SCAFFOLDING SOLUTION-ORIENTED ETHICAL DESIGN REFLECTION

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ABSTRACT

Design education is increasingly influenced by the "ethics turn" in design [1], which extends Human-Centred Design (HCD) to include broader ethical frameworks such as Value-Sensitive Design and Humanity-Centred Design [2,3,4]. These approaches aim to account for a wide range of stakeholders, including non-users, supply chain actors, and more-than-human entities. While we share these ambitions, we argue that such frameworks often fall short in helping students recognise the ethical implications embedded in familiar design patterns and concrete decisions.

This paper explores the question: *How can design education help students identify and address the ethical dimensions of their design choices?* We present a case study involving the design of digital democratic participation tools for underrepresented youth in the Netherlands. The study reveals how students tend to unconsciously apply well-worn user experience heuristics without questioning their fit across different "playing fields" of design—such as technology, humans, organisations, society, and design itself.

Our findings suggest that while students may be ethically aware in theory, they struggle to detect tensions between values and practical design choices. We propose using "playing field analysis" [5] as a scaffold to help students identify, explore, and reflect on these tensions. This approach offers a promising way to bridge the gap between abstract ethical intentions and the realities of design practice in education.

Keywords: Human-Centred Design, solution repertoire, playing fields for design, ethical reflection

1 INTRODUCTION

Human-Centered Design (HCD), defined in the ISO norm for ergonomics of human system interaction [2], has been the golden standard for designing interactive systems since the 1980s. Most contemporary design and development approaches, such as 'Agile' [6] or 'Design Thinking' [7], are based on—or borrow ideas from—HCD. However, there is a growing concern that HCD is 'not enough' in today's world. The core of the critique is that individual needs may be at odds with collective needs, and short-term personal goals may be at odds with what is best for them in the long term. We only need to think about addictive games or 'smart vapes' to sensitise ourselves towards this issue.

This criticism has led design schools to adopt alternative approaches, such as Value-Sensitive Design (VSD), which encourages designers to pay more attention to human and public values such as privacy, fairness, and sustainability in the design process. Designers are invited to consider direct and indirect stakeholders, including non-human entities [3]. Similarly, Humanity-Centred Design extends HCD by incorporating broader societal, ethical, and environmental concerns into the design [4]. Including more-than-human stakeholders may be the most challenging part, so specific approaches have been proposed to include those [1]. We could call adopting these extensions of the HCD norm the 'ethics turn' in design education.

Although we have adopted some of these approaches, looking at the work of our students, we feel something is missing. These extensions direct the student's attention to the broader context of their designs, not to a more critical examination of their actual design choices. We examine how students uncritically apply familiar design patterns from their personal experience—their solution repertoires—often undermining ethical design goals when these patterns are transplanted to new contexts without critical reflection [8]. Ethical issues often emerge when design decisions that work well in one domain create problems in another. For instance, design choices that enhance individual user experience may

undermine collective democratic values, or solutions that meet organisational needs may conflict with societal goals.

In this paper, we explore how thinking of design as (potentially) conflicting spheres of influence, or 'playing fields': technology, humans, organisations, society, and design [5] could scaffold students' reflection on the ethical consequences of their concrete design choices. Through a case study on digital democratic participation tools, we demonstrate how students' design choices, based on familiar solution patterns, optimised for user engagement, may simultaneously compromise democratic values, illustrating the need for a more nuanced approach to ethical design education. Using post-hoc analysis, we show that analysing tensions between 'playing fields' of design can help students recognise critical ethical implications in their design decisions, bridging the gap between ethical awareness and concrete design practice.

2 'PLAYING FIELDS' & SOLUTION REPERTOIRE IN DESIGN EDUCATION

Building on the context established in our introduction, design education faces a critical challenge: while ethics-focused methods help students identify stakeholder values and needs, they often fail to bridge the gap between ethical awareness and concrete design choices. These approaches may answer the question of *what* to design but not *how* [9], leaving students unable to recognise how ethical considerations materialise in actual design decisions.

This paper departs from the notion that developing a design language is an important part of design education. Each design field has its *solution repertoire*: commonly used solutions that designers understand from multiple theoretical perspectives [8,10]. Design education should not only focus on teaching students the standard solutions, but also on helping them recognise how such solutions carry embedded ethical implications. By studying and deconstructing existing and novel design examples through different theoretical perspectives, students can build a rich mesh of knowledge that allows them to see how (ethical) choices materialise in practice. Concrete designs can be used as a gateway for understanding problems, explicating design aspirations, and identifying effective design mechanisms [11]. Students can build a rich mesh of knowledge of design precedents by studying and deconstructing existing and novel design examples through different theoretical lenses, allowing them to recognise how (ethical) choices materialise in practice.

We argue that design teachers should convey the theories and demonstrate the thinking patterns needed for this design reflection. Within this general viewpoint, our concern in this paper is primarily about training students to recognise how ethical choices are reified through the solutions they routinely employ.

One way to sensitise students to the implicit ethics of their designs is by using the 'five playing fields of digital design' as a lens. According to the Netherlands' national competency profile [5], digital designers operate within five domains, each representing different specialisms with unique design implications:

- **Technology:** The foundational design material requires understanding technological capabilities and their impact through hands-on prototyping experience.
- **Human Experience:** Focus on interaction principles and user needs and reception, including how interactions with solutions and qualities like playfulness, seamlessness, or trust can be achieved.
- **Organisation:** Understanding how services operate through touchpoints, organisational processes, and resources that connect users to (organisational/business) solutions.
- **Society:** The broader social and environmental implications of design, including how solutions affect and change societal systems.
- **Design:** The methodological approaches and their effectiveness in different contexts, including how design choices influence project outcomes.

Ethical tensions often emerge when solutions optimised for one playing field create challenges in another. For example, a design choice that enhances user experience (human experience) might conflict with economic dynamics (organisation) or public values (society). By understanding the tensions, students can develop an awareness of how design choices that work well in one playing field might create unintended consequences for others. This awareness can be developed through systematic analysis of tensions between playing fields, helping students recognise the ethical implications of their design decisions across different domains, and encouraging them to think more critically about the solutions they employ. Playing field analysis offers a practical framework that transforms abstract ethical awareness into actionable design insights. This complementary approach doesn't replace ethics-

focused methods but bridges the gap between abstractly identifying values and practical design [12]. By analysing how design patterns perform across these domains, students develop skills to detect cross-field tensions and modify their solution repertoire, gaining understanding of ethical implications that transcend individual stakeholder perspectives.

3 CASE STUDY: DIGITAL DEMOCRATIC INNOVATION

To illustrate how ethical tensions emerge between playing fields and how students' solution repertoires influence their design choices, we present a case study in digital democratic innovation. This case highlights tensions between three key playing fields: human experience, technology, and society. The case stems from a research project aimed at bridging the digital democratic divide in sustainable energy policymaking. Students were tasked with reimagining WeValuate. This highly textual tool invites participants to work through political dilemmas as if they are policymakers, weighing choices and potential consequences to evaluate public values. The tool successfully engaged many citizens in policy discussions, but predominantly attracts older, well-educated males.

Students were challenged to make abstract policy decisions more accessible for underrepresented, practically educated youth. Working in teams, they designed interaction features to increase youth agency and reframed sustainability in ways aligned with young people's lived experiences. While exploring what motivates meaningful civic engagement among this demographic. Over eight weeks, four student teams applied Design Thinking [13] and human-centred research approaches [14], closely collaborating with their target group, testing their prototypes. Their goal was to move beyond traditional "design for politics" and develop inclusive digital democratic innovations [15]. Throughout the project, we observed how students frequently overlooked the ethical implications of their design choices, often due to limited awareness of tensions between different design playing fields. Two such tensions are discussed below.

3.1 Human Experience vs. Society: Peer Influence and Participation

Tension, Individual agency vs collective influence: In examining political digital citizen participation, students found that young, practically educated individuals needed to see how their opinions are positioned relative to their peers before feeling confident to engage. This stems from an underlying concern that their voices—particularly when holding perspectives, they fear might be considered "strange"—don't make a difference in political discourse. Seeing the spectrum of others' views provided contextual reassurance that encouraged their participation.

The students proposed solutions: Drawing from familiar solutions and (UX/UI) design patterns in social media and digital platforms, they proposed peer-based engagement features. A (live) chat feature was designed as an alternative interaction mechanism to traditional consultation. Where participants could discuss their opinions in 'real-time' on political dilemmas or questions presented through polls or videos. In addition to the (live) chat, shared opinions were traced and visually mapped as a networked cloud, creating a social positioning system that explicitly revealed each participant's personal position to the opinions of their peers, which could then be shared on social media.

Within the playing field of Human Experience, these proposed solutions/interactions were tested with the targeted participants and validated, showing: 1) the participants felt more confident and, at times, even proud when sharing their viewpoint; 2) they enjoyed the dynamic and real-time interaction with their peers while forming an opinion on an abstract political topic. While these patterns have proven to work in the human experience field, the students did not recognise how transplanting these patterns into a democratic innovation context creates ethical tensions.

Students overlooked one of the other fields, Society: The solutions students proposed created tensions with democratic principles (society). Where democratic theory requires independent opinion-forming and operates on a one-person-one-vote assumption, these design choices instead privileged social influence and group dynamics over individual civic reasoning. Municipalities want an unbiased individual opinion, at least within the context of (digital) participation. They require unbiased tools that do not influence individuals, as differing interests and agendas can be promoted through these perspectives. The students' design choices, while optimising for user engagement, directly undermined the theoretical foundations of deliberative democracy that these tools were meant to support. We emphasise that students must recognise how seemingly "innocent" design choices, such as adding peer feedback or live chat features, can have unintended ethical implications. This case illustrates how ethical tensions emerge when solutions optimised for one playing field (Human Experience) create problems

in another (Society). It also underscores the importance of designers and design students adopting a reflexive stance toward their solution repertoire, recognising that familiar design patterns can carry embedded ethical implications when applied in new contexts.

3.2 Technology vs Society: Social Media Mechanisms in Democratic Participation

Tension, Democratic values vs algorithmic manipulation: This second example illustrates how students' solution repertoire created tensions between technological engagement and democratic values. Students identified that traditional civic participation approaches—with intensive one-off interactions with the tool—failed to match young people's digital interaction patterns. This represents a classic tension between technological affordances and social goals.

Student proposed solutions: Drawing from the solutions they were familiar with, students proposed a two-stage approach to political engagement. 1) Initially, they designed for quick participation through highly visual TikTok-style videos and meme-culture content closely related to their lifeworld and digital cultures. Combined with swipe-right/left binary choice mechanisms, known from dating-app interactions, to navigating statements and questions to simplify the choices. They crafted emotionally targeted content, utilising personal health and well-being. This alternative framing made the urgency of an abstract message about sustainable energy transition more tangible for the young target audience.

2) The findings also suggested that, after initial interest has been piqued with emotionally charged messages, young people can best be engaged by gradually deepening the topic. Therefore, following this initial engagement, students designed a progressive disclosure interface they termed a 'tunnelling' approach. This involved incrementally revealing policy complexity through gamified knowledge-building modules, gradually introducing more complex information through gamified elements to build knowledge. Creating a smooth transition from quick interactions to more substantive participation. This empowered participants through increased knowledge on previously less-known political topics and gave them confidence to participate more actively.

Within the human experience playing field, these solutions proved highly effective. User testing demonstrated that young people engaged more readily with the emotional and personalised content related to digital and meme culture, particularly among previously disengaged and underrepresented groups. Users responded positively to the familiar interaction patterns, and the gradual engagement approach successfully supported sustained participation. These familiar design patterns also deviated from the traditional "design for politics" approach [15].

Students overlooked one of the other fields, Technology. By uncritically applying their social-media solution repertoire, students overlooked critical tensions with democratic values. Their design choices reproduced problematic ethical implications from the technology field, which prominent media and design scholars have critiqued [16][17]. They failed to deconstruct the engagement-maximising algorithmic patterns inherent in the design mechanisms they borrowed from Big Tech and social media platforms. For instance, they implemented personalisation algorithms that might risk creating echo chambers. At the same time, emotional and affective framing techniques could undermine rational policy discourse. The dopamine-triggering interaction models they implemented might discourage thorough deliberation, while their entertainment-focused features risked trivialising complex policy issues. If users participate for dopamine instead of genuine interest in democratic decision-making, the value of this participation is lessened. In retrospect, they did not recognise that their design choices themselves embodied ethical positions and materialised particular values through their implementation. While successfully fostering engagement, the students' focus on the human experience field neglected critical considerations from the technology and society fields. It demonstrates why solution repertoire analysis is crucial, students need to learn how technological patterns they know from one context (social media) may undermine core values when applied in another context (democratic participation).

4 REFLECTIONS

The case study illustrated two things. First, ethical design requires attention to detail at each ‘playing field of design,’ as design choices reify social norms. Designers can recognise and challenge such embedded norms and propose alternative forms that improve our digital fabric to be more inclusive and conducive to societal needs. Second, it illustrates that design ethics often focuses on tensions between the demands of different ‘levels’ or ‘playing fields’ of design.

Within this case, we found that students tend to draw from the solutions they are most familiar with and hyperfocus on one playing field of the design challenge, be it somewhat implicit. In this case, often the

social-media interactions that are so common right now. Subsequently, students forget – or cannot – review how their design choices affect other playing fields. The tensions that arise between playing fields remain underrecognised. An added difficulty for students is that their existing solution repertoire for designing digital solutions is firmly anchored in their own first-hand experience with digital media. They tend to 'copy' what they know works for them. To make things worse, in this case, their target group consisted of practically educated students who are very similar to the students in terms of their (social) media usage. If your target group also likes those solutions you like, it is almost impossible to take a step back and reflect. This made it very hard for students to identify potential tensions between the different playing fields of design and to act upon them.

It is up to us as teachers to stimulate this reflection. We need approaches and didactics that enable students to identify critical points and bring in the expertise needed for meaningful reflection. Analysing the tensions between, for example, technological and societal playing fields, such as engagement versus democratic deliberation, would have helped the students recognise ethical issues earlier. Critically deconstructing existing design patterns and mechanisms and adapting them to their novel designs would have ignited questions about the implications of social media patterns on democratic discourse and values. We question whether ethics-focused design methods are apt to stimulate this reflection. Although such methods help to make values and value conflicts between different stakeholders more explicit in design, those considerations do not automatically translate into apt design decisions. VSD, for example, helps identify value conflicts between different stakeholders but fails to provide clear guidance on resolving these conflicts or making concrete design decisions [18]. Our experience with such methods is that they enable a form of cognitive offloading. Students happily go through the motions of the methods, identifying values and value conflicts between stakeholders, but are not prepared to see how their design choices affected such values or power structures [19].

For students to recognise the implicit ethical choices embedded in the solutions, they should be sensitised to how the design language they use – in this paper called "solution repertoire" [8] – has an ethical dimension. The first step in this is building awareness that they have a solution repertoire in the first place. We need to make them aware that they are appropriating solutions they know from other contexts for their particular design challenge, and that this is a standard design practice. Once this level of reflexivity is reached, we can focus their attention on how different contexts may require solutions with different characteristics. This can be done through the playing field analysis suggested in this paper. Different design alternatives—at minimum, the existing design and the one proposed by the students—can be analysed based on the demands of the different playing fields. This sensitises the students to the fact that they have some form of agency, that different solutions have different cross-playing field trade-offs, that they can choose specific solutions over others, and that some adaptations of existing designers are 'better' suited than others. This triggers a form of reflection that targets the actual design they make and its design rationale rather than an evaluation of their design approach or their learning gain in the project.

5 CONCLUSIONS

The case study of this paper illustrates how ethical design often resolves around tensions between the different 'playing fields' of design, and how students often miss out on these tensions. We argue that this is due to a fundamental problem of reflecting on one's design language (or solution repertoire), which cannot quickly be resolved by introducing 'ethics-focused methods' such as VSD. Students need to be taught to recognise how the solutions they commonly employ carry certain consequences that may not be appropriate for their challenge. The playing field analysis we introduced in this paper may help students identify conflicts between different 'layers' of design. However, the most important takeaway of the paper is that we need to demonstrate how such an analysis is done by jointly discussing the designs they make using different theoretical lenses.

Our key lessons for design education are:

1) On top of teaching students' ethics-focused methods, they need to be trained explicitly to recognise the implicit ethical choices embedded in solutions they are used to and reuse them in their designs. To do so, students must be encouraged to question assumptions and deconstruct familiar, existing, and novel (design) patterns and mechanisms.

2) Fostering a deeper understanding of the ethical implications of design choices across different contexts through the lens of the five playing fields can help to achieve this. Moreover, this is a necessary complement to ethics-focused methods.

3) Providing opportunities for students to engage in critical reflection and dialogue throughout the design process is needed. It probably needs to be taught through joint reflection sessions, in which teachers give situated examples of the necessary reasoning process.

While playing field analysis offers a promising tool to bridge the gap between ethical awareness and concrete design decisions, it is not without limitations. As with any framework, there is a risk that it becomes overly procedural or used in a checklist fashion, losing the depth of critical engagement it aims to support. Further research is needed to explore how such scaffolding can be integrated into design curricula without undermining creativity or situated reflection. We also see value in collaboratively developing this approach further through practice-based inquiry, in dialogue with both students and design educators.

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