Applying Children’s Rights to Digital Products: Exploring Competing Priorities in Design

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Despite efforts to promote children’s rights in digital environments, a gap remains between principles and practice. To understand this gap and identify possible solutions, we examine whether and how designers embed children’s rights when developing digital products and services. Using the child rights-informed ‘Playful by Design’ (PbD) principles and associated card pack as discussion probes in workshops with 30 designers from diverse companies, we identify designers’ understanding of children’s rights, their workplace requirements for implementing them, and the competing professional and commercial priorities they face in designing for children’s play. The findings reveal the challenges of embedding rights-based principles into product design. Notably, designers may believe that children’s rights are sufficiently realised by protecting children from risk, without balancing protection with rights to provision and participation. Further, designers also require a compelling rationale and practical means of addressing the challenges of implementing children’s rights in commercial design settings.

CCS Concepts:
• Human-centered computing → Interaction design theory, concepts and paradigms.

Additional Key Words and Phrases: Child Rights, Children, Technology Design, Digital Play, Design Tool

ACM Reference Format:

1 INTRODUCTION

There is increasing recognition of the value of rights-based principles to guide the design of digital products and services likely to be used by children, along with growing efforts to create policy frameworks to realise children’s rights that can mitigate risks to children’s safety [15, 49], security [14], privacy [9, 22], healthy development and wellbeing [1, 16] and other rights [3, 42]. However, a gap between principles and practice remains. Even when the design of digital products seeks to prioritise free play or ‘playfulness’, for example, it can unintentionally fuel the biases, risks or other rights violations that fill the media headlines and undermine public trust in technology [27]. Business values centred on profit can result in technology that is, in effect, risky for children [17, 18]. Three kinds of adverse consequences can be anticipated: (1) harm to the safety, development and wellbeing of children as individuals and collectively [30, 46]; 2) unfair or exploitative practices that infringe privacy, safety and data protection regulations [51]; and 3) inefficient business models that risk brand reputation and undermine consumer trust [29].

Emerging from an interest in technologies developed for use in education [47], Child–Computer Interaction (CCI) is a well-established area of research within Human–Computer Interaction (HCI). It is informed by theories of child development, especially the constructionist approach which positions computers and computing systems as tools to facilitate children’s learning [45] and Bronfenbrenner’s ecological approach [6, 7], which contextualises children’s
unfolding interactions with objects (products), people and places [11] by recognising the proximal and distal factors
(including social and commercial actors, institutions and political/cultural influences) that dynamically shape or constrain
children’s development over time. Constructionist and ecological approaches, themselves mutually complementary, are
now being developed to investigate user engagement with digital devices or contents as well as how the broader digital
environment influences children’s specific contexts and possibilities for action [38, 48]. In turn, these build a bridge
between knowledge of technological design and use with child development theories [19], especially when enhanced by
critical reflections on how industry norms and design practices may undermine this effort. Certain problematic design
practices are already prohibited under international (and some national) law [41], yet they remain widespread. These
include practices that infringe on children’s rights through the use of exploitative design features or business practices
that can put children at risk, such as ‘dark patterns’ or tricky user interfaces [21, 39], loot boxes [10, 54] or algorithms
that promote extreme content [17, 50].

This article investigates the challenges designers face and the resources they need to navigate multiple and at-times
competing influences and pressures so as to respect and realise children’s rights in a digital world [44]. Specifically,
we examine how designers from different types of companies interpret and apply children’s rights to digital products
and services. Beginning with but not limited to the child’s right to play, and building on the ‘Playful by Design’ (PbD)
principles [34], we prototyped a card-based tool as a probe to help designers explore and reflect on their current
practices in ways that could better align these with children’s rights. The aim was to elicit the challenges designers face
in embedding children’s rights in designing interaction for digital products and services that children use from the
exploratory and prototyping processes of the design tool with designers. We also used our card-based tool prototype
as probes to further examine their practices. Learning from these processes can inform and motivate development of
rights-based yet practical design practices for the benefits children, businesses and the public [32].

2 BRIDGING CHILDREN’S RIGHTS AND DESIGN

2.1 Children’s rights in the design of digital products and services

Defining a child as a person below the age of 18, the United Nations (UN) Convention on the Rights of the Child
(UNCRC), which applies to all children wherever they live, recognises ‘the right of the child to rest and leisure, to
engage in play and recreational activities appropriate to the age of the child and to participate freely in cultural life and
the arts’ [40, Article 31], among other ‘provision’ rights (such as to education and cultural heritage, Articles 28-30).
Further rights relevant to play include non-discrimination [40, Article 2], best interests [40, 44, Article 3(1)], the rights
to health [40, Article 24], and to life, survival and development [40, Article 6], the right to be heard [40, 43, Article 12],
participation (civil rights and freedoms, Articles 13-15) and protection rights (notably, the right to privacy, Article 16,
and to safety from harm and exploitation, Articles 19, 34, 39). Importantly, it also includes treatment according to one’s
age and maturity (or ‘evolving capacity’, Article 5). As explained in 2021 by the UN Committee on the Rights of the
Child in its authoritative General Comment No. 25 [41], these rights apply equally in the digital environment [32, 35].
How can this be achieved in practice?

Designing digital products is often fluid, iterative and messy, involving considerable negotiation among competing
influences and expectations. Designing digital products for or likely to be used by children can be even more complex
because children have diverse needs relating to their development (in the language of child rights, their ‘evolving
capacities’) and lived circumstances, and because there is insufficient consensus on what ‘good’ looks like, for instance,
regarding children’s play in the digital environment [7, 11]. Since the realisation of children’s rights can be complex,
context-dependent and contested, it is to be expected that embedding children’s rights into the design of commercial
digital products and services will prove challenging. Indeed, meeting such a design challenge in ways that balance
children’s protection, provision and participation rights, rather than trading one off against another, can be considered
a ‘wicked problem’ [8]. Yet there are increasing calls to succeed in meeting this challenge from policymakers, rights
advocates, parents and children as well as within the design community [36].

2.2 Playful by Design principles and children’s rights

To realise children’s right to play, among their other rights, we built on the ‘Playful by Design’ (PbD) principles [34].
Grounded in empirical research and consultation with children on how physical and digital environments enable or
impede the qualities of free (or, child-led) play [11, 12], these principles accord with the classics of child development
theory that have shaped good practice in CCI [5, 13, 26] and child-centred design [4, 20, 23, 24, 28, 52]. The seven PbD
principles, each of which references children’s rights, are as follows:

1. **Be welcoming**: Prioritise digital features that are inclusive, sociable and welcoming to all, reducing hateful
communication and forms of exclusion, and reflecting multiple identities [40, Article 2, 3(1), 6, 24, 28-30].

2. **Enhance imagination**: Prioritise creative resources and imaginative, open-ended play over pre-determined
pathways built on popularity metrics or driven by advertising or other commercial pressures [40, Article 3(1),
13-16, 28-30, 31, 32].

3. **Enable open-ended play**: Provide and enhance features that offer easy-to-use pathways, flexibility and variety,
as these support children’s agency and encourage imaginative, stimulating and open-ended play [40, Article
3(1), 12, 13-17].

4. **No commercial exploitation**: Reduce compulsive features designed to prolong user engagement or cultivate
dependency on games, apps or platforms so that children’s immersive play is intrinsically motivated and freely
chosen [40, Article 3(1), 7, 8, 13 – 15, 17, 32, 36].

5. **Ensure safety**: Ensure children’s play in online spaces is safe, including giving them control over who can
contact them and supplying help when needed [40, Article 3(1), 16, 19, 34, 39].

6. **Allow for experimentation**: Recognise that exploration, invention and a degree of risk taking are important
in children’s play, and that the burden should not fall on them always to be cautious or anxious, or to follow
the rules set by others [40, Article 3(1), 28, 31].

7. **Be age appropriate**: Respect the needs of children of different ages by providing age-appropriate opportunities
for play while also allowing for safe intergenerational play [40, Article 3(1), 5, 18].

As may be seen, each principle encompasses specific components derived from the underpinning research and
evidence. For example, ‘Be welcoming’ includes reducing hateful communication. ‘Be age appropriate’ includes allowing
for safe intergenerational play. Crucially, the principles should be implemented together rather than separately or
piecemeal since human rights cannot be ranked or traded off against each other [32, 35, 41]. Taken together, they
offer a holistic approach that prioritises both ‘hygiene’ factors such as safety, security, privacy and freedom from
commercial exploitation and also children’s positive opportunities for agency, creativity, expression, sociality and
learning through play. In short, developing a pathway for designers to promote ‘playful by design’ and minimise ‘risky
by design’ practices [18] could help bridge the gap between child rights and design. With this objective in mind, our
research questions were:
Q1. How do designers interpret and apply children’s rights when developing digital products and services that children use?

Q2. What challenges do designers face in embedding child rights principles in the development of digital products and services that children use?

3 METHODOLOGY

3.1 Phases of the research

We used the PbD principles to engage 30 designers in discussions of their practice when designing digital products and services. Subsequently, we developed an associated card-based tool to probe how they interpret and embed these principles and their underpinning in children’s rights and to identify whether such tools can be helpful in their work.

This research comprised three phases:

Phase I, exploratory workshops. We conducted four workshops online to explore digital designers’ workflow, organisational requirements, and interpretation of the PbD principles. Participants attended the workshops with their teammates, choosing a product they had worked on together as a use case.

Phase II, prototyping a card-based design tool. We analysed findings from the exploratory workshops and used this information to prototype the type, prompts and mechanics of the card pack. The resulting prototype design tool comprised two types of cards: ‘principle’ (Fig. 1) and ‘prompt’ (Fig. 2) cards as well as prototype activities which became ‘playboards’ (Fig. 3). The cards and activities were then used in Phase III to examine how designers negotiate the competing priorities that can arise at different design stages.

Each ‘prompt’ card asks a question to support reflective (Why?), exploratory (What if...?) and practical (How?) responses to design challenges (Fig. 2). The aim was to support designers in unpacking the issues and addressing the interplay across the social, material and spatial factors that shape playful possibilities in a digital world [11], consistent with children’s rights and their underpinning in ecological approaches to child development [7]. Each type of prompt included 35 prompt questions, five for each of the seven principles, to provide sufficient options for diverse products and circumstances.

Phase III, final workshops. We conducted five workshops online to deepen our understanding of designers’ practices, now using the prototype design tool (PbD cards and playboard activities) to probe further. In these workshops,
some designers worked with their fellow teammates and some with designers from different companies. For these workshops, we deployed two types of activities. The first centred on the use of PbD ‘principle cards’ to identify principles which they wished to interrogate as a team, and helped us to examine how designers identified their priorities for the purpose and positioning of their chosen product. The second activity used the prompt cards to support critical reflections and discussions.

In the first activity, we began by asking participants to compare their product with the PbD principles to identify the PbD principles which they wished to interrogate as a team, using our prototype ‘principle cards’. In completing this activity, we observed participants arrange and use our prototype ‘principle cards’ in various ways, which we later converted into ‘playboards’ (Fig. 3).

For example, they began to list the features of their products and their priorities against each of the seven PbD principles to explore alignment (the ‘Check It’ playboard). They also raised issues or challenges they were currently experiencing and mapped these to a range of principles in order to identify the factors which were requiring attention (the ‘Knotty Web’ playboard). Two PbD principles, which caused tensions if addressed simultaneously in design, were identified and discussed, contributing to a critical reflection of the product (the ‘Friction’ playboard). Lastly, participants applied the metaphor of a (music) ‘mixer deck’ to interrogate their priorities at different stages of the design process (Mix it Up playboard). This activity allowed participants to discover their ways of reflecting on their design priorities challenges and opportunities.

In the second activity, we used three types of questions – why? What if? And how? – as prompts to provoke designers to anticipate and consider the result of product features and design choices for children’s experiences. These questions later became our ‘prompt’ cards. We asked the designers to select the ‘prompt’ questions related to the PbD principles they chose (in the first exercise) to explore concerning their product (using the icons on the ‘principle’ cards to find relevant ‘prompt’ cards). We conducted this activity for the three Why? What if? How? types of questions, as if running a Question-and-Answer session (the Q and A playboard), with participants writing their responses on digital sticky notes.
All workshops were held on Zoom. Each took three hours and was audio-recorded and transcribed, except for one exploratory workshop, following a participant’s request, for which we took near-verbatim notes.

We applied inductive thematic analysis to the transcripts, grouping participants’ responses first in accordance with the workshop activities, and then according to emerging themes that best reflected the discussions that occurred. The open-thematic coding of the exploratory workshops encompassed organisation values, design processes and resources – all factors that shape designers’ interpretation of children’s rights and their implications for designers’ practices and choices. The themes relating to designers’ and businesses’ priorities emerging from the final workshops (Phase III) when compared with the PbD principles highlight the challenges that designers have in embedding children’s rights in their product they are working on. These challenges constitute the findings in section 5.

3.2 Research participants

We recruited 19 designers from four companies for the Phase I workshops (see Table 1). Participants represented the toy industry and social media for children, children’s educational games and children’s media. Twenty designers joined the final workshops (Phase III), nine of whom had participated in Phase I, and 11 of whom were new to the research, to expand the range of products and companies included (see Table 2). These recruits included representation from safety tech developers, other educational games developers, independent toy and interaction designers, children’s media content developers and digital education content providers.

Altogether, 30 designers participated, of whom 27 out of 30 worked in the UK and Europe, while three were based in North America or Southeast Asia. They were recruited through our networks of industry partners. We ensured diversity and prevented bias by varying companies’ sizes, funding models, working contexts and product lines, and participants’ seniority in the team and roles including interaction designers, graphic designers, toy and game designers, data scientists and product owners. The diversity of product lines allowed us to understand designers’ requirements as they work across diverse product ranges, whether or not the products are intended for children.

3.3 SELECTION AND PARTICIPATION OF CHILDREN

No children participated in this research. However, all designers who participated in this research developed digital products or services for or used by children.
### Table 1. Phase I workshop participants

<table>
<thead>
<tr>
<th>Type of organisation</th>
<th>Type of products/services</th>
<th>Participant code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company 1 – Start-up (UK)</td>
<td>Education game</td>
<td>P1 – P2</td>
</tr>
<tr>
<td>Company 2 - Large international company (100+ employees)</td>
<td>Children’s social media</td>
<td>P3 – P6</td>
</tr>
<tr>
<td>Company 3 – Start-up (UK)</td>
<td>Education game</td>
<td>P7</td>
</tr>
<tr>
<td>Company 4 – Large publicly funded organisation (100+ employees) (UK)</td>
<td>Media and education content for children</td>
<td>P8 – P19</td>
</tr>
</tbody>
</table>

### Table 2. Phase III workshop participants

<table>
<thead>
<tr>
<th>Type of organisation</th>
<th>Type of products/services</th>
<th>Participant code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company 1 – Start-up (UK)</td>
<td>Education game</td>
<td>P1</td>
</tr>
<tr>
<td>Company 2 - Large international company (100+ employees)</td>
<td>Children’s social media</td>
<td>P3 – P5 and P30</td>
</tr>
<tr>
<td>Company 4 – Large publicly funded organisation (100+ employees) (UK)</td>
<td>Media and education content for children</td>
<td>P9 – P10, P17, P19, P23, P24 and P29</td>
</tr>
<tr>
<td>Independent designer 1</td>
<td>Interaction designer</td>
<td>P20</td>
</tr>
<tr>
<td>Company 5 – Large company (100+ employees) (USA)</td>
<td>Children’s media</td>
<td>P21 – P22</td>
</tr>
<tr>
<td>Independent designer 2</td>
<td>Digital designer</td>
<td>P25</td>
</tr>
<tr>
<td>Company 6 – SME (UK/EU)</td>
<td>Safety Tech</td>
<td>P26 – P27</td>
</tr>
<tr>
<td>Company 7 – Start-up (Malaysia)</td>
<td>Education game and content</td>
<td>P28</td>
</tr>
</tbody>
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### 4 DESIGNERS’ INTERPRETATION AND APPLICATION OF CHILDREN’S RIGHTS

#### 4.1 Factors shaping designers’ interpretation and application of children’s rights

We used the PbD principles as probes to obtain insights into how designers understand the issues about children’s rights that are relevant to their work. Focusing on children’s rights relating to digital play, we explored how the PbD principles are or could be embedded products that designers are working on or have worked on, in ways that are compatible with professional and company requirements.

Many aspects of participants’ practices seemed to align broadly with the PbD principles, although the language of rights itself was rarely used spontaneously by designers. This finding is likely influenced by the fact most of the products that participants were working on can be described as children’s products. The one that is not directly intended for children still serves to protect children. The same result may not apply to other designers working on products that are not intended for children but appeal to children.

Despite this broad alignment, designers participating in our workshops interpreted these principles in various ways, according to their products’ functionality, organisational settings and commercial models. We can illustrate this
variation in interpretation in relation to how participants were drawn to two of the ‘principles – ‘Ensure safety’ and ‘Be age appropriate’.

While protecting children from harm might seem a default value, of particular interest in relation to play is the relation between safety and experimentation or risk-taking. Consider Companies 1 and 3, which build educational games for children, their products differing only in the skills they intend children to develop. We observed that these companies interpreted and implemented ‘safety’ similarly, in that they both focused on providing a safe environment within which children could take a degree of risk, even enabling children to push their personal limits when engaging with their products. They framed this experimentation in educational terms, considering it good for children to make mistakes provided they learn from them. For example, one participant from Company 1 explained:

P1 (Company 1) ‘We try and create a safe space for kids to learn in that if they go wrong, there’s... a hint system that can just show this isn’t an error. They can basically choose to have a bit more instruction or if they’re really stuck, then pay for a hint with [a coin], not an in-app purchase or anything, but just within the gameplay.’

Similarly, P7 (Company 3) reported allowing players to explore and experiment within safe boundaries by ‘limiting camera panning to particular areas [of the game]’ and ensuring that ‘failure isn’t a scar but has irritating enough consequences’ so that children learn from their mistakes. Both companies’ design choices and rationales suggested that they interpreted ‘safety’ to include the provision of a safe space for children from commercial pressure.

However, this point was more salient for Company 2, where participants reflected on how tensions between commercial pressures and children’s wellbeing complicated their design choices:

P3 (Company 2) ‘Building a relationship is very different from, if you’re in a game environment, where you’re completely happy if kids have fun and then they want to have an in-app purchase, and it’s like junk food... But how do you actually build an experience that is fun, building that long-lasting relationship that is full of nutrients’

P4 (Company 2) ‘In the last sprint, I did a big piece on responsible engagement. One of the conclusions I got is that we shouldn’t be the ones defining the screen time, [and that we should] give that ownership to kids. So, make it super easy for kids to decide if they want to have a reminder of how much their screen time is.’

It was evident that Company 2’s interpretation of the significance and relevance of ‘ensure safety’ differed from Companies 1 and 3 due to their product’s design features and aims as well as internal research they had undertaken as a company. In this case, the emphasis is placed on the default value of safety in terms of protection from harms, for example, hateful communication rather than the connection between safety and experimentation or risk-taking which manifested in Companies 1 and 3’s efforts to create a safe spare to explore and push boundaries. In relation to safe forms of communication, a participant from Company 2 reflected on the challenge of designing safe communication tools that meet the needs and expectations of children:

P4 ‘What our research shows a lot is that kids are quite divided... They are just okay with having pre-made messages to share with each other because they know that it’s for them to be safe... But then we have the other 50 per cent of kids that actually resort to external software to be able to communicate with each other.’

The principle of ‘age appropriate’ also generated divergent interpretation, reflecting the challenge of designing for users of different ages and needs, often for a single product. While participants’ valuation of ‘age appropriate’
indeed referred to the product’s suitability for children of specific age groups as excerpted below, their definition and measurement of suitability varied.

Company 1 defined suitability by appeal, based primarily on visual aesthetics. On the other hand, Companies 2 and 4 focused on the age-specific developmental capabilities of their intended users and the intended learning outcome (e.g., skills development), reflecting a constructionist approach to the design, implementation and evaluation of interactive computing systems in the field of CCI [45].

For example, Company 4’s interpretation of ‘age appropriate’ emphasised balancing the educational benefit to the child, such as gaining new skills or knowledge, with engagement and entertainment:

P14 (Company 4) ‘The app [is] meant to encourage [children] to read, but at the same time, we want to make them engaging and fun. But not to make them too fun that it detracts from the reading. We’ve recently changed the way of doing those pieces of content. Subsequently, we’ve seen a dip in engagement, and there are calls for it to be made gamier again.’

Company 1 interpreted ‘age appropriate’ in relation to their product as manifesting through the appeal of activities to particular age groups and the aesthetic aspects of the product:

P1 (Company 1) ‘So in terms of how we begin… we kind of draw upon our memories of what we loved when we were kids. Because if we don’t create something we think is cool and that we love and we’re happy to be making, we know that that will never translate into kids liking it too.’

P2 (Company 1) ‘Well, I’ve always kind of drawn what now is age-appropriate stuff… we really try to keep it… the same as [what] Pixar and Disney are doing.’

Company 3 interpreted ‘age appropriate’ as compatibility between the levels of difficulty and the intended users’ age group. P7 said they engaged in research to determine ‘what the capabilities of the players are [in relation to their age],’ adding that they applied ‘a light touch on nudge and designed in a cut-off point.’

Designers found children’s developing maturity (or evolving capacity) particularly difficult when designing a product or service intended for more than one age group, as noted by P17 (Company 4): ‘For example, when we test this game which is aimed at a certain age level… let’s just say 11 to 13-year-olds. It’s a targeted audience [but]… where it’s hosted, [that site] could be [for those aged] 9 till 15-year-olds. So, when it comes to testing, we had this issue where it was, whom do we cater for?’

Designers’ common scope for ‘age appropriate’ excerpted here is narrower in focus compared to PbD’s scope for being ‘age appropriate’. ‘Age appropriate’ as a PbD principle demands that designers consider the ability of children to use digital products and services in ways that enhance the intrinsic motivation to play, sociality, diversity, emotional resonance and safety in ways appropriate to their maturity and developmental needs. This adds layers of complexity to product design.

### 4.2 Implications of designers’ approach to children’s rights for design

All companies conveyed their intention to design their digital products and services responsibly by not exploiting users’ engagement with the PbD principle of ‘No commercial exploitation’ (see section 2.1). However, there is no one-size-fits-all solution, and companies’ requirements for business viability differ. While the four companies were mindful of their responsibilities towards child users, other digital providers whose products and services do not cater directly to children may be less sensitive to a thin line between engaging products and prolonged engagement at the expense of children’s wellbeing.
Although not all principles may apply to all companies or products at every design stage, a child rights approach encourages designers to reflect on all PbD principles before dismissing any as irrelevant to the product or service being created. In short, all principles should be supported and not undermined for a product to be called ‘playful by design’. During workshops participants began to narrow their task by discussing which principles do or do not apply to their product or design challenge, but they also sought to reinterpret principles in relation to their priorities and practices. It appears that designers need support in valuing the full range of principles, in terms of quality of playful experience, and correlating design features underpinning each principle. For example, Company 3 discussed the tension between implementing the business objectives and the principle of ‘experimentation’, struggling to accommodate both (adult/business-framed) educational goals and children’s agency.

Finally, in making their products age-appropriate, designers across all four companies had little to say about the possibility of intergenerational play included in the principle ‘Be age appropriate’, perhaps finding it too difficult to accommodate along with safety. This raises the concern that designers’ temptation to neglect some principles or qualities of play will constrain children’s playful experiences.

5 DESIGNERS’ CHALLENGES IN EMBEDDING CHILDREN’S RIGHTS PRINCIPLES

We learned more about designers’ challenges in balancing different objectives of children’s rights with their design priorities, using the prototype of the PbD tool as a probe in the final workshops. Designers participating in these workshops also reflected on the value of a design tool for embedding children’s rights.

5.1 Balancing competing priorities and applying children’s rights the design process

We found evidence that designers, even those from the safety tech industry (P26, P27), were prompted to think beyond their products and engage more critically with the tensions that arise when embedding children’s rights into design when using the PbD ‘principles’ to discuss real-life challenges in their teams. For example, for one participant (P27) reflected on the tensions and challenges that arise when trying to respect and engage with PbD principles whilst also balancing commercial pressures that may lead to the design of compulsive features:

P27 (Company 6) ‘I think they’re all relevant to our product, but then sometimes there are trade-offs… so we prefer generally where kids are creating and participating, rather than just consuming… I think compulsion varies by age and child development. So, things that could be compulsive for a five-year-old would be very different even for an eight-year-old… I think game and educational app developers face a real massive challenge because… retention is very, very low. So, unless you include these elements in it, then kids aren’t going to use it. But how do you do that [in an] ethical… way?’. 

The way P27 engaged with the PbD ‘principles’ (during the workshop) suggested that they prompted this designer to think more deeply about new ways to find a middle path rather than trading one PbD principle for the priorities of the designer’s product. P27’s consideration of other products – game and educational apps – to which the designer’s product may be applied, suggests recognition of how an ecological approach could support new thinking. Other designers also used the cards to help them navigate their competing priorities and interests, including those that they initially did not think were ‘exciting’ (P21) or a priority, after checking their design options against the ‘principles’.

Overall, we found that participants were keen to interrogate their design choices, which had initially been informed by design objectives and their organisational settings, with the PbD principles. They seemed motivated to align their processes closer to the PbD principles.
P30 (Company 2) ‘You should actually take that feature, whatever you are designing, and go up against all of [the principles] and see how you actually fit each of them. So, you can’t say that it should not be ethically correct, you can’t say it should not be age appropriate… From a design principle perspective we use them as lenses that we look through when we start talking about the different new features and so on.’

Some designers, as in the case of P24, also used the ‘principles’ to fine-tune different elements in their design as if they were using a music mixer deck. Adjusting elements of their design in this way allows them to balance different elements of children’s rights relevant to their products rather than trading one for the other.

P24 (Company 4) ‘It helps to focus. You can bring something in and out of focus. So, like [P22] said around safeguarding and making sure that you’re welcoming… those can be slightly pushed back a little bit because we know those are catered for within… the framework we’re using… But are we looking at allowing children to experiment, are we looking at the discovery, and those areas which are the ones that we can suddenly sort of say hang on, have we really considered this? Are we just making assumptions that we’ve thought about it?’

In addition, participants responded well to all thematic prompts designed to stimulate different modes of thinking:

P4 (Company 2) ‘I think I will do the flow that you have done [from Why? to What if…? to How?] because the first one [Why? Card] got me thinking. The next one [What if? card] started making it more tangible, as in, what could I do about it? And the act [How? card]… got me thinking, what can you do about it?’

It can be inferred from P4’s thought process that this movement from an abstract concept of experience to more practical actions is crucial to making what would otherwise be abstract principles more tangible. So, for a design tool to support designers to translate principles into design features, that tool needs to have a function to facilitate these different modes of thinking.

5.2 Tackling challenges whilst negotiating and navigating team-based design cultures

Participants found diverse ways of using the ‘principle’ and ‘prompt’ cards, including for raising controversial or sensitive questions about challenges or tensions arising in their design processes in a non-confrontational way:

P24 (Company 4) ‘It’s the devil’s advocate, and sometimes we’re not comfortable to raise a question like that in a meeting. And if a card is doing it, then it takes the pressure off somebody… so it doesn’t come across as combative which it sometimes can do in a meeting.’

P21 (Company 5) ‘It triggered more questions. It also triggered things that you might want to focus on. Or bring out to other people to get their thoughts on… Especially people who have been doing this for a long time, you have all these assumptions about things. And culture. We’re all marinating our own culture and our experiences. So, it’s helpful.’

The way P24 and P21 thought of using the ‘prompt’ cards indicated that they found the deeper conversations facilitated by the cards valuable. Here, P21’s recognition of the influence of a designer’s ‘own culture’ reflects institutional factors regarding the broader design ecology that could lock designers into particular design choices. By using the cards to challenge these institutionalised choices without being confrontational, designers could be prompted, for example, to expand their engagement with children’s rights beyond the remit of safety or child development. This way of using the PbD cards could potentially support designers from commercial game companies to challenge and balance their
normative priority for compulsive design features (e.g., loot boxes [37, 54]) with features that encourage constructive child participation, as P27 suggested (see 5.1).

Participants also saw potential in using the PbD tool for onboarding new members and supporting principled discussions around company aims and values:

P21 (Company 5) ‘If you have somebody new on your team... You have so much knowledge of how the process works [in our company] that isn’t explicit. It’s not going to be in a handbook somewhere. But if you went with this process with someone new, a lot of that would [be] articulated, and they would be brought into the model that you all tend to lead.’

P22 (Company 5) ‘The deck is useful for making the invisible, often malleable design process more concrete for novice designers. It also feels productive to the social development and process-sharing of partnership work, helping to concretely guide two or more teams to the same language, processes, goals and outcomes.’

The way these participants suggested the PbD cards could also be used demonstrated the potential of a tool to facilitate learning across different design cultures – for example, between companies with expertise for designing for children’s rights and companies that traditionally prioritise maximising user engagement [22, 37, 54]. In such ways, commercial design practices might be shifted closer to children’s rights.

6 DISCUSSION

This article has sought to understand how designers interpret and apply children’s rights when developing digital products and services that children use, and the challenges they face in the process. Our workshop methods introduced the PbD principles and a related card-based tool as a way to engage designers in identifying and finding ways to overcome barriers to the interpretation and realisation of children’s rights in digital contexts [18]. By using the PbD principles, which encompass children’s rights to play and safety, and other rights, and a tool by which they can be implemented, we invited designers to recognise children’s rights holistically and to find new ways to balance rather than trade off children’s provision and participation rights against their protection rights, as has been common practice hitherto. From this research, we derived insights about how designers understand children’s rights, the challenges they face in embedding them into the products and services that children use, and the pressures under which they work. Illuminating the gap between child rights principles and design provides a basis for our design recommendations.

6.1 Bridging the gap between children’s rights principles and design

Broadly speaking, designers working on products intended for children are familiar with the child development theories that underpin both the UNCRC [40] and CCI [25, p.1]. Although they rarely foregrounded explicit consideration of children’s rights, we obtained evidence of designers’ valuing of children’s voices from both workshops, as prescribed in Article 12 of the UNCRC, particularly among those designers operating in CCI.

However, designers’ alignment to children’s rights was frequently partial, with components of each PbD principle often missed or sidelined. Evidence about how designers related their product and their design considerations to the PbD principles showed that their diverse interpretations depended heavily on the contexts of their product, product positioning, funding models and organisation settings. In these negotiations, designers tend to begin not with principles but with their priorities, familiar practices and organisational settings, using these as a reference point when determining which PbD principles might be relevant to their work. This approach to negotiation could risk PbD principles being
sidelined, although a child rights approach requires that all principles be accommodated, for rights cannot be ranked or ‘cherry-picked.’

The additional ways designers proposed using the PbD tool (section 5), highlighted significant organisational pressures stemming from institutionalised design cultures and practices. According to participating designers P24 and P21, these factors could also limit the range of child rights that designers can anticipate and accommodate. Specific commercial norms that favour design features intended to prolong or maximise user engagement, as observed in the gaming industry, were cited by P27 as a constraint on designers’ ability to respect children’s rights.

However, as P27 further suggested, design tools that could prompt reflective, exploratory and practical thinking could help designers negotiate a better balance, for example between the industry norms that demand prolonged engagement and meaningful participation. Given the influence of these proximal and distal factors [7] on designers’ interpretation and application of the PbD principles, even CCI designers could miss or struggle to strike the intricate balance between, for example, safety and enabling opportunities for children to explore and test boundaries. Especially if a product is classified as high risk, designers are pressured to adopt rigid safety mechanisms that infringe on children’s agency. However, by applying the lens of child rights, PbD principles offer a formula of what works when negotiating the qualities of play valued by child development experts [12] and the digital features that children find enhance their playful experiences online [53].

6.2 Practical considerations for embedding child rights in design

The HCI community has long been committed to developing good design practices for children. Such care primarily focuses on designing digital products and services intended for use by children. However, children use many digital products and services not necessarily intended for them, for example, search, maps, shopping, video conferencing, games and social media, sometimes in parallel to products dedicated to them, as reported by P4 (section 4). Problematically, outside the HCI and CCI communities, many mainstream digital products and services children use are influenced by industry norms that appear to sideline children’s developmental needs [31, 33], as remarked on by P27 (section 5). It may even be argued that, by paying little regard to their potential child users, these mainstream digital products and services risk children’s safety, privacy, development and wellbeing by design [17, 30, 39].

We observed that designers whose products were intended for children more readily captured a broader range of the PbD components beyond safety and age appropriateness that contribute to the protection agenda of child rights, for example, accounting for the diverse or neutral representation of children (see Company 1, section 4) and children’s experimentation (see Company 3, section 4). Companies whose products were not intended specifically for children, although children do use them, such as games, appeared to struggle to balance retention through prolonged engagement with ethical commercial models, as alluded to by P27 (see section 5). These contrasts reinforce our concerns about the importance of a broader application of child rights beyond HCI and CCI communities.

Given the proximal and distal factors shaping designers’ work [7], we learned that hard and fast rules would be futile. Instead, flexibility in applying the principles is needed to allow for negotiation between the PbD principles and designers’ priorities within the constraints of their products and organisational settings. Playing to the strength of the holistic approach to negotiation and balancing act of implementing the Convention rights, PbD principles invited designers to problematise the narrow interpretation of child rights, which tends to prioritise protection and empower designers to expand the protection agenda of child rights by balancing protection with provision, in this case providing opportunities for children to develop and exercise their agency and participation rights through play, reflecting also an ecological approach to children’s rights.
Given the holistic lens of child rights, combined with the interplay among the contextual factors that shape designers’ diverse practices, there is a need to think broadly and creatively to achieve good design that is also good for children.

To this end, we call on designers, irrespective of their practices, organisational settings, products and intended users, to (1) reflect on the impact of their design choices on children’s experiences and (2) expand their thinking before honing in on alternative design solutions that could accommodate protection, provision and participation rights, thus facilitating children’s exercise of their agency.

7 CONCLUSION

Amidst commercial design trends driven by a digital economy incentivised to maximise engagement, outreach and hyperconnectivity, which put children at risk by design [17, 39], the HCI community, particularly through its CCI agenda, strives to set standards for good design interfaces and interactive systems that support children’s development.

However, as observed in the challenges our participating designers and their fellow professionals are grappling with, designing for children’s diverse needs is complex.

This article has highlighted opportunities for the HCI community to envision design tools to help designers expand their interpretation and application of children’s rights, including, but not limited to, a concern with child protection [51], building on insights regarding the factors that shape designers’ competing priorities and complicate their decisions.

While beginning with a design brief that reflects organisational priorities and only later considering children’s rights is understandable, we suggest it is also possible to begin with children’s rights, develop a design brief and address organisational priorities accordingly. Indeed, a tool that allows sufficient clarity yet flexibility in interpreting and adapting child rights principles across diverse product lines could lend itself to fostering designers’ imaginative, iterative and rigorous product development [2], ensuring the thoughtful balancing of designers’ products, organisational settings and industry norms with children’s best interests (Article 3(1), UNCRC [40]).

Given that HCI and CCI designers and developers variously find themselves navigating competing professional, commercial, organisational, regulatory and ethical priorities, we hope our development and deployment of the PbD tool will encourage further experimentation to promote children’s agency, sociality, privacy and creativity on a par with safety. In this way, the design of digital products and services intended for or likely to be used by children can be more closely aligned with and supportive of children’s rights.

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