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ENVISIONING LARGE-SCALE EFFECTS OF TEACHING VALUES IN DESIGN

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ABSTRACT

In teaching, there is an increased awareness about the role that values play in design. In this paper, we envision potential large-scale effects of teaching values in design in higher education. In doing so, we practice what we preach, as we ourselves perform the envisioning method we normally teach our students. By applying this method to our teaching, we are scaling up the definition of "learning outcomes" from classroom-level results to societal outcomes. Specifically, we envision these potential outcomes by creating value scenarios on the basis of four topics – stakeholders, time, values, and pervasiveness. The contribution of this paper is twofold. On the one hand, it demonstrates the potential large-scale effects on people and society of teaching about values in design in higher education. On the other hand, it demonstrates the advantages of using value scenarios as a method to understand the effects of your own teaching.

INTRODUCTION

The design, implementation and appropriation of digital technologies and interactive systems impact society on many different levels, from the immediate personal experience to long-term systemic effects (Nathan et al., 2008). Through their work, designers thus play an important role in shaping society regardless of whether they have an explicit intention to do so. If designers lack an understanding of the broad impact and long-term effects of their designs, they run the risk of inadvertently causing more harm than good in society.

Ethics and values are embedded in and also supported by technologies and interactive systems (Knobel & Bowker, 2011; Tromp, 2011). Designers are always biased by a particular way of seeing the world and by their sociocultural backgrounds (Haraway, 1988). Design never derives from nowhere, and designers are never value neutral (Søndergaard & Hansen, 2017; Suchman, 2002). Previous researchers have thoughtfully addressed values in design, including value sensitive design (Friedman & Hendry, 2019), values in design (Nissenbaum, 2005), values at play (Belman et al., 2009; Flanegan & Nissenbaum, 2014), and values-led participatory design (Iversen et al., 2012). Each of these approaches provides a different lens, whether they focus more on values in the design *process* or on values in the designed *product*, and whether they focus more on *designers'* values or on *stakeholders'* values. They have primarily been developed for research and development purposes, offering methods and tools for designers to consciously work with values in their design practices.

However, not only professional designers but also students who are training to become designers need to develop knowledge and skills to work with values, to challenge established ways of working and to explore and offer ethical alternatives through design (Bødker, 2003). Teaching about values in design is currently gaining momentum (Hendry et al., 2020). However, when reviewing our own universities' curricula, we see that this is not yet incorporated in a structured way.

The crux of teaching values in design is that we equip students with the knowledge and skills required to consider the broader context and implications of their designs, in order to educate students to be responsible designers. For example, students can be asked to generate value scenarios – inspired by Friedman and Hendry (2012) and Nathan et al. (2008) – in order to imagine and analyse the potential widespread consequences, long-term effects, and societal and ethical impacts of their own or others' designs. However, considering such matters of scale, what about the broader context and large-scale effects of our own teaching? We believe it is important to keep a broad view not only when designing digital technologies and interactive systems, but also when designing teaching and assessment activities and curricula. Therefore, we aim to scale up the definition of "learning outcomes" in design education from one that refers mainly to individual or classroom-level results, to one that includes the bigger impact of educating responsible designers. As such, we pose the following research question: *what might be the large-scale effects of teaching values in design?*

By answering this research question, the contribution of this paper is twofold. Firstly, we demonstrate (through envisioning) potential large-scale effects on people and society of teaching about values in design in higher education. Secondly, we demonstrate the advantages of using envisioning as a method to understand the large-scale effects of your own teaching.

BACKGROUND

TEACHING VALUES IN DESIGN

As mentioned in the introduction, there are several established approaches for addressing values when researching or developing digital technologies and interactive systems (see e.g., Friedman & Hendry, 2019; Nissenbaum, 2005; Belman et al., 2009; Iversen et al., 2012), but there are only few examples of how values in design can be taught in higher education (for an overview, see e.g., Hendry et al., 2020).

In order to create facilitating conditions for teaching values in design, we have developed approximately 30 teaching activities and 12 assessment activities targeting teachers in higher education who wish to teach their students about the role values play in design. These activities are the output of a cross-European project aiming at developing an open educational resource (OER). The OER may serve as a teaching toolkit and an inspirational model for teachers when planning courses addressing the topic of values in design. The teaching and assessment activities offered by the OER may be appropriated by the teachers to make them fit with their particular courses in various educational settings, across different levels and disciplines. The project does not

only focus on developing conceptual knowledge about values, but also and more importantly, on educating students to become responsible designers.

The teaching activities are structured around three main pillars and learning goals for teaching about values in design: 1) ethics and human values; 2) people and stakeholders; and 3) technology and context (Eriksson et al, 2021). The learning goals related to each pillar, presented in Table 1, represent a selection of competencies required to become and be able to act as a responsible designer (Eriksson et al, 2021).

The teaching activities cover the entire design process and range from activities such as a lecture on theoretical background on values and ethics, to an exercise in identifying one's own values as a designer, to envisioning the broader implications of (one's own and others') designs.

Table 1: Learning goals in values in design in higher education (Eriksson et al, 2021).

Pillars	Learning goals
Ethics and human values	Recognise and describe different values Critically reflect on how values are manifested in designs
Designers and stakeholders	Identify and describe direct and indirect stakeholders of a design Elicit stakeholder values Identify possible tensions between different stakeholder values and imagine how to mediate these tensions in a design
Technology and design	Integrate values into the design process Analyse and critically reflect on the impact of a design (draft) and its manifested values in context

ENVISIONING

Envisioning is an approach "to support long-term, emergent, systemic thinking in interactive design practice, technology development, and system deployment" (Nathan, 2008, p. 1). When considering values in design, this kind of long-term, large-scale thinking is crucial to understand the potential implications of the values embedded in a design as well as the values affected by the design. This is no simple endeavour, because the impact of any design on society is not inherent in the design itself; rather, it is dependent in part on how the product is appropriated by individuals and society (Nathan, 2008).

Nathan et al. (2008) suggest four topics to consider for envisioning: *stakeholders, time, values,* and *pervasiveness*. In terms of stakeholders, envisioning focuses on the effects of a design on both direct and

indirect stakeholders. In terms of time, envisioning concerns the potential long-term implications of a design, many years into the future. The topic of values explicitly calls the designer's attention to the values held by the designer, the design, and the stakeholders. Finally, pervasiveness refers to widespread adoption and use of a design. By considering the combination of these four topics, we can attempt to envision the large-scale effects of a design.

Envisioning, as in the paper by Nathan et al. (2008), is done through creating value scenarios. Value scenarios integrate the four envisioning topics with scenario-based design (SBD) (Rosson & Carroll, 2002). Traditional SBD scenarios tend to be written as narratives in order to identify user needs, detect usability issues, and support communication. However, SBD often fails to take into account indirect stakeholders, negative consequences, long-term effects, and pervasiveness of a design (Nathan, 2008). By considering the four envisioning topics in scenario development, SBD is scaled up to include large-scale effects.

ENVISIONING AS A TEACHING ACTIVITY

Inspired by envisioning as a research method (Nathan et al., 2008), a teaching activity that we have developed is "Envisioning future scenarios". In this teaching activity, envisioning prompts are used as a tool for developing value scenarios. Each envisioning prompt draws students' attention to a particular socio-technical issue that is important yet easily overlooked (e.g., diverse geographics, political realities, obsolescence).

The activity requires students to envision at least one use or user scenario that goes beyond what they would normally describe as the intended use of their product. By doing so, they may rethink their designs and design decisions. The activity creates conditions for students to reach the learning goal "Analyse and critically reflect on the impact of a design (draft) and its manifested values within its context" (see Table 1).

The teaching activity has been piloted successfully with students in three different international contexts, which indicates that this newly developed teaching material can in fact be appropriated to work in various educational settings.

METHOD

As we aim to practice what we preach – or rather, practice what we teach – we performed an adapted version of this teaching activity ourselves, in order to identify the large-scale effects of teaching values in design, and answer our research question.

We first developed a traditional SBD scenario to assess the implications of teaching values in design (Rosson & Carroll, 2002). This is not typically part of the envisioning teaching activity, but allowed us to make a comparison between the SBD approach and the value scenario approach. We then developed two value scenarios, as described by Nathan et al. (2008), using prompts divided into the four envisioning topics to guide us. The prompts derive from our teaching activity and are based on the envisioning cards developed by Friedman and Hendry (2012). However, we reformulated the language in the prompts, shifting the focus from interactive systems to teaching values in design. The prompts we used are as follows.

STAKEHOLDERS

- *Identify and list direct stakeholders.* In what key roles will individuals interact directly?
- *Identify possibilities of non-targeted use.* Who might use the teaching for nefarious or unplanned purposes? In what ways?
- *Identify and list indirect stakeholders.* What are five roles that will be affected by the teaching but will not directly interact with it?
- *For each role from above, consider stakeholder benefits and harms.* What are the anticipated benefits? What are the potential harms or downsides?

TIME

Reflect on future trends. Imagine five years into the future. The teaching has been widely adopted and is part of daily life for both direct and indirect stakeholders across society. Consider the implications for:

- how people do their work;
- how people make and maintain friendships and family relationships;
- physical health and wellbeing;
- those who cannot afford the teaching;
- norms and social expectations.

VALUES

- *Choose desired values.* Create a list of three values the teaching should ideally support.
- *Consider values at stake.* Create a list of five values that are implicated by the design under consideration.

PERVASIVENESS

- *Consider masses of direct stakeholders.* Building from the earlier stakeholder activities, imagine a person in a given direct stakeholder role. Now imagine 10 such individuals. Then 100 individuals. Then 1000 individuals. What will emerge from widespread use?
- *Consider masses of indirect stakeholders.* Imagine 100 to 1000 individuals in an indirect stakeholder role. What large-scale interactions emerge now?

- *Identify implications of widespread use.* Imagine use in a particular place. Then imagine use in five such places. Then 100 such places. How might teaching values in design change as the use spreads?
- *Consider widespread geographic locations.* Imagine use across regional geographies (e.g., rural areas).

By first developing a traditional SBD scenario and subsequently developing a value scenario using the above prompts related to the four envisioning topics, the contribution of this paper is twofold. We are able 1) to envision the implications of teaching values in design and draw valuable lessons from that, and 2) to demonstrate the advantages and added value of using envisioning (over traditional SBD) to think critically about teaching in the design domain. By reflecting on the value scenarios we created, we discuss the development of future curricula and teaching activities for values in design.

RESULTS: ENVISIONING FUTURE SCENARIOS

In this section, we will present the results in two steps. First, a traditional SBD scenario is presented, with a focus on the short term. This is followed by two value scenarios, based on time, values, stakeholders and pervasiveness. Finally, the content of the scenarios is explicitly linked to the envisioning prompts described in the method.

The characters in these scenarios who have had an education in values in design are assumed to have the competencies of a responsible designer, i.e., these characters have achieved the relevant learning goals (see Table 1).

TRADITIONAL SBD SCENARIO

Alice and Bob are two students who are about to finish their first semester of their master in interaction design. Bob has a bachelor's degree in computer science, and Alice in architecture. They are both happy to have developed their knowledge and skills in designing interactive systems over the course of the past semester, especially in regards to materials, form and function. However, they have been less successful when it comes to users' evaluations of their designs.

After hearing about their concerns, an older student gives Alice and Bob a tip about an interaction design course with a focus on values in designing technologies. Alice and Bob, in spite of their very different backgrounds, decide to take the course, and it soon proves to be a good decision. In addition to their previously gained knowledge and skills in designing interactive systems, they have now also developed practices such as identifying and taking consideration to

what is important to a range of different stakeholders and envisioning future consequences of their designs. They experience an increased awareness of the role they themselves play as designers in future technologies and practices. They are also more aware of how to incorporate what is important to those who may be affected by their designs. After taking the course, Alice and Bob are more successful at considering stakeholders in their design process, and their designs receive more positive evaluations from users. Although working with what is important to a range of different stakeholders might not always be without conflicts, they have managed to develop strategies for dealing with such value-based tensions in a constructive rather than detrimental way. As a result, they even founded a start-up company with the technology they designed as part of their master's thesis – a collaborative balance trainer for rehabilitation of older people – in partnership with the physiotherapists who had been involved as users in the project.

FUTURE VALUE SCENARIOS

Scenario 1: The Pioneer (Carol)

Carol recently graduated from college and quickly managed to find work as a designer at a large company in the telecom sector. Most of Carol's colleagues are many years older than she is. Carol thinks their approach is old-fashioned: no analysis of long-term societal effects of the design is requested and decisions are based purely on expected profit. But Carol's education has instilled a sense of responsibility in her – she knows it's the designer's moral duty to consider stakeholders from the start and consider potential negative effects of the products she's designing. Unfortunately, Carol's manager doesn't want to provide her with the time and budget to do this. Carol feels increasingly stressed because she wants to do *right* – it's what's expected of her, by her old teachers, by her friends from college, and by herself. She repeatedly tries to educate her colleagues about the importance of addressing values, which results in her becoming somewhat of an outcast within the team. But Carol feels like she can't give up. She starts working unpaid overtime to be able to work with values in design. She keeps asking people from her personal network to help her out by giving stakeholder feedback, which is starting to put a strain on her relationships with friends and family. Her final designs are very successful, and Carol is proud of what she has achieved, but at what cost?

Ten years down the road, Carol has recovered from a severe burn-out. She could not cope with the feeling of responsibility to change an entire company's approach on her own as a junior employee. After her burn-out, she took the time to try to find a company whose vision already matched hers. She succeeded and is now happily part of a younger team of designers. In the

meantime, Carol's old company has changed drastically. Even though Carol paid a high price for the changes she was trying to make, she demonstrated how successful a values in design approach could be. After a while, her colleagues and even her manager couldn't deny that. After Carol fell sick, they thus started looking to hire another employee who knew about values in design. And within a few years, every single new hire had those skills; this was easy enough for the company, because values in design had become a standard ingredient in most design and engineering programs. Having several young voices within the company and a more open mind, the company made time and budget available to work with values in design. This approach was so successful that by now, the company refuses to hire any designer who does *not* know how to practice values in design.

Scenario 2: The Critic (Dave & Erin)[1]

Dave, a designer without an education in values in design, comes up with the idea of developing a technology that would support parents when taking care of their infants. Together with Erin, a friend from college who *has* studied values in design, Dave gets into contact with a large international company that produces all sorts of baby care products and starts sketching ideas for supportive technologies. After a couple of years, this process results in a working prototype of a smart diaper, that detects when it needs to be changed. The diaper status can be viewed using a mobile app, which also allows the parent who is not with the child to check on the status. During the process, Erin, coloured by what she was taught at university, starts to question the rationale behind the product and the values it is based upon. She recognises the trade-off between the ability to make informed decisions versus values such as intuition, trust, independence, and interdependence. She claims that the product sends the message that modern parents are incapable of communicating non-verbally with their children about their needs. She also fears that the system might create a sense of insecurity among parents. By using this technology, they might start to question their own capability to take care of their newborns and believe that they need technology to assist them instead of trusting their own instincts. Dave gets increasingly frustrated with Erin's criticisms, because it is delaying the release of the product. Dave continues to see great commercial potential in the product, and the company eventually decides to bring it to market.

It turns out that Dave was right: the product became a success. Just a couple of years later, the new standard is that parents check their smartphones for the status of their infant's diapers, instead of asking them in person,

looking them into the eyes, and checking the diaper by lifting up the child. The parent-child relationship is mediated by this "smart" technology. The infant misses out on the opportunity to learn how to communicate needs, since the technology takes care of that kind of communication with the parents. Erin realizes that her initial ambition when she joined forces with Dave – to do good and support parents – has failed, and that the company failed in analysing the long-term societal consequences of their design. Erin starts a movement reclaiming the rights for parents to follow their instincts instead of relying on technologies that create a distance between them and their children.

CONSEQUENCES IN TERMS OF STAKEHOLDERS, TIME, VALUES, AND PERVASIVENESS

This section explains how the consequences we envisioned in our scenario relate to each of the four envisioning topics: stakeholders, time, values, and pervasiveness. By making this link, we are able to answer our research question: *what might be the large-scale effects of teaching values in design?*

Both scenarios consider key *direct stakeholders*: students as future practitioners. Scenario 1 demonstrates that value-sensitive designers may face resistance due to money concerns and tradition (*values*). In this situation, Carol has obtained a strong sense of responsibility (*values*), which eventually leads to negative consequences for her mental health and interpersonal relationships (*time; indirect stakeholders*). However, the scenario also shows that over time, a cultural shift occurs. Carol's company recognises the benefits of working with values in design, and the way designers work changes (*time*) as all new graduates know how to do so (*pervasiveness*). As a result, those who cannot afford to take a course on values in design may have a harder time finding a job (*time*).

Erin's scenario demonstrates the importance of considering values in design. Erin wants to respect (*values*) the values of consumers (parents and children; *indirect stakeholders*), such as trust and interdependence, but realizes that the smart diaper goes against these values. However, her co-worker (*indirect stakeholders*) resists her objections: considering values in design can lead to friction or conflict when different designers have different priorities (*time*). This also illustrates that even when a lot of people are well-educated designers like Erin (*pervasiveness*), a designer like Dave may still successfully market and sell a product. Nonetheless, it is implied that if Erin worked together with like-minded designers, their products may

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[1] This scenario is loosely based on an existing "smart diaper" product which is currently on the market.

play a role in safeguarding what is important to consumers (*time; indirect stakeholders*).

DISCUSSION

ENVISIONING VS. TRADITIONAL SCENARIO-BASED DESIGN

The contrast between the traditional SBD scenario and the value scenarios based on envisioning prompts demonstrates the advantage of using envisioning as a method to consider the consequences of one's teaching. While the traditional scenario considers mostly the immediately obvious and desirable consequences of teaching values in design for direct stakeholders, the value scenarios – by incorporating direct and indirect stakeholders, time, values, and pervasiveness – open our eyes to less obvious, unintended, concrete, long-term and large-scale effects, both good and bad. It demonstrates that design education is definitely a matter of scale: individual classroom outcomes are not the only important consequences one's teaching may have (on students nor on society). Rather, the way education shapes students continues to play out beyond the classroom and throughout their professional lives. Envisioning has helped clarify in what ways students as well as indirect stakeholders (such as the people for whom they create designs) could be affected by teaching.

LESSONS LEARNT

Crucially, then, we should translate the insights gained from the envisioning activity to concrete improvements to be made to our teaching. What have we learnt? What should we pay (more) attention to when teaching values in design?

Calibrate expectations and ambitions

We should *protect our students from biting off more than they can chew*. Values is a topic that may evoke strong emotions in a person and as such, it may drive students' motivation (Schwartz, 2012). Carol's scenario illustrates the risks of students being overly ambitious, and while we should foster their self-esteem, we should also manage their expectations. This is especially relevant for the first generation(s) of students in values in design. One opportunity to do this is through internships, during which students often get their first insight into the job market and corporate culture. Teachers can guide students in how to balance their ambitions of being responsible designers with the reality in actual practice. In the transition from a focus on considering stakeholder values in student projects to facing the practices of traditional corporate cultures, there might be a clash, as the role of values in design might not be prioritized, or even known in the company. The role of the teacher, then, is to help the student to not take on a responsibility to change the whole work

culture, or even make a point of this way of thinking – but rather to try to set an example, to the degree this is possible within the company and, most of all, within the boundaries of the mental health of the student.

In addition, we should *protect ourselves as teachers from being overly ambitious.* Dave's scenario demonstrates that it only takes one designer to bring a product to market that *isn't* designed according to the principles of values in design. Ideally, we would like to reach all design and engineering students with our teaching and create conditions for all students to understand the importance of values in design (e.g., by teaching its background and purpose rather than only its methods). At the same time, we must also learn to accept that we cannot reach everyone, and that some students or designers may be uninterested in or disagree with our methods.

Reduce the discrepancy between education and industry

Industry might not be prepared to receive a whole generation of designers who want to work with values in design. Carol's scenario demonstrates that current professionals may be reluctant to change their ways of working, at least initially. As teachers, we can help facilitate the transition in two ways.

First, we should *create conditions for industry to learn about values in design*. This can be done by offering further education for people already working in industry, and through further outreach to industry and alumni through workshops and exhibitions. The role of values in design could be highlighted in discussions with the reference group that many educational programs have, which typically consists of people from industry. Also, thesis proposals about values in design could be developed in collaboration with industry.

Second, we should *prepare students to deal with resistance when introducing values in design (and the critical thinking that comes with it) to others.* Both scenarios show that other designers may not always be open or susceptible to criticism regarding values in design. To give students as many tools as possible to overcome such resistance, we should teach them how to demonstrate and explain to others the importance and benefits of working with values in design. This means a curriculum shouldn't focus exclusively on applying methods for working with values in design, but also on communicating the underlying motivations and advantages.

Foster a culture of responsible design long-term

Aided by this emphasis on communication, we should aim to *create a culture of questioning each other's designs and listening to each other*. Dave's attitude towards Erin's concerns is not the one we want to instil in our students. Instead, we should encourage critical

thinking and teach students how to handle criticism of their own work as well as how to provide constructive criticism to others. One way of doing this is to introduce students to methods for running design critique sessions (Baumann, 2004) that specifically address values. In doing so, students learn to put into words the relevant aspects of their own and others' designs from a values perspective. They build a value vocabulary which they can use for communicating in a nuanced and grounded way when they critique design proposals. Achieving this kind of culture within the design community will require a "critical mass" of responsible designers who are both interested in and capable of initiating and running such conversations. We can look to the previously mentioned avenues to spread awareness about values in design both in industry and in education to help achieve this.

Make education inclusive and open

As much as possible, we should *make teaching materials publicly available*. Carol's scenario shows that those who do not have an education in values in design may eventually experience negative consequences (e.g., trouble finding a job). As a result, we should make the threshold for teaching and learning about values in design as low as possible. This can be done by making teaching materials available for free, and additionally, by offering case studies and testimonials from other teachers to be used as guidance and inspiration. This is something we already aim to do through the open educational resource we are developing. To further promote teaching values in design, we could initiate a professional teacher network on teaching values in design, to allow teachers to exchange ideas and spread the word. In addition, we could offer free online courses or make the teaching materials easily adaptable for self-study, to also allow individual students to pursue an education in values in design, even when this is not part of their curriculum or when they cannot afford to take a course.

ADVANTAGES OF ENVISIONING: A SUMMARY

In summary, we have shown that envisioning (through value scenarios) is a useful way to understand the potential large-scale effects of your own teaching, and that valuable lessons can be drawn from it.

In our case, envisioning allowed us to formulate examples of how the competencies of a responsible designer (see Table 1), and thus the outcomes of our teaching, can have an impact beyond the classroom. As demonstrated in Scenario 1, Carol's ability to *identify and describe direct and indirect stakeholders of a design* and *analyse and critically reflect on the impact of a design*, gave her the role of being a pioneer that initiated a movement towards a culture of responsible design at her company. In Scenario 2, Erin's ability to *critically reflect on how values are manifested in design*

and to acknowledge the importance of *integrating values into the design process* gave him tools to reflect on his own responsibilities as a designer of new products.

The envisioning activity provided us with a critical perspective on our own teaching: we realised the potential negative consequences of our teaching, and this allowed us to formulate ways to help mitigate these consequences. Conversely, the scenarios also illustrated potential positive consequences. Carol's scenario showed how values in design could become widely accepted in the future, implying that our teaching will not pass by unnoticed. Dave's smart diaper exemplified the risks of *not* practicing values in design, emphasizing the importance of teaching values in design. Finally, both scenarios clearly demonstrated the importance of educating a *critical mass* of responsible designers, which we hope will motivate our fellow teachers to design future courses and curricula with values in mind.

LIMITATIONS

Of course, our scenarios are by no means a complete overview of the potential consequences of teaching values in design. Several envisioning prompts have not been completely considered – for example, what are the consequences for teachers (direct stakeholders), employers, manufacturers and retailers, the environment, equality (indirect stakeholders), etc.? Scenario 2 gives a brief idea of what the potential consequences could be of *not* teaching values in design, and how parent-child relationships may be different had Dave also considered family values. However, the consequences of (not) working with values in design will be different for each design project.

Other examples of envisioning prompts that are not included in our scenarios, but that are nonetheless highly relevant, are the prompts about teaching values in design in particular places (such as vocational schools) or in widespread geographic locations (such as in different cultures or rural areas). The different knowledge systems of the West, the East and indigenous cultures and "ways of seeing" present very different ways of understanding human values (Lent, 2017), which can affect the way of working with values in design.

It would also have been possible to write a more utopian scenario, outlining all the potential positive differences value-sensitive designers could make in the world. This is no doubt a valuable exercise to demonstrate the importance of teaching values in design. However, we believe that slightly more pessimistic scenarios are both more realistic and more educational – they have allowed us to identify potential risks and ways to mitigate them, rather than encouraged us to go forward unencumbered.

As a final remark, we are aware that as designers of educational resources, we can never envision and imagine the full implications of our designs. We are also aware that over time, the political significance of artefacts as well as educational approaches will change (Tromp et al., 2011; Winner, 1980). However, we acknowledge that as teachers and designers we are shapers of society, and as such we strive to be as responsible as possible. Envisioning has the potential to be a tool that can help in such an endeavour, although we should acknowledge that while envisioning can be applied by anyone, people may draw different conclusions depending on their own values.

CONCLUSION

In this paper, we have envisioned potential large-scale effects of teaching values in design and drawn valuable lessons from that. By doing so, we have demonstrated the advantages of using envisioning through value scenarios to think critically about teaching in the design domain. We believe that envisioning the effects of our own design teaching practice can help us become better teachers, because it allows us to account for otherwise unforeseen consequences of our teaching. We highly recommend other teachers do the same, by applying envisioning to their teaching, on whatever subject (also beyond the field of design) and seeing what they find.

We will continue to have discussions about what we have learnt from the envisioning activity in this paper, as well as about other envisioning prompts, in the hopes of educating responsible designers in a responsible way, to have a positive impact beyond the classroom, on a larger scale.

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