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THE DIGITAL CHILDHOOD INDUSTRY

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Many children lead lives that are heavily influenced by the digital world (Danby et al., 2018), whether that's through digital products, services, and practices made for them, or made about them. For some children, a digital childhood means they have opportunities to engage with new forms of media that impact their lives in meaningful, although sometimes problematic, ways. For children and their families, their digital childhood is mediated across many dimensions (Livingstone & Blum-Ross, 2017), including play, learning, communication and the everyday routines of family life (Gee et al., 2018). In this panel, we examine some of the ways digital childhood is mediated through Industry. In particular, we explore the ways that children, their families, policymakers and the wider public all contribute to the construction of, what can be thought of as, the 'digital childhood industry'. Each of the papers in this panel is concerned with the myriad ways that digital industries both benefit and are challenged by practices of children, their families, and policymakers. While these papers provide timely critique of how, often 'big tech', industries influence the construction of digital childhoods, this does not mean that children and their families do not receive benefits from the digital world or work to subvert the practices expected of them—they do (e.g., Johnson & Francis, 2022; Main & Yamada-Rice, 2022). Rather, this panel draws attention to the power that industry holds, which often constitutes an unfair relationship with its young users, even when a child and their caregivers enjoy or create meaning through engagement with digital services.

Each paper takes a nuanced look at the complex issue of digital childhoods, the internet and the associated industries that require children's or parental engagement to contribute to the ongoing success of a company or product. While some online spaces are specifically designed for children, across the papers we examine how these spaces—or spaces designed for adults that children join—often are not created with the interests or perspectives of children at the centre. Even beyond their youngest life-stages for instance, children are frequently subjected to datafication that may or may not be in their best interest (Hartung, 2020), and they can neither agree nor object to such practices. Moreover, children and families' own views on technology are often either not sought out or given cursory attention by Industry. Yet, in spite of this, children are often confident and competent inhabitants of digital worlds, claiming sometimes hostile spaces for themselves and radically shifting perspectives on what a 'Children's Internet' should look like (Dezuanni et al., 2023). Although this approach may be shifting perspectives for some, this panel calls on Industry to directly consult with children and incorporate their perspectives within earlier conceptualisations and development of the digital products, services, practices that construct their lives online.

In line with Rodriguez and Levido's (2023) paper which discusses moral panics around the digital childhood industry, this panel supports a critical disposition broadly to children and the internet. We argue that perpetuating moral panics—particularly those that erode

children's agency—dismisses the important, interesting and fun 'work' children and their families perform in their everyday lives as they connect online and construct digital childhoods.

These papers are purposely diverse to showcase the breadth of the digital childhood industry. Each paper has a focal point on children, the internet, and the industry that often mediates the relationship between the two. Calling this mediation the digital childhood industry provides, not only this panel but broader internet scholarship, a way to examine the issues arising from children's digital lives, from several starting points.

The first paper examines an instance of a 'children's metaverse', Roblox, and is concerned with the tensions between children learning through play and creative labour through this platform, while Roblox as a company simultaneously benefits from said, children's digital labour. The second paper highlights the important ways that political and societal discourses concerning children and social media, using Instagram Kids as an example, can lead to a stifling of conversations in this space. The third paper reports on a project where Industry has partnered with researchers with the aim of understanding children's perspectives of their own online videogame play, with this research showing one instance where children's perspectives could potentially be incorporated by video game developers specifically, and designers of digital spaces for children more broadly. The fourth paper explores the digital labour of contemporary parenthood, challenging us to reflect on where the digital childhood industry begins, including the 'how' and 'who' of the practices that normalise the routine datafication of children's bodies and development, with parents often engaging in building the digital lives of children from before birth. Finally, our last paper draws on a large qualitative study of children's digital play and wellbeing to consider how a focus on what 'drives' children's digital play might offer a more nuanced perspective on children's labour within the digital childhood industry.

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CHILDREN'S INDUSTRY IN THE METAVERSE

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The Metaverse has emerged as an important concept for how the internet is imagined and constructed. Many companies are investing in Metaverse strategies, with increased interest in how such companies can build or put measures in place to support users who are children. One such company is Roblox, which offers children opportunities to build and play in their 'metaverse' through gameplay and production opportunities. Indeed, Roblox relies on user generated content and player labour, sometimes referred to as playbour (Kücklich, 2005), as a key aspect of its business model. Millions of children play Roblox around the world. These numbers mean that Roblox is an important research site as we try to understand not only what constitutes a metaverse for children, or a metaverse where children gather, but also the industry practices that engage children as both players and creators of worlds.

This paper presents a political economy analysis as a way to investigate the industry and business practices of Roblox as one example of a children's metaverse. Here, we situate the Roblox metaverse as a media entity whose industry and business practices impact the meaning-making and production (Hardy, 2018) practices of children. As a key player in children's meaning-making and production practices worldwide, Roblox's industry practices set up particular types of power relations within and around the platform. These particularly benefit Roblox as a company that profits from the labour of its users, under the guise of economic benefits to content creators (van Dijck et al., 2018). We specifically examine the modes of production and monetisation within Roblox and what this means for learning.

What is a children's metaverse?

The definition of a metaverse is evolving, however Shi et al. (2023) describe the Internet as a "world or cyberspace which refers to a network of networks," while "the Metaverse depicts a parallel and immersive world where virtuality and reality are fused" (p. 1). Weinberger (2022) contends the Metaverse is where the physical and virtual worlds overlap in ways that are "enhancing [of] the physical world" (p. 1) where users connect

with others through user-generated experiences and there is a system for potential economic benefit for contributing users.

The concept of a ‘children’s metaverse’ is likely to have multiple understandings. As we see with the children’s internet more broadly, children often play in online spaces that were initially designed for adults (Dezuanni et al., 2023) although recently some companies, one example being the LEGO/Epic Games collaboration, are delivering child-specific instances of a type of metaverse (Epic Games, 2022). Indeed Roblox has called itself a metaverse, and while its CEO claims Roblox is for all ages (Baszucki, 2023), many of its users are children and young people, with the platform being very popular across this demographic (Pangrazio, Cardozo & Gaibisso, 2020).

Modes of production

Roblox has come under scrutiny in the past regarding its business model and how children and young people face the risk of exploitation. Within the platform game worlds can be created by anyone or any entity, including commercial companies (Blackwood, 2023). Children can contribute to the Roblox community by creating content they are able to sell for Robux, the in-game currency. Media attention has highlighted how children can be taken advantage of in this business model. For example exploitations can occur if children spend countless hours creating content that is not popular or marketed earning them little of an imagined reward, or if children join ‘teams’ where profits are not appropriately shared (Rinaldi, 2024; Parkin, 2022). While participation in this content creation has been promoted as a good way for children to learn about game development, a power imbalance is built into the Roblox platform and reinforced by individual adults since children do not always understand how labour practices work across such platforms (Ataby et al., 2023).

Economy

Although Roblox is free to download and join, there are limits to what children can engage with for free. Roblox offers players the ability to buy or earn Robux to engage in various experiences through microtransactions (Kou & Gui, 2023). For instance, if a user wants to change the appearance of their avatar, it is likely they will need to purchase new features using robux. Some games within the platform require upfront payment to become accessible. Other games offer in-game payment options to upgrade avatar abilities.

Additionally, Roblox users are able to convert real-world currency for robux to buy products, subscriptions, passes or private servers within Roblox (Roblox, 2024). Adding to the complexity is that some Roblox games have their own subscriptions or convert robux into other types of currencies or tokens. This is incredibly complex for children to comprehend, resulting in some children spending money on items that hold very little in-game value.

The flip side to this is that creators or developers of content on Roblox are compensated for their creations, although this model has come under scrutiny. Roblox acknowledges that their in-platform economy is “powered by creators” (Roblox, 2024), with top creators earning millions of dollars annually. However, Roblox as a company takes a large share of any revenue generated, with developers receiving around 30% of the share. Children who are part of teams or developing small-scale avatar items may get a share, but developers need to earn 30,000 robux to ‘cash out’ their robux into real world currencies (around USD$375). Again, the power lies with Roblox, and this model shapes the kind of content that is created, including content that resembles copyrighted games or experiences designed to maximise spending, for example, loot boxes, subscriptions or limited edition items.

Learning

Although research concerning Roblox as a children’s metaverse is in its infancy, some of the research concerning children and young people examines Roblox as a site for learning (see for example Han, Liu & Gao, 2023). Children and their educators are able to explore experiences designed to teach particular topics and educators with STEM and computer science experiences featured on the Education homepage. By positioning themselves within this space, Roblox positions the type of content on its platform, and the Roblox Studio platform, as educational. While children clearly are able to learn with and through Roblox, the monetisation processes could prove lucrative to those creating educational experiences. For example, many of the experiences marked as educational have passes available to increase gameplay experiences, blurring the lines between educational and edutainment.

Conclusion

While Roblox may be a metaverse that attracts children, rather than a metaverse designed for children, the fact is it remains highly popular and engaging for this age group. As such, the industry and business practices of Roblox have a responsibility to consider how it can implement principles that ensure children receive an experience that considers the reasons children visit Roblox and create an environment where children’s meaning-making practices are valued.

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POLITICAL ‘HEROES’ AND TECH ‘VILLAINS’: THE CASE OF INSTAGRAM KIDS

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Introduction

On 18 March 2021, *Buzzfeed News* reported that Instagram was intending to build a ‘children’s version’ of its popular photo and video sharing app, “that allows people under the age of 13 to safely use Instagram for the first time” (Mac & Silverman, 2021, para 2). Since at least 2017, Instagram has been a focal point for discourse about potential harms social media can cause teens (Leaver et al., 2020). Thus, news of ‘Instagram Kids’, swiftly galvanised parents and policymakers to vehemently push back against Silicon Valley’s larger interest in marketing its digital products to children. This paper argues that the ensuing discourses used by US policymakers in reference to Instagram Kids left little room for nuanced discussions about how a social media product for under 13s could support children’s fun, productive, safe, diverse and ethical experiences online.

The concept of Instagram Kids immediately became the ‘the stuff of politics’ (Bruan & Whatmore, 2009). Considering how a social media service for young adolescents—that is, for children aged between 10-13 (Odgers et al., 2022)—should or could look like, requires due consolidation. But even before Instagram Kids existed as a material prototype that children, parents, and experts could explore, it was shut down, both discursively and literally. Specifically, following the leaked report, the idea of Instagram Kids was discursively framed as ‘dangerous’ by US policymakers in subsequent Congressional Hearings in 2021; and in September of that year, after the release of internal research conducted by Meta about teen mental health—known as the Facebook Files (2021)—the CEO of Instagram Adam Mosseri announced that Instagram was pausing the development of Instagram Kids (Pausing Instagram Kids, 2021).

This paper examines the transcripts of four US Congressional Hearings in 2021 where issues about Instragram Kids are raised by policymakers to tech industry representatives. By examining the issues—that is, the matter of concern (Latour, 2004) that mobilise the media, politicians, and the wider public—about Instagram Kids, we observe discursive efforts to purify (Latour, 1993), that is oversimplify, the debate. Importantly, this paper is not about condoning the tech industry’s current commercial practices in respect to under 13s, as more work in this area is essential. Rather, this paper surfaces how policymakers in these Congressional Hearings silenced the issues

which, we argue, eroded the opportunity for alternative discussions to be had about designing a social media app for children.

Methods

The method of this research involved applying open coding (Strauss & Corbin, 2004) to four US Congressional Hearings that spoke directly to the issues of Instagram Kids, namely, *Disinformation Nation: Social Media's Role In Promoting Extremism And Misinformation House Committee Hearing* (held on 25 March 2021); *Antigone Davis' (Facebook's Head of Safety) Testimony on Mental Health Effects: Senate Hearing* (held on 30 September 2021); *Frances Haugen Testitfies on Children & Social Media Use: Full Senate Hearing* (4 October 2021); and *Adam Mosseri (Instagram CEO) at Subcommittee: Protecting Kids Online: Instagram and Reforms for Young Users* (held on 8 December 2021). During the process of open coding, desk research in the form of literature searches were conducted to explore the claims made during the Hearings. By analysing this data, we identified some key themes.

Findings

A key theme observed within the transcripts was the mischaracterization by policymakers about the supposed consensus within scholarship around issues relating to children and social media, such as effects on mental health. Policymakers often presented claims as having come from scientific consensus but research into the practices and effects of social media on children is still ongoing. For instance, during the House Committee Hearing on 25 March 2021, Rep. Cathy McMorris Rodgers (R-WA 5th District) claimed that "the science on social media is becoming clear", asserting that "one study found" while "other studies found" before listing four distinct statistics about youth mental health. By conducting a simple online search for these claims, we found that the research in question did come from distinct papers that were led by the same author (Twenge et al., 2017; Twenge, 2019; Twenge; 2020; Twenge & Campbell, 2019). The author in question, Jean M Twenge is also the author of the 2017 book *iGen* (Twenge, 2017), which attributes youth unhappiness to smartphone use. This book has been critiqued by other leading scholars in the field of children and digital media, for misrepresenting the data and lacking context (Livingstone, 2017; Swist et al., 2019; Third et al., 2018). Another example is seen on the 30 September 2021 hearing when Rep. Ed Markey (D-MA) claimed that "all recent scientific studies by child development experts found that not getting enough likes on social media significantly reduces adolescents' feelings of self-worth." Again, conducting a search for this claim returned more contextualised findings such as this one from Lee et al. (2020), which found that there is a "possibility that technology which makes it easier for adolescents to compare their social status online [i.e., Likes]...could be a risk factor that accelerates the onset of internalizing symptoms among vulnerable youth" (p. 2141). We argue that framing the science in such settled ways as above, does two things: it misrepresents scientific research findings and debate; and it discursively shuts down the idea of exploring what social media for children could or should look like.

Another observation within the transcripts is the spectacle and performative nature of the Hearings. To start, each Congressperson and Senator only has five-minutes or so to ask their questions which results in policymakers asking broad questions, sometimes with multiple questions at once, and they then request a “yes or no” response from the tech representative. In one instance during the 25 March 2021 Hearing, Rep. Billy Long (R-MO) each asked the CEO of Google, Twitter (now X), and Facebook (now Meta) if they “knew the difference between yes and no?” They all answered “yes” to which Rep. Long responded: “Thank you. I want a steak dinner there from one of my colleagues. They didn't think I could get all three of you to answer a yes or no question. I did it,” before moving to his real line of questioning: “Mr. Zuckerberg, let me ask you: How do you ascertain if a user is under 13 years old?” This particular exchange is problematic because it trivializes the opportunity that Hearings afford and more broadly, the allocation of mere minutes for each exchange hinders the opportunity for necessary explanations to be explored. Of note, in contrast to what the tech representatives experienced during their Hearings, during Frances Haugen’s Hearing on 4 October 2021, where she testified against Facebook, she was permitted more time and space to contextualize and explain her answers. In this way, we can observe, similar to Cohen’s (1972/2011) work on ‘folk devils’ and ‘folk heroes’, the tech representatives framed as ‘villains’ preying on children and the bipartisan politicians—and Ms Haugen as a whistleblower—‘heroes’ keeping the industry accountable. This discursive process is an attempt to purify the inherently messy nature that questions about a children’s social media app, fundamentally raises. We argue that we need to not shy away from sitting in the complexity of digital products for children and considering wider interpretations of who is responsible for supporting children’s experiences online.

Discussion

The case of Instagram Kids is an example where efforts to purify (Latour, 1993) the complex issues regarding children being online, hindered the opportunity to robustly engage in the fair question: how could a social media experience for young adolescents be designed to be safe, ethical, diverse, and fun? We argue that the issues presented in the Hearings discursively frame the mere idea of Instagram Kids as inherently harmful without due consideration about the potential benefits or discussions about how such digital products could be designed to amplify high quality experiences for children. We argue that better online experiences for children are possible (Dezuanni et al., 2023), but it requires children, parents, policymakers, and industry working through the complexity together.

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CHILDREN'S VOICE IN THE DESIGN OF VIRTUAL SPACES: USING VIDEOGAMES TO EXPLORE PREFERENCES

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Background

In 2016, 97% of Australian households with children under 15 years had access to the internet (ABS, 2016), and similar figures were reported in 2021 for households in the U.S. (US Dept of Commerce, 2021). Internet access allows children to retrieve information, and also affords entertainment opportunities such as playing videogames. It has been suggested that up to 93% of Australian children aged 5-14 years play videogames, with a total play time of around 100 minutes per day (Brand et al., 2023). Recent reports suggest that Roblox users under 18 years in the U.S. played for an average of 190 minutes per day in 2022 (Clement, 2023). As such, many children worldwide are spending large amounts of time in virtual environments. In light of plans to create virtual spaces for children (e.g., children's metaverse), it is important to acknowledge that children may perceive and interact with virtual spaces differently to adults. Across a range of disciplines there has been acknowledgement that children can and should have a say in research about themselves (Mason & Hood, 2011), as children are capable of and should be afforded opportunities to provide insightful and useful interpretations of their world (Mason & Danby, 2011). This should include virtual spaces.

Over two decades ago, Druin (1999) developed a research approach to include children's voices in technology development. The cooperative enquiry approach involved three techniques: contextual inquiry, participatory design, and technology immersion, all of which are applied to gather children's insights about technology. A decade later, after more refinement, Druin (2010) discussed the evolution of the approach with attempts to minimize adult-child differences in ways of communicating to ensure ideas are shared and explored. The field of child-computer interaction has also flourished in the last two decades; this research investigates the interaction between children and digital technologies, whilst allowing considerations for children's variations in language, reading abilities, cognitive skills as well as interests (Markopoulos et al.,

2021). These attempts to include children in the design of digital technology for them is important and warranted, yet the methods are often time and resource intensive. Identifying less intensive methods would be valuable.

One way to glean children's insights into the virtual spaces they would like to spend time in is to evaluate their perceptions of the videogames they play. A review of research on motivations for playing videogames identified the top-rated motivations for children aged 11 to 14 years were fun, excitement, challenge, and relaxation (Olson, 2010). A myriad of design elements could contribute to eliciting these desired feelings and experiences in virtual spaces. Investigating children's perceptions of the design elements of videogames could provide valuable insights into what they like, and highlight the value of design elements that may impact children's experiences which may differ to adults.

Method

This study is part of a larger program of research: the Responsible Innovation in Technology for Children (RITEC) project, co-founded by UNICEF and the LEGO Group and funded by the LEGO Foundation, which aims to create practical tools for businesses and governments that will empower them to put the wellbeing of children at the centre of digital design. We asked children aged 7 to 13 years to play two videogames– Rocket League (RL) and LEGO Builder's Journey (LBJ). RL is a fast-paced sports-style game where players control cars to play soccer. LBJ is a puzzle-style game where players use bricks to build paths between two minifigures.

In total, 68 children participated in two sessions: (1) a laboratory session in which the children played the two videogames and their psychophysiological data was collected; and (2) a reflective interview conducted to co-create video-stimulated accounts (VSA) of the children's experiences, which involved viewing key moments of the children's gameplay. The VSA methodology allows the researcher and participant to co-construct accounts of experiences, thus centering children's voices. This abstract presents findings from VSAs from 30 participants, focusing on comments related to the children's perception of the design elements of the videogames. Of these participants, 15 (50%) had played videogames online. Reflective thematic analysis was used (Braun & Clarke, 2021) to analyse the data using NVivo. Three overarching themes were identified: (1) design elements preferences, (2) importance of feeling in control, and (3) improvements to game design.

Findings

Our participants described their ***preferences for design elements*** and explained why. In LBJ, preferences included moving from a grassy forest scene to a desert scene because it *"felt like you were getting away from like a bad place, like a place where it's just barren"* (P68). Visual scenes that included elements for which they had descriptive language, such as trees or sand, afforded them opportunities to effectively share.

Preferences for RL included events that incited joy and excitement such as explosions, boosting, and being blown backwards, which are features that allow the use of onomatopoeia to help describe them (e.g., bang, boom, whoosh). For LBJ, the soundtrack was calming for many, which was identified as beneficial when solving a challenging puzzle: *"I usually get frustrated with these kinds of things but I think the music actually kind of helped to keep me thinking calm"* (P7). Comparison to other experiences in their lives was a technique used to share their views.

Our participants highlighted the importance of ***feeling in control*** for their enjoyment, and in both games participants identified the need to effectively use the controller to achieve their goals. LBJ included a tutorial to learn the controller functions and many participants found this valuable and even acknowledged that they would not have picked up the requisite skills without it: *"It helped me know how to move the blocks and how to drop them and lift them. If I didn't know that... I would be stuck there at the very first one and not know how to do it"* (P6). We suggest that experiencing enjoyment within other virtual spaces will need the requirement of control for easy navigation.

Our participants provided insightful, informative, and measured ***descriptions of improvements*** to the videogames. For LBJ these included different modes of play, e.g., creative mode, with detailed descriptions of how it could be achieved. Notably, some participants critiqued their suggestions to indicate potential downsides: *" Because like if it's like in a story mode kind of way, that wouldn't really work because you'd end up getting distracted, never really finish it"* (P32). Other comments stemmed from an interest in seeing and doing things "out-of-the-box," such as driving everywhere possible: "*I went onto the roof and off the roof and drive wherever I wanted*" (P59). Mechanisms for eliciting insights included listening out for comments of exploration beyond capabilities of the game– e.g., *"I was like curious as in like I wanted to jump off to see what was down below, like the big islands"* (P11), and explicitly asking what improvements they suggest.

Discussion

We identified some design elements that children desire and require in virtual spaces to maximize enjoyment. Within the research approach, mechanisms that scaffolded the children to share were identified. We argue that children have a lot to contribute towards the design of digital experiences for them, which can be descriptive, insightful, and measured, and investigating children's perceptions of videogames is a way of capturing these.

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SHARING IN (DIGITAL) CARING? DIGITAL LABOUR IN A DIVERSE SAMPLE OF NEW PARENTS

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Introduction

In Australia and many other post-industrial societies, the transition to parenthood is a highly digitised and 'appified' period of the life-course (Lupton & Pederson, 2016; Donelle et al., 2021), that significantly contributes to the industry of the digital child. Parenting apps represent a growing component of the mobile app development industry (Fedorychak, 2024), with many 'key players' in the market providing apps for use throughout the perinatal period (Technavio, 2024). The range of mobile applications to assist parents throughout this life-stage includes apps to manage fertility, pregnancy, infant feeding and 'baby-tracking', and children's development (Dienelt et al., 2019; Lupton & Pedersen, 2016). While some of these applications focus on the monitoring of women's reproductive bodies, they similarly begin to normalise the datafication of children's bodies and development. The datafication of the transition to parenthood thereby represents the earliest stage at which children's digital footprints emerge (Barassi, 2020). These practices are driven by parenting culture trends that prescribe caring dataveillance (Sukk & Siibak, 2021) – data-based surveillance as an expression of love, affection and attention (Lupton, 2020) – as a necessary culture of care (Leaver, 2017).

This paper draws attention to the gendered role divisions in the digital labour of parenting, which is predominantly performed by mothers (Peng, 2022; Langton & Zhao, 2024) – reflective of traditional (Western) expectations of gender roles. The uneven distribution of parenting labour perpetuates gendered social inequalities, specifically in employment opportunities and earning potential (Doucet, 2009) that compromise social and financial security (Australian Government, 2023). In the context of digital parenting, these gendered divides result in a digital double-bind of maternal responsibilisation: Mothers are encouraged to perform caring dataveillance – while simultaneously making themselves accountable for their children's datafication (Mascheroni, 2020).

Parenting apps are an important vehicle to communicate, and potentially challenge, normative expectations of gender-differentiated labour in (digital) parenting. Yet, Hiebert and colleagues (2021) found that "digital technologies tailored to new and expectant parents actively reinforced Western sociocultural heteronormative feminine and masculine gender roles" (p. 7). Previous studies of mobile applications for (expectant) parents highlight the intense responsibilisation of mothers for all kinds of reproductive and parenting-related labour (Hall et al., 2023; Thornham, 2019; Lupton & Pedersen, 2016; Johnson, 2014), the marginalisation of other caregivers (Thomas et al., 2018), and of non-traditional family structures, through the perpetuation of heteronormativity (Byrt & Dempsey, 2019).

This paper builds on the existing body of work, by exploring how the performance of and responsibility for the (digital) labour of parenting is negotiated within the parenting team, and in the context of everyday family life, from the perspectives of caregivers of a range of genders and family structures – that both extends and moves beyond a focus on mothers' perspectives only.

Methods

This paper draws on the results of 28 semi-structured interviews with Australian parents of different genders and family structures, including conversations with fathers, single parents, and same-sex coupled parents. Where possible, coupled parents were interviewed together. The interviews were conducted between June 2021 and March 2022, as part of a larger research project. This paper draws on the results of these conversations, focussing on parents' descriptions of the app ecologies that mediated their experience of the transition to parenthood and early parenting, and how patterns of app use mediated the division of labour within the parenting team. The interviews were manually transcribed, coded and analysed in NVivo. Data analysis followed Braun and Clarke's (2006) approach to thematic analysis, while detailed coding and analysis were based on constructivist grounded theory (Belgrave & Seide, 2020; Charmaz, 2006).

Findings

App ecologies of the transition to parenthood

Parents' accounts of their digital labour in parenting outlined the digital media ecologies of their transition to parenthood. Especially for mothers, the routine use of pregnancy tracking apps was often experienced as pleasurable, affirming their embodied experience of carrying child, and increasing feelings of connection to their unborn baby. However, these apps' gender-specific designs often excluded fathers, prompting many mothers to perform additional labour in conveying the information they received to their partners, to allow them to relate to and share in their embodied experience of parenthood. For same-sex coupled fathers, parenting apps for the pre-natal period were largely irrelevant. Nevertheless, this life-stage was still heavily appified, as social media applications played an integral role in connecting these couples to support networks, including lawyers and potential surrogates, to make parenthood possible in the first place.

Gendered role divisions: rationales and practices

As in previous work (Hiebert et al., 2021), several mothers voiced their frustration at their male partners' lack of involvement in digital parenting and hands-on caregiving, framing their routine deference to mothers as a deliberate attempt to avoid assuming responsibility for caregiving labour. Yet, participating fathers in opposite-sex relationships provided a range of rationales for their reticence. These included the wish to respect and support their female partner's agency and self-determination, a lack of confidence as new parents, and a lack of cross-generational role-modelling, which meant fathers had to negotiate their new identity without a 'gendered script' – a set of socio-cultural role expectations (Dunne, 2000) – that fitted their aspirations of the kind of parent they wanted to be. These challenges were exacerbated by the gendered nature of digital sources of parenting support, that frequently constructed fathers as lesser parents, or sidelined them completely.

Challenging gender-differentiated norms in parenting labour

To promote more equitable sharing of caregiving labour, there is much to learn from the approaches of same-sex couples who, through their non-traditional family structure, similarly lack a 'script' for their parenting roles. Consequently, these parents proactively negotiated their role divisions – and chose parenting apps reflecting this approach. For example, the use of infant feeding applications that focussed on tracking features only and allowed caregivers to record data to a shared profile, represented a parenting practice that promoted the sharing of digital labour. These apps lacked images and text-based information through which gendered norms or assumptions about family structures could be perpetuated. Shared participation in recording and accessing baby-tracking data allowed caregivers to share in the mental labour and – importantly – in the *responsibility* for infant care. Within the context of the family unit, the 'disembodied' nature of children's datafication – by 'reducing' bodies, embodied practise and experience to numbers – can therefore have somewhat of a democratising effect on parents' involvement in caregiving.

Conclusion

The designs and features of many parenting apps are no longer reflective of parents' lived experience of the transition to parenthood, and their planned and actual role divisions. This paper shows that although many digital spaces for parenting continue to promote hegemonic heteronormative caregiving arrangements, parents still have agency in choosing more equitable approaches to the digital labour of parenting, which can be supported through suitable parenting apps. As part of the industry of the digital child, mobile applications used in the transition to parenthood play a significant role in the 'how' and 'who' of children's datafication. Future work should explore how parents could move from sharing the responsibility and accountability for children's datafication, to the development of shared strategies to manage these now-normalised practices.

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CASHING IN AND MUCKING OUT: WHAT DOES A 'DRIVERS' APPROACH TO RESEARCHING UK CHILDREN'S DIGITAL PLAY TELL US ABOUT CHILDREN'S DIGITAL LABOUR?

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Introduction

The children's digital game industry is a powerful commercial entity, whose users are presented with an ever-growing range and complexity of commercial content (Göksu et al., 2020; Meyer et al., 2019). Past studies have focused on the commercial dimensions of children's digital play, including their impact on consumption (Harris et al., 2012) and the implicit and explicit forms of labour implicated in children's digital play (Dezuanni et al., 2023; Caton & Green, 2023). Commentators are rightfully concerned about the extent to which policy governing the children's media industry succeeds in protecting - or fails to protect - children's rights. Meanwhile, past research has also emphasised that the interests of different stakeholders are complexly intertwined. Children's diverse engagements with digital content and contexts serve purposes for parents and carers, for commercial entities and for children themselves (Scott et al., 2023).

This paper foregrounds two forms of 'digital labour' that children engage in when playing digitally, considering how a 'drivers' perspective might expand understanding of the value of this digital labour for different parties. The theorisation of 'digital play drivers' expands on past work (Galpin, 2016; Katz et al., 1973), to interrogate how the drivers of children's digital play connect with their experiences of subjective wellbeing.

I present findings from an international research project (June 2022 - August 2023), delivered in collaboration with a partner in the children's digital play industry and a global children's rights organisation. Rather than presenting comprehensive findings of the overall study, which is being reported elsewhere, the paper draws on theories of children's motivations and play to address the questions: (1) How is digital labour enacted in the digital play practices of children aged 6-12?; (2) What does a 'drivers' approach reveal about why children engage in digital labour online?; and (3) What do these findings tell us about children's digital labour?

Methods and approach

To support the overall aim of examining the relationship between children's digital play and their wellbeing, we deployed a multi-method qualitative study in a case study design. The theoretical approach was ecoculturally-informed (Weisner, 2002), semi-longitudinal and ethnographically-informed. Methods included: conversations and semi-structured interviews; ethnographic video observation; family-led data generation and sharing; and iterative family feedback. Participants were selected to ensure diversity across a range of factors, including age, sex and gender, socioeconomic status, race and ethnicity and disability/ non-disability. Data were analysed and interpreted collectively, following a deductive-inductive approach, with inductive coding following a

framework designed for the project. Analysis summaries were produced and discussed between researchers. For this paper, we reviewed the inductive codes and analysis summaries to identify insights relevant to the research questions outlined above. It draws on a subset of the data collected specifically in the UK, wherein 120 research visits were made to 20 UK families.

Findings and conclusions

Children engaged in diverse digital labour practices in their digital play, including commercial and caring forms. The broader study identified that children's digital play choices and practices were driven by deep interests, needs and desires characterised as 'digital play drivers'. These drivers, which are reported more comprehensively elsewhere, offer a unique lens on the digital labour practices in the present study.

Children's commercial digital labour

Children encountered a range of commercial content and game mechanics. Perhaps most strikingly, children engaged in repetitive in-game tasks to earn virtual currency to spend on virtual items, skins, objects, abilities, outfits and avatar customisation. Nine-year-old Penny spent a great deal of time working in Bloxburg to generate income to spend in-game. Whilst children's digital play choices and practices undoubtedly served particular purposes for commercial entities, a 'drivers' approach emphasises the deep interests, needs and desires children are seeking to fulfil. One of the eleven 'digital play drivers' identified in the present study was the drive to understand, and meet, one's own emotional needs. For some children in the study, games with this combination of design features appeared to afford something past researchers have termed a 'flow' state (Johnston, 2021; Csikszentmihalyi et al., 2005). Nine-year-old Penny framed the repetitive tasks associated with generation on in-game currency in Bloxberg in terms of flow state. Penny would often come home from an already busy day of work at school and then spend time 'working' in Bloxburg to earn income to spend, something the research team initially found both surprising and intriguing. Penny explained that engaging in this sort of repetitive task helped her to feel relaxed and focused. Penny's digital play was also often driven by a need to explore, construct and express identities. At the time of the research, she was beginning to tentatively explore a range of new, more 'grown up' identities, activities and interests for the first time. Penny expressed doubts and self-criticism about these identity explorations in the physical world, playing down the seriousness of her interest in trying out new hairstyles and make-up. In her digital play, however, Penny used the currency she generated in Bloxburg to attentively customise her avatar, changing its clothing regularly. Where physical world identity experimentation carried increased cost and risk, Bloxburg's extremely customisable avatar feature afforded Penny rapid and relatively low-stakes experimentation with different hair, make-up and clothes. Digital play experiences within Bloxburg thus appeared to fulfil Penny's need to explore identity and, as a result, support her wellbeing.

Children's caring digital labour

Children's caring labour was enacted in two ways. Firstly, children invested considerable time empathising with, nurturing and tending to imagined others (including imagined humans, animals, natural organisms and spaces). Like Penny, 8-year-old Ollie spent considerable time 'working' in his digital play, in particular building structures to look after animals in Minecraft. Ollie had constructed a large 'Mansion Dog House' to house his substantial pack of dogs, which he had tamed from wolves, using bones, something he said was hard work. Ollie's attempts to build the house would sometimes lead to dogs falling off the dog house, which had by this point become several stories high. Ollie would apologise to them, and subsequently mused on ways to better protect them from falls by outlining the surrounding areas with slime blocks, so the dogs would bounce rather than hurting themselves. Secondly, children engaged in digital play practices that appeared to deliberately prioritise the wellbeing of others over personal needs and desires. Both Adaobi (11) and Annie (10) played digital games with younger children to support their wellbeing, rather than to meet their personal digital play preferences. As in the case of children's commercial labour, a 'drivers' approach emphasises the deep interests, needs and desires children are seeking to fulfil in their caring labour in digital contexts. Children including Ollie, Adaobi and Annie all appeared driven by the need to empathise, tend and nurture, fulfilment of which driver appeared to support wellbeing.

Summary

Children in the present study engaged in substantial 'digital labour', some of which was complexly intertwined with commercial purposes and the needs of social others. Notwithstanding this, children's digital labour also appeared to fulfil specific individual needs, desires and deep interests for children themselves, sometimes transcending designers' imagined uses of digital games. The study's findings emphasise that children's labour within digital play contexts cannot be understood in isolation from children's broader practices, interests and enquiries.

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