], while design fiction may be more free and can be any design that tells a fictional story.

Criticisms of speculative design include questioning the elitist, white, patriarchal position and thus single-minded way of futuring, the inaccessibility for non-designers, as well as failure to improve underlying structures in the present, which can result in ‘empty’ discussions [13]. Despite some of this criticism, however, speculative design is becoming a frequent tool in design justice interventions, and, alongside design activism, has come to be regarded as an important part of discussions around democratising the creation of the human-built environment.

In certain fields, such as Human-Computer Interaction (HCI), speculative design has come to denominate an approach that includes a variety of methods, including design fiction and critical design [14]. There are three waves of HCI, which can be understood less as temporal waves and more as research paradigms that evolved from one another, but are all still applied. While at the beginning, human factors were considered in computing as coupling between humans and machines, this soon shifted first to focus on cognitivism and information processing, then towards a more phenomenological, situated, value-sensitive and socio-politically laden paradigm: the ‘third wave’ [15]. The first wave mainly focuses on single users, the second on cooperation and networks, while the third wave focuses on ethical, cultural and emotional aspects of computing that is part of life and society [16], a more critical approach that requires researchers to look beyond cognitive and engineering research [17]. Thus, speculative design has entered HCI to address third-wave questions, and is within this field understood as design methods and processes that focus on critical question-asking and the opposition of normative design in alignment with third-wave HCI values such as participation, ecology and culture [16]. In short, speculative design in HCI is design that, through speculation, critically engages socio-technopolitical computing issues. As the course we discuss in this work is an informatics course offered by TU Wien’s HCI department, this will be our understanding of the term for the following.

To summarise, speculative design scaffolds discussions, and dreams about fictional realities and futures in response to issues in the present reality. By dropping certain claims to realism, speculative design allows free engagement with complex topics, rendering it an ideal tool for creative learning, especially around subjects like wicked problems.

## 2.2 Ways Of Thinking In Informatics – an Introduction to the Real-World Context of Digital Technologies

In the course “Ways Of Thinking In Informatics”, first-year students of informatics at TU Wien engage critically with different perspectives on informatics and their own responsibility as co-developers of the digital world. Students attend introductory lectures about 8 ways of thinking in informatics: *Scientific Thinking*, *Mathematical Thinking*, *Computational Thinking*, *Design Thinking*, *Creative Thinking*, *Critical Thinking*, and *Responsible Thinking*. While the first three “ways of thinking” are more classically associated with informatics, *Design Thinking* addresses the concept of wicked problems and creative product development, *Creative Thinking* guides students through creative processes and explores creativity techniques, *Critical Thinking* engages them in topics of social justice, *Responsible Thinking* addresses ethics, theories of change and sustainability, *Criminal Thinking* introduces them to malicious intentions and unintended consequences, and finally, *Policy Thinking* provides an overview over current issues such as algorithmic bias or the data economy and connected policymaking.

As noted in the introduction, we had to change the mode of the course to distance learning instead of presence learning due to legal restrictions in connection with the COVID-19 pandemic. This led to a variety of changes structurally, such as flipping of the classroom [18] or introducing panel discussions a few days after each introductory lecture, for which the online modus allowed us to invite international experts to join panel discussions about each way of thinking. We report in more detail on this here [19].

After the respective introductory lecture and the panel discussion, assignments were unlocked for 6 of the chapters: *Scientific Thinking*, *Computational Thinking*, *Design Thinking*, *Critical Thinking*, *Creative Thinking*, and *Responsible Thinking*. These assignments were split into several tasks. Once deliverables for a task were handed in, students anonymously peer-reviewed the same task submitted by other students before continuing to the next task. After hand-in of the complete assignment, students were given time to make revisions before finally being evaluated by teaching staff. For each chapter, students could choose between two or more assignments, in order to allow them to choose their preferred focus.

Below, we present one such assignment, which was created for the chapter *Design Thinking* to offer students the opportunity to learn about design within a current and real-world setting they themselves were experiencing.

### 3 “Speculative Design: A Not Entirely Normal Semester...”

In the following, we outline the assignment, titled “*Speculative Design: A Not Entirely Normal Semester...*”, including the introduction text, the prompt for each task, and the list of deliverables. The goal of the assignment was twofold: first, to give students an abridged but broad insight into design processes, and second, to give them space to process their personal experience of student life in a pandemic through a design lens by speculating about possible solutions to social distancing.

Based on our experiences running this course, we had to navigate the freedom needed for speculative design and the expectations of students, most of whom were not familiar with the field of design. We therefore chose to frame the project in a relatively problem- and solution-driven approach, and added the overarching narrative of following the course of real-life product development, including advertising, since we believed that grounding speculative design in familiar outcomes, that is, creating evident purpose, would make students feel more secure and guide them in discovering the relevance of more free, critical and creative content. However, we also stressed that they should use fantasy, imagine the impossible, but also think of possible futures.

The version below is translated from German and omits some details, such as footnotes, secondary instructions, examples, and information relating to the course such as points awarded for each task.

### **3.1 Assignment Prompts**

**3.1.1 Introduction Text.** This year's first semester students are experiencing a very unusual entry into university, which is in a state of constant disruption as everyday life is re-configured while navigating a pandemic. Strictly speaking, you will not know what 'normal' studying means for your first year. You start this new chapter of your life in interesting times – missing out on many of the experiences you would usually have as a newly enrolled student, and it doesn't matter if it's your first or second degree.

In this abridged design assignment, you will engage with how you navigate life as a student in a pandemic, and analyse the social aspects of your day-to-day life in distance learning. Then you will let your imagination run wild to creatively address your personal challenges in times of social distancing by designing a fictional solution to enhance closeness to other persons from afar.

**3.1.2 Task 1 – The Problem.** *To design something, it is crucial to understand in which context and for which requirements, situations and people you are designing. This usually happens before the project itself begins by developing an understanding for the situation. In addition to classic research methods, so-called user research is often applied. In our case, this is relatively easy: you yourself are the user, and your everyday lived reality is the context your design will exist in.*

Create a list of social interactions you would have expected to experience in your everyday life as university students (you can base this on previous school, work, university or other similar experiences) and juxtapose it with a list of how you digitally or non-digitally compensate for these interactions in times of social distancing. Not all items on the list necessarily have to be related to studying, just to your every routine as students.

**3.1.3 Task 2 – The Design Task.** *Now it's all about not forgetting your grip on the situation as you design. For this, you formulate the question or problem the design should answer or solve as an assignment for yourself – a verbalisation of your goals or mission in this design process.*

Take a look at your list – which of the “replacement” interactions are an adequate digital solution, which are still lacking? For which of the social interactions that require embodied presence are there no satisfactory digital features yet? Is there anything about your list that strikes you as an area where digital solutions could be improved?

Briefly write down your remarks. Then, try to summarise them as a design task, that is, an instruction to yourself – this text should be as short as possible (!). Whether you choose to focus on a “trend” you see underlying certain interactions, or on one specific aspect you find interesting, is entirely up to you.

**3.1.4 Task 3 – The Impossible ‘Solution.** *At the beginning of the design process, we explored a relatively wide array of opportunities, from which we then developed a precise design task with clear limitations. Now, we open another aspect up wide and give free rein to our imagination – what would the ideal solution be, if there were no limits or restrictions at all? Along with sketches, designers also use sketch models to visualise their ideas – quick, inexact, sometimes even ugly physical models meant to establish a feeling for the possible size, shape, layout and usage.*

You have described your task, specifying limits and requirements. What would the ideal final outcome be? The unrealistic dream outcome? And which features would it have to have in order to fulfil your requirements? The solution doesn't have to be ideal in the sense of positive or plausible, the outcome may just as well be exaggerated, dystopian or humorous. Let your tech-fantasy run wild – from robots to disinfection suits and even holograms, you are allowed to “invent” anything, even if it is not technologically possible (yet).

Draft your concept as a sketch or sketch model, and, in a short text, describe what it does, which features it has, and why it is the perfect answer to your self-assigned design task.

Important: we will NOT evaluate your drawing or model-building skills!

**3.1.5 Task 4 – Presentation.** *If this were a real project, there would be several iterations and the entire production process... but we will simply skip this and pretend the product is finished and available. In this last task, therefore, you will present your design in a fictitious advertising campaign!*

Design a poster to advertise your product, and write either a short text to print in a newspaper, or a short text to be recorded and broadcast on the radio. Alternatively, you can make a video spot instead of the poster and text.

There is no requirement in terms of length or complexity. The text can be a single line, or a conversation, and the poster can be hand-drawn, or feature only layouted text – there are no rules here. It all depends on your message: you have to find the best way to convey why people should decide to use your product, and what they stand to gain from it.

### **3.2 Deliverables:**

- Task 1: A list of social interactions in everyday and student-related life before COVID-19, and the COVID-19 replacements and workarounds, described in terms of functions and features.

- Task 2: A short analysis of one, a pattern in, or a summary of the above issues, and a design brief formulated from the analysis.
- Task 3: A fantasy concept, product or technology to fulfil the above brief.
- Task 4: A newspaper or radio ad and a poster for the speculative concept if it was real.

Each task statement featured supplementary footnotes providing links to further material or examples to better understand our expectations as needed, for instance, we explained how important choosing words can be in formulating a goal. We also made a point of adding footnotes that offered transparency on our motives and expectations, such as *“Of course, every design discipline, from speculative to product to graphics and advertising, is its own profession and subject of study. Neither we expect you, nor should you expect yourself to produce perfect work. So why should you dabble? The purpose of this assignment is for you to come in contact with design processes, and find out what you need to consider in these processes and what they look like. These things are important to know not just because you might end up cooperating with designers professionally, but because you are exposed to design in your private lives as consumers.”*

## 4 Methods

### 4.1 Summary and Reflections: Data Pool

For this work, we analysed students' reflections, which was a questionnaire students filled out during the revision phase, after handing in their work and before being evaluated. These questionnaires were created by us in order to allow students to reflect on their learnings and insights gained in working on the assignments. They were not formulated in order to write the work at hand, which was sparked retrospectively from our interest in the unexpected answers we received when skimming them and the discussions we had as a teaching team.

The questionnaire was as follows (one question regarding the course structures omitted):

*“As usual, the content of your answers will not be evaluated, merely your participation in earnestly answering the questions.”*

- *Has your view on our situation (pandemic) changed? To what extent has design as a process led to unexpected insights or revelations?*
- *Are you satisfied with your work? Do you think your concept could be developed into a real product?*
- *What have you learned in this assignment? Has this assignment changed your understanding of design or design thinking?”*

### 4.2 Analysis of Data

The answers to the questions above were evaluated using Reflexive Thematic Analysis [20], a qualitative method used to explore the subjective experiences of

particular groups of people through ‘themes’ that are addressed in (usually verbal) statements [21]. We used Reflexive Thematic Analysis within a constructionist paradigm, with an inductive approach, which means we did not expressly look for themes with a specific question in mind [ibid], but we did conduct the analysis from a subjective, personal perspective and in relation to our roles as educators in the course, focusing on the experiences of students in the socio-cultural context we and they are in. Our focus in the analysis was on the latent and semantic expressions of the experiences of students rather than the content discussed in answer to the questionnaire, which we largely ignored. The analysis followed the 6 steps proposed and refined by Braun & Clarke [22]:

1. Familiarisation with the content and preliminary notes
2. Open coding of semantic and latent chunks of text
3. Development of themes based on notes and coding
4. Refinement of themes by renewed comparison with content
5. Final themes described and connected to each other
6. Presentation of themes in this work

Despite the high number of participants, we chose to apply Reflexive Thematic Analysis as the method most suited to our interest in the subjective lived experiences of students taking part in the assignment, and our further aim of gaining teaching insights from the outcome. Our analysis does not pretend to be neutral or replicable – in conducting the analysis, we drew from our experiences and discussions with students, as well as discussions with each other during previous this course and previous iterations of it.

### **4.3 Evaluation Process**

We obtained answers to the questionnaire above from 253 submissions on the online platform where the course takes place. We loaded these submissions into a spreadsheet, automatically anonymising them in the process. In the first read-through, we familiarised ourselves with the content in general, taking notes along the way. In this process, we deleted 4 submissions without any content entirely, and greyed out some submissions that did not directly address questions. We then thoroughly colour-coded student experiences in terms of emotions, topics and attitudes, as well as highlighting quotes we found defining of the themes that we began to see. From this and further notes, a set of themes was proposed. This was used to read through the answers a third time, assigning them to the themes, while refining the theme names and taking more detailed notes and selecting representative quotes to capture the chorus of individual perspectives. During the last step, the write-up, these were summarised, and some examples put into dialogue with each other and translated by us from German.



#### 4.4 Ethical Considerations

Students had the possibility of choosing another assignment entirely for this assignment pool, which led them through a similarly condensed classical industrial re-design process of a technology of their choice. Before entering either assignment, students could see the introduction texts for the assignment, as well as the texts describing all tasks and deliverables, as documented in section 3. Students were also notified before entering the elaboration that their submissions (but no other information about them) would be exported, anonymised and may be used for research purposes. They were encouraged to get in touch with the team if they wished for their work not to be used in this manner. Over the duration of the entire semester, students had several channels to connect with the teaching team: a comment section in their personal profile (the team would be notified if a new comment appeared), a question area underneath each task description (also resulting in notifications), traditional e-mail (checked daily) and a weekly office hour held online via zoom by (author). We regularly encouraged students to get in touch even if they needed anything unrelated to the course, which some did.

### 5 Findings

We found experiential accounts to be focused on four themes: the emotional impact of working on a traumatic topic, design as a form of empowerment, feelings of connection and respect towards others' experiences, and reflections on personal creativity. The themes are mentioned in alignment with different questions asked in the reflection, and are often interwoven.

#### 5.1 Emotional Impact of Working on a Topic of Personal Issue

Many students offered unprompted insights into their emotional experiences during their work on the assignment – this theme was the most present, and sometimes also supplemented with punctuation mark emoticons. Students who spoke about their feelings either felt happy working on their assignment and more hopeful about the pandemic situation, or hopeless and more strained because of the preoccupation with the situation.

*“I think the assignment for ‘Design Thinking’ was something like an outlet valve for all of us [...]”*

*“Design as a process helped me realise that you should always make the best of every situation, and look to the future, e.g. with a good idea. :)”*

*“This assignment made me realise the current situation was stressing me out a lot, because, like I said, I miss my friends.”*

Positive experiences were often reported as part of a change of perspective or insights owed to the design process, with many students describing the process as “fun”.

*“But the assignment was very fun and lets you hope about cool innovation for the future”*

*“I actually had fun. And I’m also more optimistic about Corona after this challenge.”*

*“My realisation: even the worst situation can be somehow improved/saved.”*

*“Yes [my perspective has changed], this assignment helped me see the current situation a bit more positively.”*

*“My perspective has changed. I see the whole situation in a more positive light.”*

Those with a negative perception of the situation or negative feelings connected to or triggered by their work on the assignment often used phrases like “shown me again” or in other ways noted that their view of the pandemic situation was still the same.

*“The first task was emotionally demanding, because you had to analyse everything that you were missing [...] My view on the situation has not really changed.”*

*“This task has just shown me again how important it is that we end this crisis. I want to live again :’(“*

*“I really had flashbacks and remembered the time when Corona was less present.”*

Both positively and negatively impacted students often mentioned the work of others, the reviewing process, or mentioned their colleagues in other ways. Thus, sometimes rather than their own process and thoughts, that of others influenced their own perception of the situation:

*“I think my perspective on our situation hasn’t changed, but as I was reviewing certain submissions I had to laugh, which in our current situation should not be disregarded.”*

This particular quote, among the first results coded, prompted the emergence of the first idea of the theme of connection, which is discussed in detail in section 5.3.

Beyond just their emotional experience during the elaboration for the assignments, some students reflected on the assignment in connection with themselves and their lives more generally, and many mentioned having gained insights about how to handle the situation better, or even made changes to their everyday routine because of things they learned about themselves in the design process.

*“Design has helped me realise I need to re-structure my daily routine”*

*“My view has actually changed. Before, I took the whole Corona thing very seriously because I had bad experiences with it. But now, my view is slightly mellowed. You can take things seriously, but you can also have a lot of fun at the same time.”*

In terms of assessments of positive and negative feelings that were not directly about the social distancing experience or their experience with the assignment, students also discussed technologies as replacements for social contact. Again, some were hopeful and positive, mentioning that through their analysis of current replacements, these struck them as impressive feats of human creation, while others felt more woeful, as they perceived the situation as an overview of what was missing, or what didn't work.

*“More or less everyone chose the topic of how to create more closeness in times like these. This made me realise how [...] lacking our digital alternatives were compared to physical closeness.”*

*“Of course you should be grateful for the many and impressive possibilities we have to send messages and even (video-) calls at any time. But these are obviously only satisfying as an addition to physical contact.”*

*“The whole situation is pretty exhausting for everyone, but certain software (like Discord) make it a lot easier. This assignment showed me clearly just how much they help improve the situation.”*

*“But maybe I am more grateful for the technologies we have today.”*

Regardless of positive or negative perception, all those who reflected critically on this topic further drew attention to their either existing or new-found conviction that digital technologies can never replace true human interaction, an insight which for some crystallised directly from their struggles to design replacements for human interaction. In this, latent emotional implications are evident.

*“No technology of the years to come will ever put us in the situation of being able to replace real contact.”*

## **5.2 Design and Feelings of Power(lessness)**

Reflecting on their experience of the design process, and whether their concepts might be manifested, students discussed feelings of empowerment and agency, but also of powerlessness, discouragement and being overwhelmed. Of the students who felt disempowered, none of their viewpoints had been changed by the challenge, and as above, they perceived design as emphasising or capturing just how powerless they felt, with every impossible obstacle between their speculative solution and the real world painfully clear.

*“Through the design process I once again realised how hard it was to develop products for this situation”*

Many of the students who responded above with newly-found positive outlooks on the pandemic explicitly stated that design helped them feel like there was something they could do about it, rather than feel overwhelmed and passively experience the situation.

*“At least I could escape the whole thing in my head through [this assignment].”*

*“It helped me win a new perspective on the situation, and through this, motivated me anew.”*

*“[...] I learned that, from crisis, you always have the possibility to develop something new.”*

When asked if they thought their product might become reality, all students gave realistic answers, but many expressed enthusiasm for a future in which their product could be available, and there were often mentions of enthusiasm about possible availability of colleagues' products.

*“As I was developing my concept and writing reviews for colleagues, it struck me that our lives would be a lot better during Corona if we had the products we were conceiving.”*

*“Many ideas I saw could make our daily lives in lockdown a lot better. Some lack resources and possibilities, but others could possibly even become reality with resources we already have.”*

*“It gave me hope, somehow, that in a coming lockdown it would be possible to have improved contact with people close to me.”*

Even while they were aware that their products were fictional, they still felt like they had confronted an obstacle in a constructive way, and come out making a difference – to themselves and their experience of the situation, or to their colleagues.

*“This challenge motivated me not to complain about the situation too much, but rather think about possible solutions.”*

*“Namely that, with innovative ideas, we can come out of this suboptimal situation stronger than we initially blundered into it.”*

*“You learn from it that you can nevertheless draw Good from every bad situation.”*

Thinking about design invariably also led to thoughts about how the practice of design – even fictional design – shaped the future, or their understanding of what the future means, how it is made, and what their agency in this process is.

*“I learned that design is sometimes more important than our technical possibilities. We don't need the hardware of the future to already outline future products right now, through good design.”*

*“It's also scary to be exposed to such solutions, because they imply that the abnormal times we have today are slowly becoming the new normal, since we are trying to find a permanent solution for the social deficits [...]”*

*“Above all, I learned to not think just in what is possible, but first and foremost about what could be possible, and what is needed to achieve that.”*

### 5.3 Feelings of Connectedness and Relatedness – With Each Other and Others

Many students expressed feelings of relatedness and connection with two distinct groups of people: their colleagues, with whom they experienced solidarity in the face of a shared experience, and design professionals, for whom many expressed a new-found empathy.

*“We are all looking for (impossible) solutions to try and make our everyday life as ‘normal’ as possible, and this process was very interesting to me.”*

With regards to the latter, most of those students who stated that they had learned nothing new about design typically mentioned this as due to having previous experience or knowledge in the area, while most of those students who had never come into contact with design expressed not only new revelations about what design means and how it works, but many also expressed a new-found respect or empathy for designers and their work, including the responsibility that goes with it.

*“I was aware that product design was hard, but I had no idea that it demanded this extent of creativity and originality. The assignment really opened my eyes in this respect.”*

*“[...] I learned to appreciate the work of others like never before. That is not trivial!”*

*“Until now, I sneered at [the design] sector, because I thought with a bit of sense and photoshop anyone could do it. Now I realise that my work is by far below the standards of professional designers, even though it took me considerable time.”*

*“I would argue my understanding of design has changed. I always thought design was something arbitrary and negligible, because for me it was always only about functionality. But the functionality in itself is influenced by design. The better the design, the better the functionality.”*

More than with professionals in the design industry, however, students poured out exclamations of solidarity with one another and feelings of relatedness and closeness to their peers. Many of these evoke a latent feeling of gratitude for the insight, and a lightening of the burden with the realisation that it is shared.

*“You noticed that everyone was having more or less the same experience with [the pandemic].”*

*“Reviewing all those elaborations always reminded me that it’s not just me who feels this way, but rather that we’re all sitting in the same boat.”*

*“But now that I have thought about solutions and seen other solutions, I have understood that you don’t have to be alone in a pandemic.”*

*“My view changed insofar that I don’t feel like only I alone feel this way. Until now, I always had doubts that it might be only on me that I barely had contact with other students [...]. But after the many reports and ideas of other students I noticed that it was because of lockdown [...].”*

*“It demonstrated to me more how strong the need for interpersonal interaction is for most people.”*

As already mentioned in 5.1, the process of peer reviewing also shaped their perspectives on the situation, their feelings, and sometimes even actions beyond their studies.

*“To be honest, my view on the situation has not changed because of the work I did, but because of the work I reviewed.”*

*“For 4 months I have been living alone in (City), so the situation was extremely hard for me. In this assignment, I saw that many of us have the same problems. This is why I then reflected more on the situation and confronted it more maturely”*

#### **5.4 Reflections on Personal Creativity: Myths about Design and Creativity**

The final and perhaps most latently present theme was students' experiences of creative work in terms of how they positioning their own personal creativity within their concept of what creativity or design should be, and what constitutes “good” or “bad” creative output.

*“I was previously of the opinion that designing a product would require way too much creativity that I did not possess. But the first 2 tasks helped me understand how helpful it is when you concentrate on a problem and try to find out how it could be solved with a product.”*

*“Yes, it was inspiring for me, because I never thought I was creative, but by following along with this assignment, I was able to create a product that I was happy with in the end. So it was very positive and inspiring.”*

However, while many were surprised at their own capacity for creativity, none questioned their own constructed notions about talent and creative skills.

*“It was unexpected that I kept having more and more ideas for my concept. This is, of course, a beautiful experience.”*

*“Yes, I’m pleased, and even surprised that I was so creative after all and immediately came up with something.”*

Many also had apologetic notes about their own creativity, directed either outwards at us as the teaching team, or towards themselves, and statements about personal creative skills often semantically featured derogatory words, like “ugly” or (in this case English-language in the original) “crappy”, were used when describing personal work.

*“I think I can be reasonably proud of my work. My drawing talent may be limited, but I think the purpose of the drawings should be apparent.”*

*“Personally, I am pretty content with my submission, even though I wouldn’t have expected to ever have to hand in one of my crappy drawings in a university course :^).”*

*Furthermore, I learned that when you’re designing you just have to try a lot of different things and you shouldn’t be ‘ashamed’ about how ugly the first concepts are, as long as they make sense and communicate the message of the product fittingly.”*

In light of the above, we must take a short moment to break our strict qualitative paradigm by throwing in a number that meant something to us: 198 of 249 students stated they were proud of their work, even if some lamented that it was unrealistic due to the speculative nature of the assignment. Only a small handful equated their perceived success in completing the assignment with realistic outcome. To end on an equally personally satisfying and once more qualitative note:

*“This challenge helped me re-discover my creative side. I have started drawing a little again, and that was a welcome change from all the mathematics and homework.”*

## **6 Discussion**

Now framed as the central concept of this paper, during the analysis, we were surprised at first to find so many students unsolicitedly offering insights into their emotional experience during the design process. Since wicked problems are often stressful and overwhelming to confront, we were further surprised to see how many students described the process as fun, and had positive emotional experiences. Conversely, however, our understanding of the extent of negative feelings has also been expanded – we will address this further when we discuss the insights for teaching practice in 7.3.

Less surprising to us were the consistent acts of self-deprecation that we interpret as latently conveying insecurity and vulnerability about personal creative work. We had, through our teaching experience so far, anticipated a certain shyness or even anxiety about activities that take place within the context of social myths surrounding personal expression, talent, and creativity. These are often heavily connected with judgementality and ridicule. We had tried to address this by taking a light-hearted and even humorous tone in our prompts and explanations, and pointing out explicitly where our priorities lay. This was evidently not enough.

Within the wicked problem context, the theme of power also comes as no surprise. While we wonder whether changing the assignment to underscore the fictionality of the project even more might have seen less students criticising their concept in terms of holding it up to standards that might be expected of an actual solution to the pandemic (the mere idea of which may sound preposterous, but despite clear and repeated emphasis on fictionality this was still often the case), on the whole, we think understanding the connection design has with power, whether experienced as empowering or powerless in this assignment, is an important learning outcome.

The insight that was most important to us was how the extent of the impact the peer-reviewing process had on both the emotional experiences of students and their

perception of their own work, and how often it was both implicitly and explicitly mentioned in all themes. The social context put students' personal experiences into dialogue with those of others, enabling reflections, comparisons, discussions and learnings about speculative design as well as the pandemic. When we were creating the project, due to the massive number of students and our limited resources, we had to find workarounds for the missing aspect of feedback and discussion, an irreplaceable part of design. Thus, when we implemented automatic peer review after hand-in, we thought it would be a poor replacement – to our relief, the self-reports of students disagree with this. We are also pleased with the effect putting students in designer shoes had on their understanding of the importance of design.

Since we rooted the assignment in realism in order to provide more structure to students new to design completely, we were impressed how deeply students – whether consciously or unconsciously – critically engaged the (pandemic) future, speculating about the possibilities of replacing human contact through technology, and thinking about what kind of futures they want, or do not want, to build. There was more critical and reflective engagement with topics thrown up by the project than we expected – students understood or learned that the outcome did not have to be real to be meaningful and provide insight about the situation and its possible development. Many speculated about futures in which their fictional products might be real products, and thought about whether this would be desirable.

Overall, we were impressed by students' candour in talking about their feelings – in connection with the design process on the one hand, and the pandemic-induced social distancing situation on the other. As the different factors connected to the emotional experience of students were entangled and influenced each other, distilling distinctive themes took a long time. However, we believe we have managed to find a balance between themes that represent the experience of students and the factors that made an impression on their emotions, and themes that help us reflect on, understand, and develop our teaching practice.

To us, the voluntarily offered disclosures of emotions and feelings, and thus well-being, in itself demonstrates the importance of the assignment and thus, the relevance of addressing current and personal topics with students, as well as using speculative design as an educational method.

## **7 Implication for Teaching Practice**

We believe this format can contribute to making speculative design as a teaching method more accessible to large-scale courses and courses in less design-related subjects. In the following, we present practical insights we will consider in reiterating this assignment, and hope will be helpful to other educators who are creating similar assignments for mass higher education or distance learning courses, educators who aim to offer some insight into design and creativity to students in other disciplines, or educators who are guiding students through creative explorations of personal issues.

### **7.1 Peer Feedback**

As designing is a process in which discussion, feedback and a back-and-forth between different people is not only important, but crucial, this poses challenges to attempting



to conduct design projects in courses in which, due to distance learning, lack of resources or sheer number of attendants, the students become almost anonymous. In creative education, small class and even department numbers are the norm, with usually only a handful of students per educator or tutor, as personal guidance and feedback are a key aspect of design education.

Not that any of these may be adequately replaced – to paraphrase one of the students quoted above, ‘technology can’t replace persons’ – but we believe that setting in place a system of several rounds of randomly assigned peer review at critical junctions in the design process has great potential in providing at least part of the structures mentioned above. Peer review systems could play an important role in improving accessibility to creative education. By giving students a dual role as creators and peer critics, we believe we can provide them at least with a basic insight into feedback in a design process, and allow them to develop some ideas about its relevance, how it is given, why it is essential, and what it might look like in reality.

In so doing, it is important to ensure that feedback is given conscientiously, but also freely. In our application of peer feedback, this was successfully achieved in that, while students were encouraged to create revisions based on feedback they received, we made it clear to them that the feedback they received from colleagues would not impact their final evaluation of the assignment by the teaching team, and the feedback they would give colleagues would be evaluated only in terms of earnestness and thoroughness, but not specific content.

## **7.2 Vignettes from Different Professions for Transdisciplinary Insights**

In terms of students’ future careers as informatics professionals, one of the possibly most important takeaways from this assignment was empathy for design professionals and a basic grasp of how designers work, how issues can be addressed with design, and how objects can be developed. Too often, design as a profession has the status of ‘mysterious talent sorcery’, or, on the other side of the coin, the unpleasant connotation of being useless or elitist. In addition to demystifying design and creating empathy for designers, thus laying the founding blocks for future cooperation and better trans-disciplinary skills, learning the workflow of design also equipped students with a nominal new *Way Of Thinking In Informatics*, and a deeper and more critical perspective on the human-built world and thus, the human-built future.

Thinking beyond design, students could benefit from experiencing what we call vignettes for other professions. If, for example, a university offers a course on medical device engineering, while it goes without saying that first-hand cooperation later on should be self-evident, offering more insights into the everyday lives of different healthcare professionals early on in the curriculum could deepen student understanding about the context in which their future work will be situated. Thus, assignments could be developed in cooperation with different healthcare workers. The form of the vignette would have to be thought through as well – with design, it makes sense to go through an abridged and speculative design process. But what might a vignette meant to give students a glimpse into the work of a nurse look like?

### **7.3 Understanding the Risky Nature of Addressing Personal Issues in an Educational Context**

We maintain that there are a host of positive aspects, including a positive impact on well-being, to be gained from addressing personal topics and personal issues in design education. To us, the overwhelming responses of students who gained insights about themselves and their experience, or new perspectives or knowledge about the issue they were facing, confirms that firstly, addressing personal and contemporary issues is generally a good idea, and secondly, speculative design as a process is uniquely suited to do so. We posit that the evident emotionality of learning with and around personal matters may contribute to making the content that is being taught more relevant, and lead to more learning beyond the subject at hand.

Although we consider addressing personal issues a good idea in general, we must also stress that it can have a negative impact on students' emotional state – this, in our opinion, depends on the safety structures built around it. Attention must be given to the possible consequences that deep immersion in a stressful, upsetting or otherwise negatively laden topic may have on the well-being of students.

We believe that in our case, simply offering an alternative assignment and support was not enough to prevent negative impact, since this placed the responsibility of assessing personal reaction in advance on the students, who, per the purpose of this assignment, were mostly unfamiliar with design processes and speculative design. It is our responsibility as educators to ensure that in the future, we not only address this more explicitly from the beginning, but also create structures that allow students to pull an 'emergency brake' of sorts if needed.

While considering the well-being of students is simply good teaching practice, when tackling issues that students are personally experiencing or have personally experienced, the stakes are higher, and the possible negative emotional consequences should be carefully considered in order to pinpoint potential triggers and understand the vulnerability of students, depending on the issue. The more sensitive the topic is, the more the potential to cause mental harm or even trauma. Additionally, we believe that the pre-existing vulnerability of personal creative work, especially for students who are less experienced or going through a creative process for the first time, heightens the possibility of negative impact when engaging personal issues.

Similar considerations, although less clearly understood by us, also apply to feelings of empowerment or disempowerment: educators must carefully consider how much potential disempowerment and how much potential empowerment could be experienced by students, and try to tweak the assignment accordingly. Design in itself should be an empowering action, however, the results indicate that it can have the opposite effect sometimes. This is interesting and warrants further investigation – therefore, we can only point to it in the work at hand.

### **7.4 Fostering Safe Spaces for Creativity**

Simple foundations for a safe space, such as a patently light-hearted, low-pressure framing or explicit statements of expectations like e.g. "drawing skills are irrelevant, it's about conveying the message" are useful basics in conveying to students that they can express themselves freely and without judgement.

However, as evident from the findings, we believe there is need for further measures to address and allow students to critically engage with their preconceived notions about creativity. Therefore, we believe there is a need to find additional ways to ensure safe spaces for creative work, especially when student contact is limited and when students are novices at creative work.

Providing additional examples to give students an understanding of what the outcome should more or less look like is one way of soothing anxieties about creativity that we think was useful for us. However, every such communication of expectations or providing of structures can also have the converse effect of restraining creative freedom, and should be applied with caution, especially in a context lacking opportunities for more detailed discussions.

One additional resource we plan to apply here in the future is to address topics like creativity, talent and shame in the learning material and lectures, or provide optional further resources for students in these areas.

## 8 Challenges and Limitations

Because there was a choice between the assignment presented here and an alternative assignment, it may be possible that students who were already interested in the matter chose to complete the speculative design assignment. We did not ask students why they chose this challenge over the other one.

Further, we have no demographic data to offer on the students, thus, we cannot put the results into any context other than first-year informatics students at the TU Wien.

## 9 Conclusion

In this paper, we have described how we implemented a speculative design assignment that dealt with students' personal experiences with social distancing during a pandemic in a large-scale distance-learning university course. In a thematic analysis of reflections that students wrote in answer to prompts about their experience with the assignment, we discovered four distinctive themes that were all connected by an underlying emotionality in connection with the answers: 1) the emotional impact of the assignment itself, 2) feelings of empowerment or powerlessness, 3) feelings of relatedness and empathy with others, and 4) reflections on personal creativity. From these, we developed insights for teaching practice in similar design education processes around personal issues, and offered thoughts on how to develop speculative design mini-projects that include peer feedback, provide a safe space for creativity, and foster empathy. We also share thoughts on possible problems that arise when addressing personal issues in an educational design process. We believe there is great potential in the assignment format presented here in terms of making speculative design more accessible to other fields of education.

**Acknowledgments** We would like to thank the students who participated in this assignment for their enthusiastic reflections on the assignment, as well as the rest of the teaching team working with us, who make the course possible every year.

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