Practicing Design Judgement through Intention-Focused Course Curricula

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Abstract

This paper elaborates on how design judgement can be practiced in design education, as explored in several iterations of an advanced course in interaction design. The students were probed to address four separate design tasks based on distinct high-level intentions, i.e. to 1) take societal responsibility, 2) to generate profit, 3) to explore a new concept, and 4) to trigger reflection and debate. This structure, we found, served as a valuable tool in our context for bringing important topics to discussion in class and for actively practicing design judgement. We discuss what we see as the main qualities of this approach in relation to more conventional course structures in this area, with a focus directed more towards aspects of methodology, specific interaction techniques, and design principles more generally.

Key words

interaction design, design education, design intentions

Introduction

Several scholars have emphasised design judgment as a main trait of skilful designers (see e.g. Lawson, 2006; Nelson & Stolterman, 2003), and which therefore should be acknowledged and practiced in design education. In design schools, this skill is taught for instance through design critique sessions (e.g. Reimer & Douglas, 2003), through critical analysis of existing products and experiences (e.g. Bardzell, 2011), by practicing methods for understanding people and usage (e.g. Dourish & Button, 1998), and through reflective design work using various tools and materials (Schön, 1983). In Fernaeus and Lundström (2014), we introduced an increased focus on design intentions as a complementary approach to guide such activities, and which we have explored in the context of interaction design education. In this article, we extend this work by further elaborating on our experiences in relation to prior work in the field.

The complex issue of intentions in relation to design judgement is likely already well accounted for in existing knowledge practices, for instance in online design forums, in established design practice, or within other similar courses. This especially as designed artefacts, and perhaps especially interactive products, are increasingly reviewed when met by professional as well as amateur critics, and posted publicly, e.g. in online blogs, newspapers and tech-specific forums. However, we recognize a need to engage more specifically with these topics in relation to teaching and education within the design research community. Here, we will further elaborate on our experiences from placing an increased focus on higher-level intentions as a general theme in master level courses in interaction design.

We will begin by outlining the motivations behind this project through an overview of related work, and theory behind the specific implementation that we choose for our course context. Thereafter, we will give a brief descriptive overview of the content and structure of the course, how we have implemented themes and assignments, and a short analysis of how these have played out in practice during the three years we have implemented this setup. We end with a brief discussion based on reflections and learnings from these experiences, in relation to our expectations and experiences from similar courses that use a more methodological course focus.

Background

In an attempt to move beyond simplistic measures of usability, and more seriously address also aspects such as style, experience, value, and purpose of interactive products, there is a need to acknowledge that designers may have different and sometimes conflicting intentions with their work, and through which they may need to be judged and assessed. Making a design that aims to be critical or that explores a new type of technology obviously needs to be judged by different means than one that aims to generate profit or fulfil the needs of a marginalised user group.

However, the relationship between intentions and judgement is not always straightforward, since the intentions of the designers will never be the only measure by which a final product will be judged and evaluated. Jeffrey Bardzell has elegantly discussed this circumstance for the specific case of interaction design, emphasising the cultural context and the varying perspectives as

represented in the professional tradition of criticism (Bardzell, 2011). As put by Bardzell & Bardzell (2013): "*the designer intending to create a critical design can hardly be satisfied with making a design that is critical in her or his opinion only*" (p 10). Matching the higher-level intention of the designer with the interpretation of its potential audience can therefore be an important challenge for designers, and which could be addressed in many ways, e.g. by tuning in with the expectations and desires of the audience, or by through various means being explicit about one's own intentions (titling, description, context of presentation). In other cases, the core intentions of the designers do not necessarily have to be obvious or visible to the general audience, but still be important to shape the design. As an example, higher-level intentions such as making money by selling information to third parties, as is the case in products like Google and Facebook, might be central in driving and shaping central interactive aspects of a product, but still not be the measure by which one wishes the end users to judge the design.

Concerning the interpretation by the audience or end user, openness for interpretation might also be beneficial to a design as it might appeal to a broader spectrum of people, and a broader range of uses, as highlighted by Sengers and Gaver (2006). However, this should not mean that the designers do not need a good sense of the design intentions with the design. On the contrary, to be able to make decisions of what should be apparent and how to play with the openness for interpretation requires a certain amount of understanding for what is interesting to make and for what purpose.

As put by Bryan Lawson (2006): "*Design is a messy kind of business that involves making value judgements between alternatives that may each offer some advantages and disadvantages. There is unlikely to be a correct or even optimal answer in the design process, and we are not all likely to agree about the relative merits of the alternative solutions*." (p. 81)

One basic way of addressing design judgement is from a perspective of design methods. Such a perspective offers many different frameworks and taxonomies for how design work could and should be practiced, from general outlines such as the double diamond process of the British Design Council, to methodological guidelines for specific domains,. In Interaction Design course books, we find for instance Dan Saffer (2010) – also quoted in (Sharp, Rogers, & Preece, 2002) – describing five major approaches to designing products: 'user centred', 'activity centred', 'data-driven', 'systems', and what is referred to as 'genius design'. The authors argue that these approaches should not be seen as mutually exclusive, instead they serve the purpose of bringing light to the general observation that successful design work can be executed in different ways. Depending on the task, some approaches may be more suitable than others. An important dilemma put forward by this taxonomy, is that user-centred design methods (UCD), which has been the most actively proposed in Human-Computer Interaction and Interaction Design education, may not always be the most successful method when it comes to real product design cases. The very fact that Saffer's taxonomy includes different methodological approaches, with UCD as one of many, emphasise that user involvement can in some cases be substituted by the judgments and activities performed by skilled and experienced designers. As an example, a designer or design firm that has worked with a specific domain before has arguably also accumulated knowledge and experience beyond what could be obtained through UCD methods, e.g. general knowledge about what the users want, the market, stakeholders, and other business aspects, to mention a few.

While the focus on methodological approaches is relevant to all design work, we will here instead discuss design judgment on a more conceptual level, and how we have addressed this in our own educational practice. This means that our focus is on frameworks and models that aim to help designers elaborate on what to value and what aspects to consider. In Fernaeus, Tholander and Jonsson (2008), we used the notion of shifting 'ideals' to discuss the consequences of an increased focus on practice and human experience in the design of interactive products. These ideals represented a fundamental conceptual shift in focus from primarily individual usage, information and cognition, and properties of the technology, towards increased emphasis on collaboration and sharing, engagement in a physical context, and allowing for different parallel practices and interpretations. The framework has later been used as a resource for guiding design work as well as for analysing qualities of the designed interaction (e.g. Tanenbaum et al., 2011). A variety of other models elaborate on what aspects might be considered from a certain perspective, e.g. from a perspective of materiality, crafting or form-giving (Gross, Bardzell, & Bardzell, 2013; Vallgårda, 2013). Other higher-level distinctions has concerned the characterization of design itself, e.g. as the merging of Art, Science and Technology of Bauhaus (Findeli, 2001), or Nigel Cross' definition of design as Discipline, as opposed to Science (Cross, 2001).

The work presented in this paper is heavily inspired by the 'four fields of design' initially articulated in an online article

by Bruce and Stephanie Tharp (2009). Their framework took its starting point in the profession of industrial design, but has in our case been applied to education in interaction design. The 'four fields' comprises a taxonomy for design work focused on different types of higher-level purposes, or intentions:

- Commercial design: with the general intention to generate profit
- Responsible design: intending to do 'good' or serve the unserved
- Experimental design: with focus on the process of learning and exploration
- Discursive design: with a higher level goal to generate reflection and discussion While these different intentions typically overlap in parts, the main argument put forward by Tharp & Tharp was that by articulating them designers could see how intentions might interplay and sometimes even contradict one another. Thereby they could guide discussions and potentially help judging the outcome of a design, although taxonomies such as this will naturally only articulate partial understandings of certain relationships.

The framework was also used to acknowledge the growing terminology of approaches used within the design field. As put by Tharp & Tharp (2009):

> 'Just try and make sense of the range of the terms floating around out there: user-centred design, eco-design, design for the other 90%, universal design, sustainable design, interrogative design, task-cantered design, reflective design, design for well-being, critical design, speculative design, speculative re-design, emotional design, socially-responsible design, green design, conceptual design, concept design, slow design, dissident design, inclusive design, radical design, design for need, environmental design, contextual design, and transformative design." (p.1)

All these terms refer to aspects of importance to design practice, but they also go beyond both the 'type' of product being produced (e.g. mobile, tangible, graphic), as well as specific design methods. In addition, the academic discourse has been concerned with similar terms as tools for understanding and shaping design practice, with concepts such as ludic design (Gaver et al., 2004), design for ambiguity (Gaver, Beaver, & Benford, 2003), translucency (Dourish & Button, 1998), seamfulness (Chalmers & Galani, 2004), among others. It has even been argued that the development of such concepts, so called 'strong concepts', is one of the main contributions of design-based research (Höök & Löwgren, 2012). We also found that in the academic discourse, there is often an unclear distinction between discursive design and experimental design. For instance, Daniel Fällman (2008) writes:

> "Design exploration often seeks to test ideas and to ask "What if?" – but also to provoke, criticize, and experiment to reveal alternatives to the expected and traditional, to transcend accepted paradigms, to bring matters to a head, and to be proactive and societal in its expression. (p. 8)

With the focus on higher-level intentions, we found that the four fields managed to articulate important distinctions between design projects that aim primarily to raise discussion or awareness (as discursive design) and projects that are conducted for the sake of learning or exploration (experimental design). Although these often overlap, especially in research settings, articulating this distinction can be important in order to know what qualities to value and on what basis a project should be judged.

With this as a starting point, we wanted to explore how the four fields could be used to guide interaction design projects in a master level course at our university.

Case: Intentions in Interaction Design Education

There are many ways to structure interaction design education. A general challenge is to develop a format that brings in more designerly values to an education traditionally grounded on engineering and social science. A common way in technically oriented contexts, e.g. in computer science schools such as ours, is to provide themes or course modules based on different types of interaction technologies, e.g. graphical interfaces, tangibles, mobile computing, sound and haptics. This is in many ways a logical structure, since it allows students to focus deeply on different technologies and thereby learn about the broad design space that each of these areas provide, which is an important part of becoming a skilled interaction designer in a technical domain. These activities are normally complemented with course content that focus more on theory and exercises related to general methodological issues, such as conducting field studies, engaging users in the design process, and methods for ideation, sketching, and working in a team. However, since there are so many different approaches and settings for the making of interactive systems, our experience is that it is often difficult to cover all the relevant aspects in a structured manner. To address this challenge, the focus in our advanced interaction design course has not been on how to practically conduct design work, but rather on how

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Figure 1. Conceptual designs on the experimental theme, from left to right: Strike a Pose
• Visitors are encourage to imitate dancers and thereby explore their own body image in a playful manner. Design that attempts to catch passers-by attention and spur a curiosity to visit the museum. Image recognition used in an app to identify artefacts and access richer descriptions and other media connected to the artefact.

to develop and judge design as a central part of the design process, based on its overarching design intentions.

The course has been offered in a similar format during the last three years, covering four smaller design projects, each representing one of the abovementioned 'four fields'. Each of the four projects lasts 4 weeks and is conducted in pairs, with students working with a different partner in each project. The course ends with a presentation of an individual online portfolio, showcasing all four projects. Important to note is that we have had the privilege to organise this course in an intimate studio format, with a limited number of 16-24 students, running at 50% study speed during 20 study weeks. Which is rather unusual in university context like ours. This naturally allows a structure heavily based on personal supervision, external study visits with the whole group, and weekly design critique sessions. However, since countries and schools have different teaching conditions, our focus in this paper will be on the conceptual content rather than on specific practical arrangements.

It should also be further emphasised that this is an advanced course in the subject, and the students are therefore expected to already know how to independently drive an interaction design process, i.e. knowing how to apply established methods for field studies, ideation, state-of-the-art analysis, user involvement, prototyping, and documentation in the form of video and academic writing. The students are also expected to have an idea of the research front in the field and be familiar with design issues related to different types of interaction technologies. The focus of the course is thereby almost entirely on issues related to intentions and fundamental approaches to practical design work while also conducting practical design work providing cases for discussion. Below is an overview of the four themes as implemented and interpreted in our course.

Experimental or Exploratory Design

Experimental Design or what might also be called exploratory design, refers to design work where the main goal is not necessarily a finished product, based on readily defined briefs with sketches, plans, or requirements. Its primary intention is instead to explore, experiment, and discover within a chosen frame, for instance a specific technology or technique, theme or concept.

Typical examples reside within learning contexts and academic projects following a research-through-design process (Zimmerman, Forlizzi, & Evenson, 2007). Within technically fast paced domains, such interaction design, this is also a relevant design approach outside of academia since emerging interaction technologies, development tools, hardware platforms, to mention a few, constantly require new learning. Experimental or exploratory design work may well result in complete products at a later stage, but the primary intention is much more open – and may even see value in design 'failures' (see e.g. Gaver, Bowers, Kerridge, Boucher, & Jarvis, 2009). Thus, these types of design projects value the process almost as much as the resulting product and are motivated and driven primarily by curiosity and an interest in learning.

In our course, this theme starts off with a design brief asking the students to explore a topic, concept or technology beyond what they already know. Previous examples in our case have been to design something based on exploring the functioning of a chosen sensor of a smart phone, or to work hands on with e-textiles. In our latest course round, students got a brief to explore new concepts for interaction at a newly set up museum of dance in our city. The task for the students was to explore possibilities around the general topic of dance in the museum setting, along with testing out different possible technologies (see Figure 1).

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Figure 2. Screen designs of commercial design concepts, from left to right: A concept that aims to help customers at a furniture store figure out what furniture would fit in their car. Tool for turning blogs into physical books. Conceptual design for families to stay in touch and privately share pictures and videos.

This rather specific brief worked well in this case, since the personnel at the museum wanted input on what might be possible or not, rather than solutions. The students were therefore not pressured to develop something fully working, but rather to explore possibilities. The topic of dance in itself also seemed to force the students outside of their own comfort zones and encouraged them to work hands-on with technologies that they were less familiar with from beforehand. Resulting in a range of novel scenarios and setups, including interaction contexts such as the street outside of the museum, visitors waiting in line for the toilets, and the use of a medical stethoscope as an interaction device. In addition, the students explored various ways of interacting in an exhibition space, ranging from mobile applications to physical exhibits, combining experiences from other museums and applying it to the topic of dance. The students were also naturally provided with content and media to engage with as they were encourage building on the existing and upcoming exhibitions.

The staff at the museum, who had initially expected to see a presentation of eight different types of mobile app-based solutions, were excited by the results, and are now considering to implement several of the designs in some form. Indicating that the main intention for conducting explorative design worked well as it led to several new perspectives that not only opened up for new possibilities of installations, but also reinvestigated the very nature of interactive exhibitions in this particular context. In this way the main outcome of the process was to open up a design space, explore possibilities, and for all the involved partners to learn something, which is also from an academic perspective an important purpose of design work at large. The very fact that the students were able to be so successful and explorative also demonstrate that they understood and carefully engaged with the higher-level intentions while not falling for the expectations and pressure perceived among the staff at the museum.

Commercial Design

Commercial design refers to design aimed at the real economic market. Economy is an important component of any design work, so what commercial intentions adds is primarily that the design itself gets grounded much more concretely on what might be desirable on a market, as well as, how the business model of that product would take form and in turn shape the design. The goal is thereby to create attractive, useful, and well functioning products, but with design judgements focusing primarily on potentials for commercial profit. In interaction design specifically, business models are often very deeply intertwined with the design of the interactive product itself, as shown in examples such as streaming media services, ad-sponsored mobile applications, open hardware licensing, and a broad range of electronic currencies and interactive payment systems. Investigating how such systems and models work is therefore a very relevant topic for interaction design students.

In our course, we have let this theme stay as an open brief, placing much focus on the process of ideation, discussion, and grounding design choices in existing use practices. The general task has been to come up with a concept for an interactive product or service that would have a potential of becoming a commercial success. The students are also asked to make the business model a part of the interaction design and to deliver a 'finished' design (see Figure 2), personas, realistic scenarios for interaction, and a proposed plan for bringing the product to market. Core to this design challenge is to develop concepts that are well grounded, in technological realities, be it in research or what exists on the market.

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Figure 3. Example screen designs from four passed projects, from left to right: Two concepts exploring novel ways for foreigners to use public transport. Two solutions for families with children and teenagers who alternate living with separated parents.

During the course we invited external lectures that drive businesses to share their experiences and explain how they make money, but also lectures that work with helping researchers and students to develop their ideas into businesses. This is to provide the students with real accounts of business and it is usually are very appreciated by our students as there is often aspects emerging that are surprising or otherwise pointing towards commercial and design aspects never thought of before, e.g. it could be that the profit does not come directly from the end user but from another stakeholder unknown of if just looking at the product as such. In addition to these lectures we have seminars and workshops concentrating on the business model canvas1 and examples of other businesses by using this canvas. In this way the students are encourage to analyse, interpret and discuss various ways of making money in the digital domain.

Our impression is that this has been a tough challenge for the students, but they have also shown much enthusiasm, and some have continued working on their ideas after the project ended, showing that their project has reached some potential for commercialisation and thereby also demonstrating that the students have truly understood and shaped something more commercially viable based on a commercial intention. The serious focus on business models and who might be ready to pay for a particular product or service highlights the complex realities of interaction design oriented businesses. Based on the discussions in class we can only stress the importance of covering such aspects, in particular for interaction design as this is not always as straight forward as for fields more oriented towards selling and making money of physical products, were the profit generating scheme might be more visible. Being able to discuss different types of business models and how each of them relate to interaction design, is a topic that – in our experience – is often overlooked in ordinary interaction design education. Ironically, this is core to any successful commercially viable interaction design work, independent of other intentions with the design. As a note, even systems designed within other themes during the course and within research have been brought to discussion here, highlighting how the fields often overlap in interesting ways, and the benefits of engaging also with other intentions in commercial contexts to open new spaces for designs that generate profit.

Responsible design

The concept of responsible design refers to design that place ethical and humanitarian aspects at the forefront. The term in it self is broad and invites a variety of topics like designing for people who are ignored by the market, environmentally friendly products, or otherwise to counteract different types of social or physical suffering (see e.g. Papanek, 1972). While commercial products sometimes can and in the best of worlds should take such aspects into accounts, the orientation is fundamentally different as the main measure for success is not framed in economical terms. Rather it is framed in terms of other values, such as if it is helping a group of people or and individual, or if it is more responsible with regards to the environment. This is more in line with what has been referred to as 'worth' (Cockton, 2006) or what might be referred to as value in value-sensitive design (Friedman, Kahn Jr, Borning, & Huldtgren, 2013).

In this project we let students select and redesign an existing system of their own choice that they would argue are being 'irresponsibly' designed in its current form. The definition of responsibility is then left open for the students to discuss, define and motivate, with grounding in literature. Making students start with the existing situation to improve on also reflects a typical interaction design practice, where you would only rarely start out completely from scratch and spend a large part of the process at the ideation stage. This have also resulted in a very broad

1 http://www.businessmodelgeneration.com/

variety of projects, some examples are to redesign existing services for people with special needs, to make for more sustainable solutions, or to improving poorly working systems in general. This way, the brief also opened up for more general discussions regarding different interpretations and perspectives on what is actually meant by responsibility in design, and how it can be practically addressed.

In addition to the project work we arrange several reading seminars where we discuss academic work discussing various aspects of responsibility, ranging from classic reads as Victor Papanek, to more contemporary critical work that discuss what we should and could do, for instance by using persuasive technology (Purpura, Schwanda, Williams, Stubler, & Sengers, 2011). The main aim with these seminars are generally to face the students with assumptions concerning responsible design, as what could be actually solved with technology and design, and who could solve it, where we for instance discus problematic aspects of designing for the so called third world while belonging to and judging design from the perspective of the privileged world.

In previous years we have also given more narrow design briefs, e.g. to let students design tools to help foreigners finding their ways through the public transport system in our city, or to design tools for children to manage the situation of living at alternate places due to separated parents (see Figure 3). What we valued in these two design briefs were that they took a perspective of responsible design that focused on ordinary issues where interaction design might actually enhance a currently complex situation. In other projects in similar courses we explored more complex issues, e.g. designing for alone coming teenage refugees, which as such brought in a series of higher level humanitarian and political matters that are difficult to address through the design of interactive systems alone. Although these projects have been extremely interesting, we found that the open briefs on this theme seems more beneficial in terms of keeping the discussion focused on the overarching theme of responsible design.

In terms of learning outcomes and designed results, we have seen a broad variety of exemplars and discussions over the years. One general observation is that the students often initially engage with superficial or almost cliché like topics, but through the process and the design critique sessions the problematic aspects of such framing often gets heavily discussed and critiqued, both by the teachers and the other students, which in turn often leads the students to reframe their problem. We these discussions, observations and from comments by the students, we have come to

understand this as an important learning experience, as the students re-conceptualize what it means to take responsibility for something and what they could or should engage with in contrast to stereotypes images of responsible design.

Discursive and Critical Design

The fourth and final of the four fields concerns designs which might not necessarily be oriented towards the market, but rather to trigger reflection and awareness around topics worthy of discussion. Sometimes aiming to make explicit a problematic or ironic issue of some sort, which may be directed towards the society at large or to a specific community. Examples include norm-critical or speculative designs, design fictions and provocations, designs that might dwell over into the art scene and where primary measures of success could be to get exhibited in respectable museum settings or to turn viral in social media. Rather than 'mere' art projects however, these projects are actively referring to current discourse by focusing on utilitarian objects and function, while at the same time carrying ideas and provoke thought beyond the utility of the artefacts themselves. Much design work within the academic sphere belong in this group (perhaps most notably Dunne & Raby's Critical Design). Tharp and Tharp (2009) describe critical design as being a form of discursive design, but since critical design is a more well-known term in HCI and interaction design literature, we like to highlight both terms here.

There are many well known examples on this theme within Interaction design, stretching from gimmicky installations such as the Fun Theory experiments of Volkswagen, to dark dystopian designs presented in science fiction, as well as a growing range of examples presented in academia (e.g. Purpura, Schwanda, Williams, Stubler, & Sengers, 2011). Since this type of projects tend to achieve a very broad visibility and popularity, it is reasonable to argue that educated interaction designers should have an informed relationship towards these types of designs, even if it might not represent what most designers get to work with for a living, or what most people will actually get to interact with. Understanding the value of these designs requires an understanding of intentions as beyond use and user experience.

Many of our students have been seriously excited about this theme, although it has also been the part of the course that most have struggled the hardest with. Parts of this difficulty could be due to the brief, which we have let

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Figure 4. Snapshots from three discursive design videos, from left to right: A concept that applies current business models with augmented reality glasses and critiques how it could intercept our perception of the world. Conceptual design playing with gender roles and lets girls drink and select clothes for their boyfriends in a game like and social media inspired fashion. A physical matching game based on ambiguous design terminology.

stay fairly general and open, i.e. to articulate and re-think existing norms in interaction design, questioning what might otherwise be taken for granted. Sometimes they came up with design ideas that were found extremely interesting among the teachers, but that the students dispelled as silly and irrelevant even before they started the actual design. We interpret this partially as a clear indication that our student struggle with understanding the underlying discursive intention, as they seam to fail to make the leap of judging the design against the general purpose of discursive design, rendering it silly in comparison to the established ideas of what design should be. An alternative explanation could also be that they lack the knowledge about the general discourse that we as teachers find them being discursive towards, therefore it does not appear as interesting to them. However, with regards to understanding our students and this behaviour it is important to acknowledge that they all have an engineering background. Therefore, working on a design challenge without a given problem to 'solve' requires a slight shift in mindset from what they are used to, and such a shift usually takes time as it challenges deeper ideas of their professional role and identity.

Parts of the difficulties that we have experienced could also be that we on this theme have let the students present their designs in the format of video (see Figure 4 for some snapshots), which in itself has been a new medium of expression to some of the students. Perhaps influenced by the format, many groups chose to present scenarios of what could go wrong, using the storytelling genre of dystopian science fiction. Although this is indeed a perfect way of bringing up discursive matters in the field, our experience has been that the actual interaction designs sometimes lacked a clear focus in favour of higher-level narratives. In other cases, the students focused entirely on the humorous aspects of their scenarios, using irony to such an extent that the point of the discursive message became difficult for an outside person to decode. In some cases the students were even reluctant to include their videos in their public online portfolios, which was a requirement for passing the course. However, it is important to note that we have not seen the use of humor and irony as an issue, as we rather interpret it as a way for the students to deal with this new and unfamiliar situation when they are asked to do something provoking discussion, which is a delicate task to begin with as others might confront such efforts. It is also interesting to note that humor, irony and satire is a common method for social critic, e.g. through political humor. With this in mind, we find it important to be sensitive to the social dimensions and the difficulties involved when engaging with critical design.

Although mixing the theme of discursive design with video scenarios was successful in most cases, it also added extra layers of complexity as it takes time, skill and effort to make a video. To us, the most interesting part of this theme has been the discussions concerning existing examples and literature, and to engage students with strong engineering identities in reflections around more conceptual artistic values.

Student feedback on the four themes

Having four separate design projects requires a lot of creative efforts from the students, and it has been clear from the student evaluations that some had liked more time to be able to make more completed designs, perhaps at the cost of skipping one of the themes. However instead of skipping a theme, we have informed the students about the possibility to continue on one of their projects from the course as an individual course or master thesis project, which several also have chosen to do.

Still, most students have shown a great understanding and insight regarding the four themes, both as expressed in class discussions and as illustrated in the four student quotes below:

"All projects were good in different ways and I think that all of them contributed to the course in general. I worked very similarly in all these projects but with different goals, themes and angles in each of them, this made all the projects motivating in different ways."

"Obviously, interaction designers should learn what good design is and how to do great interaction design, this was particularly good with this course, as it challenged what you could actually do as an interaction designer. In this way there was a point of having four such different projects so that we could practically explore as many aspects of interaction design as possible."

"At times it was even a little frustrating to struggle with the differences within the projects and having to stress the creativity made me feel uninventive, but it has all been a good experience that hopefully strengthened me in the field of interaction design."

"All in all, the course has been very educational, fun and challenging."

The first quote, as we interpret it, speaks primarily about the student experience during the course, that he/she found the projects "*motivating in different ways*", although the process was otherwise similar in all of the projects. The second student is more directed to the value of getting a chance to explore "*as many aspects of interaction design as possible*", and that this is perceived of as an important skill for the future. The two last quotes both reiterate that the fast pace and many projects was a challenge and even at times frustrating, but they also suggest an acceptance of it all as a "*good experience*", "*fun*" and "*educational*".

Otherwise, upon the question on what was appreciated in the course, many students highlight one or several of the projects that they had worked on, e.g. "I *thought that responsible, experimental and discursive designs were very interesting and rewarding", "The discursive project was particularly fun as we could be very creative and think about how we could create a discussion*", and "*We think our concept turned out really well and we had a lot of fun!*" (about a commercial design, eds.). Apart from their own projects, many also appreciated the study visits and guest lectures, which were also tied specifically to the themes. As already mentioned, some students expressed frustration with the many projects and the fast pace, but we have not yet been given any suggestions of a specific theme to omit from the course, or a theme to be replaced by another topic or theme. This, to us, indicates that the students were in general positive to the four themes, although there are areas for improvement in terms of arranging the themes into a course structure and reduce element of stress.

Discussion

In this article we have presented work heavily influenced by the 'four fields' of design, as defined and proposed by Tharp and Tharp (2009). There are surely many other concepts that could be valuable for the purpose of articulating intentions in design within educational contexts such as ours. For instance, in our specific case it might be relevant to place more emphasis on topics and terminologies specific to the area of interaction design. However, we find that the four fields have worked as a solid enough base for structuring our course as it has provided both depth and breadth in terms of learning the details that different intentions bring to design and the broad variety of intentions relevant for different design tasks.

In our experience, the four fields have shown to – at least to some extent – help design students to "better understand and focus their projects" (Tharp & Tharp, 2009). First, commercial profit, as an intention commonly overlooked in academic design contexts, proved to spur deep discussions and thereby ensure quality of education in terms of the broad spectrum of issues and solutions connected to designing something commercially viable. Second, by shifting the intentions towards responsible design, students were given the opportunity to discuss and engage with what it really means to be responsible in design projects, discussions that have often turned out incredibly interesting and difficult. Third, the theme of experimental design has proven to be a fruitful tool to trigger deep technological engagement and playful exploration among all students. Rather than working with tools that they already know, which easily gets the case when asking students to deliver working prototypes, the experimental framing invited students to discover new possibilities. Interestingly, the theme of discursive design has turned out to be one of the more problematic themes in the context of our education. Surely, producing a clever and to the point discursive design can be difficult, and the process may not be as straightforward as to have commercial, responsible or experimental intentions. Yet, since it is such an important field in research and art contexts, and also in terms keeping a reflective stance towards innovation, we will continue our struggle on this topic with our students.

Most clearly, the framework has been effective in structuring our education so that it ensures a broader range of design challenges. Without such a structure, our design briefs and projects have previously tended to get defined in a more ad hoc fashion, based on what seem relevant in terms of scope, technology, and on-going research projects. While not necessarily being a problem in itself, it might result in student projects unintentionally ending up very similar in character, with the risk of missing important points for discussions or aspects of value in a design. The structure of the four fields has also worked as a useful frame for engaging collaborations between students, researchers and partners in industry, as we now know well beforehand what types of projects and perspectives we are looking for.

Apart from being a helpful tool when structuring the course as such and by providing a rich variety of projects, we also feel that the four themes helped the students to channel their focus and concentrate on what is most important for a given design brief. In addition, as our implementation also ensures that several groups work on different projects but with similar higher-level intentions, the course also facilitate a breadth within each theme as the students gets to dig deeper into and share different problems, designs and areas for investigation. Of course, this is a natural effect from any project-based course; however, in our case we know for sure that the students will get this benefit for each of the four intentions.

Another experience from this thematic format has to do with the structure of intellectual discussions in the classroom. Seeing that interaction design can be driven by different high-level intentions also means that the students need to acknowledge that success can be measured in several different ways, and that a design task is not always as straightforward as solving a technical or conceptual problem. This brings up interesting questions for discussion, regarding what we value and take for granted as desired, good quality, or successful in a specific design process.

The extent to which the students have been willing to discuss such matters is in our case is obviously affected by the intimate course size, but it also seem heavily influenced by the varying focus of the four themes, which helped guiding discussions in new interesting ways. The commercial theme brings focus to personal experiences of products, trends, and markets. The experimental theme brings more focus to what is known about research and new technologies. The responsible design theme brings in aspects of ethics and how to approach people and their values. Finally, the discursive theme brings to debate a discussion around current design norms and political perspectives around the field as a whole. Without the four themes, these discussions would, again, probably become structured in a much more ad hoc fashion, driven by specific research interests of the teachers or topics brought up freely by the students. This is not to say that such discussions would necessarily be any less interesting, but probably less varied and dynamic. For instance, and from our experiences of other HCI courses at our school where students do one project that changes each year without considering underlying intentions in the topic selection process, the discussions, learning outcomes and even the quality, also varies from year to year. To conclude, we find it interesting how these themes open for reflections concerning the relationship between education and research, and how we can develop this relationship so that research and education could benefit – as naturally as possible – from each other.

Relevant to our specific experience is also that the students that we work with have undergone a long education that has a strong thread of classical sciences and engineering, in contrast to design students with more artistic backgrounds. In comparison to traditional engineering education, we believe that discursive design especially might have a similar role as mathematics traditionally has had, namely, as an intellectual exercise with qualities to expand thought. Here, instead of practicing logical thinking, students are confronted with the challenge of engaging in more conceptual design thinking. From this perspective of practicing thought, discursive or critical design could be argued to deserve a strong and natural place in design education, just because it is difficult and entails so many conceptual challenges.

Finally, our approach and the implementation of the four themes in the course have been slightly different each year, and we see many potential ways that this could be structured differently. One interesting approach, which we are testing in the writing of this article, is to connect the four themes more concretely, e.g. by having the same overarching design brief stretched over the entire course and then approached using the four intentions. The main benefit that we have discussed with modifying the implementation in that direction, is that less time would be needed for ideation after the first theme, as the students then already have explored the topic quite a bit and could instead continue to redesign and reformulate with regards to the changed intention. This would also potentially provide additional room for other activities such as reading seminars, lectures, further discussion, and more finished projects. In such efforts, starting with the exploratory and experimental theme might be a natural way to open up the design space in favour for the following themes.

Concluding Remarks

In this paper we have discussed our explicit focus on design intentions in the last three instances of an advanced course in interaction design and described what we see as the main qualities with such course structure. The work is originally inspired by a framework that suggests that design is normally driven by one of four major types of intentions: to serve users, to generate profit, to learn, or to trigger reflection and debate. In general, the course structure and the amount of time spent on reasoning and talking about complicated issues seams appreciated by our students. Although the framework was originally presented as a resource for practicing industrial designers, it seems to have some value also in the education of interaction design, and probably in other design fields as well. In particular, we see clearly how this approach aids the student in mapping the landscape of underlying intentions, something that in turn helps to shape and guide their design processes.

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