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The COVID-19 2020 lockdown measures altered how families spent time together, with many fathers adopting new household roles and spending more time with their children. This paper contributes an empirical account of technology use and fatherhood during the COVID-19 pandemic, and draws implications for the design of technologies to support fathers. We outline the findings from semi-structured interviews carried out with fathers during lockdown in the UK. Initial interviews (n=19) highlighted challenges in screen viewing, family dynamics, idea generation and self-care. This informed the design of four prototype apps to enrich follow-up interviews (n=12), using these prototypes as prompts to explore the emergent challenges in more depth. The interviews identified significant changes and concerns related to technology use within the context of COVID-19, with new roles for fathers conflicting with traditional ones combined with situational stressors to amplify issues with guilt, shame and self-care related to technology use.

CCS Concepts: • Human-centered computing → Human computer interaction (HCI) → HCI design and evaluation methods; • Applied computing → Law, social and behavioral sciences

KEYWORDS: Fatherhood, Screen Viewing, COVID-19, Self-Care, Technology

ACM Reference format:

1 INTRODUCTION
The rapid spread of Coronavirus Disease 2019 (COVID-19) affected millions of people worldwide [39]. Governments globally implemented lockdown measures, significantly
changing family life [71] and dynamics [24]. Parents and caregivers in the United Kingdom attempted to work remotely, provide full time care, and educate their children, with a lack of clarity on the duration and long-term impact of the situation [20]. As perceptions on fatherhood are influenced by changes and shifts in family structure, exploring family dynamics in a time of severely impactful flux on both a global and local scale allows for in-depth investigation into the ‘private sphere’ of the home [30]. Lockdown measures meant that the home became the sole context for children to access technology, providing a new perspective on fathers’ boundaries and management of screen viewing (SV) behaviour, and how technology might mediate interactions and influence family dynamics.

The availability of digital devices in the home has increased markedly in the last decade [78], particularly for those living in higher-income, Western countries. Screen viewing is omnipresent in children’s daily lives; they engage with a variety of different devices (e.g., laptops, game consoles and television), access a variety of online platforms (e.g., Netflix, YouTube, and social media), and frequently use multiple devices at the same time [58] for purposes such as entertainment, homework, and socialising [18]. Excessive screen viewing has been associated with obesity [35], increased metabolic risk [36], inhibited academic performance [23] and a reduction of psychological wellbeing in children [79].

Furthermore, SV of more than two hours per day has been negatively associated with positive health behaviours such as physical activity [69]. As behaviours established in childhood translate into adulthood [25], understanding family dynamics related to SV is an important area of CSCW. Despite evidence of the negative health impacts of child SV [35, 58], some within the HCI community believe that parents are ‘flooded’ with oversimplified and dramatized messages regarding the negatives of SV and wish to debunk biased policy communication [55]. The HCI community are not alone in this concern; a recent systematic review concluded that most policy releases over the last three decades have overstated the evidence for harmful effects of SV [37]. Therefore, there is a need to further explore parental perceptions of SV, to understand these societal influences and parents’ own experiences of managing SV within the home.

This work focuses specifically on the views and perceptions of fathers. The term ‘fatherhood’ is used to refer to the institutional status of men’s parenting; a ‘father’ is an individual male parent who may be defined as such either biologically, socially, or both [72]. Definitions of fatherhood status have become more fragmented with developments in DNA technology, which can more accurately define biological fatherhood, and in the legal sphere, in response to changing patterns of marriage and coupledom, so that a child may have different fathers over time [21]. Fathering is commonly used within social science literature to refer to the practices - the doing - of male parenting [72] and it is this which is the focus of the paper both in terms of how self-identified fathers engage with digital technology as parents and how they view these activities.

Societal views of fatherhood have altered over the past three decades, as social norms of fathers as ‘wage earner’ and ‘mentor’ have evolved to incorporate broader roles of ‘caregiver’ and ‘emotional support provider’ [76]. Fathers are spending more time with their children than ever before [54], as individual families strategize ways in
which fathers can balance their economic support, if in full time employment, with time spent with children and emotional presence [76]. Nevertheless, the current period of transition around fathers’ role in families is still in progress, as the extent to which fathers engage with aspects of responsibility and management of children’s everyday lives does not match that of mothers [61]. Understanding fathers’ perspectives on screen viewing behaviours gives the opportunity to understand influences on family health and family dynamic in a technological context. Prejudices in parenting literature, such as through recruitment and research bias, reify social norms about motherhood being the primary mode of caregiving and parenthood (e.g., in CSCW [93]). This reveals a need for literature that empirically captures the lived experiences of fathers with technologies in different parenting contexts.

During the 2020 lockdown in the UK, we employed semi-structured interviews (n=19) to explore fathers’ insights into their children’s technology use and SV. This informed the design of four prototype apps used to enrich follow-up interviews (n=12) to further understand fatherhood and technology practices. Our research aims were twofold: 1) to gain an empirical understanding of fathers’ perceptions of technology use, fatherhood, and family dynamics within the context of COVID-19, and 2) to explore the potential role of technology in supporting fathers’ roles as caregivers. This would not only provide an opportunity to explore how technology might support fathers to care for their children in evolving family contexts (such as disruptions to childcare/working situations), but would also provide a platform to explore fathers beliefs, perspectives, and considerations on digital technology during a time where many participants were actively reflecting on their roles as fathers.

2 RELATED WORK

There has been an emerging body of research focusing on children’s SV behaviours in the family context in both the HCI [57] and public health research communities [87]. These works have examined digital balance within the home, parental perceptions of child technology use, and the role that technology plays in children’s learning. However, few studies have focused specifically on fathers’ views and relationship towards child technology use, or the potential role of technology in helping fathers to identify alternative activities to do with their children.

2.1 Growing Importance of Digital Balance

Technology management interventions are not confined to academia; commercial platforms are increasingly implementing explicit screen viewing management features with major corporations offering interventions. For example, the Amazon Fire 7 ‘Kids Edition’ tablet, which allows parents to remotely control their child’s device, set time limits for screen viewing, and send educational goals from their ‘Parent Dashboard’ [16]. In addition to parents acting as mediators for their child’s screen time [75], and parents and children being able to monitor their own screen usage through smartphone ‘Screen Time’ features [82], some service providers like Netflix also facilitate awareness of user screen consumption through the ‘Are you still watching?’ message [74] and allowing auto play features to be deactivated [52].
Previous research highlights that parents find it challenging to achieve a ‘digital balance’: recognising the potential negative aspects of technology use whilst also wanting their children to keep pace in a continuously growing digital environment [87]. This mirrors the evidence base, as there are many benefits of technology use such as exposure to new ideas and knowledge, and increased opportunities for social contact and support [18]. However, these are mediated by potential negative health and wellbeing effects [23, 35, 36, 69 & 79]. Even among older children, the narrative around technology use can be oversimplified, with characterisations of overuse as a dangerous addiction [62, 63], when there is actually a complex reciprocal perception of technology use between teens and parents [26]. These negative associations with technology are reflected in the parental beliefs that not all technology use is considered equal, and that some modes of technology use are more valuable than others [87]. HCI research suggests that designs for technological screen time interventions are biased by the transposition of ‘bad’ SV management by adults to children [75]. While some HCI works have explored parental attitudes toward young children’s technology use and contextual details about negative behaviour caused by transitions to and from screen-based experiences [56], the majority of previous research has focused on parental perceptions as a whole.

2.2 Fatherhood and Technology

Fathers’ perspectives on technology use related to their children are less commonly reported than those of mothers [28]. Mothers are still often portrayed as the primary caregivers for children, and this has typically shaped research agendas in public health. However, fathers’ perspectives have predicted children’s health behaviours in several studies [27, 67] and others have reported significant positive associations between fathers’ and children’s health behaviours, for example nutrition [50], physical activity [42, 73], and screen time (in older children) [1]. In addition, a recent UK report highlighted that mothers were only slightly more likely than fathers to mediate internet use and that both expressed similar levels of digital skills, albeit in different domains [95]. These studies highlight how fathers’ perceptions of technology in the home should be considered and could provide new and important insights into children’s relationships with devices.

A core aspect of CSCW research is to understand the role of technology in the everyday lives of groups of people, and there is growing interest in understanding the role technology can play in supporting parenting. However, existing tools and research usually focus on mothers, with little research specifically focused on fathers [60]. Previous works have focused on fathers’ use of social media platforms [2, 3], revealing differences in how parents present and advocate for themselves online, and emphasising how fathers lament the lack of fatherhood-supporting online spaces [2]. While the body of technology literature regarding fathers is growing, there is a need to further explore how technology can be harnessed specifically to support fatherhood, and the influences that technology can have on parenting and family dynamics.

2.3 Family Dynamics and Technology in the Context of COVID-19

Being in quarantine bears a plethora of psychological and physiological burdens, including for families [44]. Home confinement imposes immediate psychosocial impact on children and families due to changes in lifestyle, physical activity, and mental excursions [33, 48, 85]. During the COVID-19 2020 lockdown, the United Nations estimated that 1.38 billion children were taken out of organised childcare or school [20]. Evidence shows that when children are out of school (e.g., school holidays or weekends) technology use increases, paired with a reduction in physical activity, ultimately resulting in weight gain and poor cardiovascular outcomes [12]. This was likely to be exacerbated in the context of COVID-19; children were left without in-person access to friends, social activities, and team sports, and were confined indoors (early evidence has shown this to be the case for children with obesity during lockdown [81]). Children’s wellbeing can depend upon parental companionship [45]. The pandemic has meant that families have spent more time together and developed closer bonds; however, parents have also been under increased stress associated with the role of parenting [45, 51].

In addition to isolation and social distancing measures, schooling, and financial impacts of the pandemic increased tensions within family units. Many fathers have attempted to work remotely from home, whilst also caring for children and facing demands of home-based education, without respite. We wish to clarify that “work” throughout our study is used to primarily refer to office-based or out-of-home employment, given that most of our participants were employed in managerial or business roles and were able to carry out their employment from home during the lockdown (see Table 1). We acknowledge that for many, “working” outside of the pandemic may typically include caring responsibilities, household chores and out-of-home employment to varying degrees; this was generally just not the case for our participants.

For some fathers, loss of a job or reduced wages further exacerbated the tensions associated with working throughout the pandemic [51], however a “fatherhood premium” meant that many employers in the US were less likely to lay off fathers [31, 80]. During the pandemic there was also a rise of intimate partner violence: “the fear of the disease, the restructuration of the regular household routine, increased time with the partner and isolation from other people outside the household, and economic crises can significantly contribute to the increase of stress in a previously already strenuous relationship” [31]. Increased stress impacts the wellbeing of fathers and their families. Parenting under typical conditions is already challenging, but being a father during the pandemic involved performing multiple roles with fewer resources and less outside support.

A key factor differentiating the COVID-19 quarantine from historical quarantines was the overwhelming presence of technology in peoples’ daily lives [7]. As the 2020 pandemic provoked massive, immediate, and unprecedented changes, technology became central to maintaining social interactions, work schedules and routines. Within the context of lockdown, screens became a common way to mediate ‘joint media engagement’ [86] with friends, family and colleagues through video chats, shared video games, conference calling, and communications on digital platforms. This huge shift in routine provided an opportunity to further explore how technologies are integrated.
into everyday family lives, and to study changes in family practices with technologies in the context of social distancing. Due to changes in societal attitudes and advancements in technology, development in parenting and technology is both a shifting and complex socio-technical context. Looking at pandemic-led abrupt changes to this context can provide insight into the impacts of other swings in family dynamics. This is particularly interesting in relation to how fathers perceive these shifts, as there are indications from narrative accounts that lockdown has spurred reflection on fatherhood and masculinity [47].

3 METHODOLOGY

This research aimed to use qualitative investigation to explore fathers’ perceptions of technology and fatherhood during the COVID-19 lockdown. We applied research and design methods [11] to provide a holistic account of father’s views on personal and child engagement with technology. To achieve this, we first conducted semi-structured interviews to identify fatherhood-related challenges with technology during COVID-19 and to inform the design of four prototype apps. These apps enriched follow-up interviews as prompts to further understand the challenges around fatherhood and technology during lockdown. This work provides an account of fatherhood and technology use during COVID-19 lockdown measures in the UK and draws implications for fatherhood supporting technologies.

3.1 Data Collection

3.1.1 Semi-Structured Interviews. For the initial interviews, participants (n=19) were recruited via social media, word of mouth and advertisements located on a university campus. We recruited self-identified fathers who lived in the UK, were over 18 years of age, and had at least one child of 11 years old (primary school age in the UK) or younger. Participant details are given in Table 1; the fathers had a mean age of 33 years, 18 were in full-time employment, and 14 were living with their children full-time. For each interview, participants were reimbursed with a £10 voucher for their time.

Table 1. Participant Information

<table>
<thead>
<tr>
<th>PID</th>
<th>Live with their children?</th>
<th>Employment</th>
<th>Employed during the pandemic?</th>
<th>Age of father</th>
<th>Age(s) of child(ren)</th>
<th>Interview 1 participant?</th>
<th>Interview 2 participant?</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>Mechanical Engineer</td>
<td>No</td>
<td>28</td>
<td>3, 1</td>
<td>Yes</td>
<td>Yes</td>
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<td>2</td>
<td>Yes</td>
<td>Company Director</td>
<td>WFH#</td>
<td>46</td>
<td>13, 10</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>Leader of Operations Engineer</td>
<td>WFH</td>
<td>29</td>
<td>9, 3</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>Finance</td>
<td>WFH</td>
<td>30</td>
<td>9</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Fathers, Young Children and Technology: Changes in Device Use and Family Dynamics During the COVID-19 UK Lockdown. XX:7

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>Yes</td>
<td>Electrician</td>
<td>No</td>
<td>29</td>
<td>3, 2</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>Administrative Officer</td>
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<td>7</td>
<td>Yes</td>
<td>Research Designer</td>
<td>WFH</td>
<td>44</td>
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<td>8</td>
<td>Yes</td>
<td>Lecturer</td>
<td>WFH</td>
<td>32</td>
<td>1</td>
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<td>9</td>
<td>Yes</td>
<td>Social Services</td>
<td>WFH</td>
<td>47</td>
<td>21, 12, 8</td>
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<tr>
<td>10</td>
<td>SC</td>
<td>Company Manager</td>
<td>As normal</td>
<td>34</td>
<td>14, 12, 7</td>
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<td>11</td>
<td>Yes</td>
<td>Events Manager</td>
<td>No</td>
<td>42</td>
<td>6, 3</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>Yes</td>
<td>Head of Network Engineering</td>
<td>WFH</td>
<td>50</td>
<td>13, 11</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>SC</td>
<td>Sports Coach</td>
<td>No</td>
<td>27</td>
<td>6, 4, 3m</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>No</td>
<td>Civil Servant</td>
<td>WFH</td>
<td>-</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>Yes</td>
<td>Consultant</td>
<td>Reduced hours</td>
<td>37</td>
<td>11, 9</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>No</td>
<td>Environmental Engineer</td>
<td>No</td>
<td>35</td>
<td>7</td>
<td>Yes</td>
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<tr>
<td>17</td>
<td>Yes</td>
<td>Unemployed</td>
<td>-</td>
<td>42</td>
<td>2, 8w</td>
<td>Yes</td>
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<tr>
<td>18</td>
<td>Yes</td>
<td>Sales Manager</td>
<td>As normal</td>
<td>38</td>
<td>5, 3</td>
<td>Yes</td>
</tr>
<tr>
<td>19</td>
<td>No</td>
<td>Firefighter</td>
<td>As normal</td>
<td>32</td>
<td>3</td>
<td>Yes</td>
</tr>
</tbody>
</table>

WFH = Working from home; The participant is primarily carrying out their employment from home.

SC = Shared custody; The participant lives with their children part time, whilst the children also spend a portion of time living with the other parent/elsewhere.

Note: "As normal" means that participants employment schedule has not been affected by the COVID-19 pandemic.
"Reduced hours" means that whilst the participant is still working the same employment, the scheduled working hours have been reduced.

Interviews were semi-structured, with questions surrounding fathers’ perspectives of their child’s activity and screen-viewing behaviours, and the impact of COVID-19 public health measures on these behaviours. We have attached the interview guides as supplementary material, to provide an overview of the questions asked during each interview session. Interviews were conducted Skype or Microsoft Teams on an encrypted laptop. These were audio recorded, and their durations ranged from 17 to 52 minutes (M = 37.57 ± 11.3 minutes). Some participants gave long and detailed answers to the questions, prompting deeper and longer discussions that occasionally moved beyond the scope of the intended interview content. Conversely, some participants provided brief and succinct answers, without offering as much detail. For this reason, the interviews varied noticeably in length. Due to participants’ childcare responsibilities within the home, interviews were frequently interrupted (e.g., children entering the room). These interruptions were not transcribed and were not analyzed.
Invitations for follow-up interviews were sent to all recruited fathers from the first interviews. Researchers received 15 responses; of those, 12 accepted the invitation to take part in a second interview. Analysis of first interview data informed the development of the second interview guide and mobile phone application prototypes. The second interview guide covered issues that had emerged from the first interviews - including SV monitoring practices, non-digital activity idea generation, and perceptions of self-care - and prototypes were used to provoke deeper reflection on the more extreme aspects these issues (e.g., digital tracking of child SV). Prototypes were shared with the participants via screen sharing. Again, interviews were carried out using Microsoft Teams or Skype and were audio recorded; their durations ranged from 37 minutes to 1 hour 02 minutes (M = 50.42 ± 7.96 minutes).

3.1.2 Design of Fatherhood Application Prototypes. The prototype design process was informed by the 'design thinking' framework [32]. The process is comprised of five stages: (1) empathize (understand the needs and values of the user), (2) define (describe user needs based on user insights), (3) ideate (generate design ideas), (4) prototype (implement a physical design) and (5) test (provide users with a prototype and illicit feedback). Stage 1 of this framework was carried out during the initial semi-structured interviews: empathising with fathers to better understand their needs, perceptions, and attitudes. This led to Stage 2 of the framework, as interview findings helped us to develop ‘problem statements’, reflecting the main concerns raised by fathers. From here, we designed prototype applications to further understand these issues (Table 2).

The themes that led to the development of the four prototype apps are provided in more detail in Table 3. We have provided the overarching themes that arose from the data, the sub-themes within these, and the specific apps that they were linked to. For example, “Self-Care” was a sub-theme that emerged in the first round of interviews - within the overarching theme of “COVID-19” – with the pandemic aiding or negatively impacting self-care, to explore this further it was decided that one of the apps should focus on self-care so we could explore that dynamic in greater detail. We screen recorded interaction flows of the prototype applications and presented the videos to the participants in the follow-up interviews, to prompt and investigate father’s experiences [92].

Table 2. Problem statements with corresponding prototype apps.

<table>
<thead>
<tr>
<th>Problem Statement (PS) and Description of Prototype App</th>
<th>Screenshot of Prototype App</th>
</tr>
</thead>
</table>

PS1) Fathers reported an increase in children’s screen time during lockdown. This was often a result of ‘passive-parenting’, to allow fathers to perform other tasks.

The "Monitoring App" aimed to further explore fathers’ perspectives on screen surveillance, by allowing monitoring of device use for all family members within the household - including parents. This included time spent using devices and the specific content accessed. The app also paired with a behavioural log for the child. Using this prototype, second interviews prompted questions around acceptability of screen surveillance, concerns for child privacy, and fathers’ perceptions of the link between children’s behaviour and screen use.

PS2) Father’s self-care is the first thing to be sacrificed when time is short (the most dispensable form of time). The impact of this can build up over time and lead to effects on mood.

The "Self-Care App" aimed to explore father’s perceptions of their own self-care habits. Whilst the father carried out and logged a self-care activity for himself, the app would automatically send a screen-based distraction to their child’s device. This prototype was used to help us understand father’s self-care routines, any perceived barriers to self-care, and how fathers felt about using screens as a distraction for their children.

PS3) In light of COVID-19, fathers are reporting a negative change in their usual home dynamics and routine, for example, increased tensions and bad behaviour. Additionally, many have highlighted an increase in screen time among their children.

Drawing insight from similar work [22], the "Virtual Garden App" aimed to explore the link between screen viewing and home dynamics. The app classified specific examples of SV as positive (e.g., watching a documentary) or negative (e.g., playing X-box for 3 hours), and instances of these SV activities would directly result in positive or negative changes to a shared family garden. For example, positive screen time could cause existing or new flowers to grow, small animals to visit the garden, or vegetables to be planted; Negative screen time could cause existing flowers to wilt, unfavourable weather conditions to destroy garden structures, or fruit to fall from trees. The more "positive" screen time, the "better" the garden would grow, and vice versa. The app also included a "friends list" feature to allow families to view each other’s gardens, introducing a means of potential comparison and insight to other family’s SV habits. Using this prototype, second interviews focused on using screens for family bonding, SV-related tensions, the perceptions of positive or negative SV, and societal pressures associated with SV behaviours in the home.
PS4) Fathers are struggling to think of non-digital activities to do with their children.

The “Activities App” aimed to further understand the idea generation process and why fathers struggle with this. The app presents fathers with a wide range of activities, which could be filtered by factors such as child age, weather, and distance, etc. Using this prototype, second interviews prompted further discussion on father’s particular struggles with idea generation, how this differs from their children’s mothers, and any advantages that an app like this would provide for fathers in particular.

3.2 Data Analysis

We applied an inductive approach to analysis with the objective to gain in-depth insight into the lives and experiences of participants, rather than drawing on a specific theoretical lens to make sense of participants’ views. We were particularly interested in participants’ lived experiences (e.g. [59]) and drew on a similar inductive approach [13].

All interviews were transcribed verbatim, anonymized, and imported into NVivo 12. Using the framework method [43], thematic content analysis was conducted by the authors on a subset of the first semi-structured interviews (n=6) and the second interviews with the prototypes (n=4), enabling themes to develop that reflected the personal experiences and views of participants. Data analysis comprised of several stages: (1) data familiarisation, (2) thematic coding and framework development, (3) framework application and (4) assimilation. Familiarisation involved the study team independently reading and re-reading transcripts, immersing themselves within the data and individually identifying emerging themes. The authors then iteratively reduced the data into overarching and sub-themes to develop a thematic framework. These themes are outlined in Table 3. Each theme was discussed by the study team and were reviewed again once the framework matrix was complete.

This framework was then applied to the rest of the dataset facilitating deductive analysis. Each team member was allocated a subset of transcripts to code. Daily team discussions ensured coding accuracy and consistency, and allowed refinements to be conducted regularly throughout the analysis process. Any changes were discussed by all authors in detail and any additions/refinements to themes were voted on. Authors collaboratively selected the most representative quotes to illustrate these themes from across the interview datasets. This process was conducted entirely online due to United Kingdom lockdown restrictions. Analysis discussions were held on Microsoft Teams or Zoom. This required a high level of “digital competence” from all authors and anecdotally increased the duration and complexity of the process compared to face-to-face analysis meetings.
4 FINDINGS

This research took place during a time of societal and economic uncertainty, meaning that all research themes are underpinned by immense personal stressors and pressure felt by the fathers and their families. Factors such as lockdown, social distancing measures, and new requirements to work from home have instigated changes in the home life/work dynamic. Within this context, both sets of interviews revealed consistent themes, specifically: occupying children with technology during lockdown, COVID-19 Parenting within the Pandemic, All Home dynamics within the Pandemic, All COVID-induced Challenges, All COVID-induced Changes, All Current Technology Use, All Societal Views of SV, All Virtual Garden, Positive vs. Negative, Virtual Garden, Impact of Social Comparison, Virtual Garden, SV to Manage SV, Monitoring, Monitoring (incl. Privacy), Monitoring, Age Considerations, Monitoring, Child Specific (incl. Behaviour), Monitoring, SV to Distract Children, Self-Care, Types of Self-Care, Self-Care, Gender Differences, Self-Care, Mental Health, Self-Care, Influences to Self-Care, Self-Care, Perspectives, Self-Care, Parental Differences, Activities, Idea Generation, Activities, Father Specific Benefits, Activities, COVID-19 Activities, Activities, Specific App Ideas, Activities.
barriers to non-digital activities, idea generation for activities beyond screens, increased use and monitoring of technology, a wider range of uses for technology, and less time for self-care.

4.1 Occupying Children with Technology During Lockdown

Screen viewing can be used by parents as a “babysitter” for many different reasons [15], particularly during times that the parent needs to concentrate on another activity. This result was found in a study of mothers’ perceptions of screen viewing, where it was reported that screens were used by children during times that the mother did not want to be interrupted (e.g., sleeping-in in the morning) or was busy elsewhere (e.g., preparing a meal) [8]. This was also captured in the current study, as screen viewing was used during lockdown as a way to occupy children while fathers undertook routine activities (“if we’re trying to make dinner, then we will let them play on the phone or the computer, whilst we’re doing that” [P3, Int1]). However, the change in context where many participants’ families were at home together for most of the day increased the number of activities that the children needed to be occupied for. Participants described an increased use of screens to occupy children during lockdown in ‘emergency’ situations: “I think we probably have had to resort to the emergency TV a few more times than we normally would” [P8, Int1]. Despite our participants having children of a range of ages, using screens to distract children was not restricted to any particular age group: “yeah, I think we’ve all been there” [P8, Int2] (child aged 1) and “Yeah [SV as a distraction is acceptable] as long as I choose something that’s educational and rewarding” [P2, Int2] (child aged 9).

Most fathers expressed that screen viewing at home is typically regulated in some way, but that COVID-19 had inadvertently caused them to take a more flexible approach: “I wouldn’t want them playing computer games [normally] but we are at a loss, you know, what to do. It’s not just trying to find something to do today, it’s trying to do that every single day, whilst working” [P15, Int2]. Technology boundaries were in flux in as fathers adapted to conducting most activities at home with children present. SV became used as a way to settle children as a new part of the household live/work dynamic: “we used to be able to settle them down with screen viewing as a treat, now it’s become the norm” [P5, Int1]. One of the biggest challenges reported was that fathers who started working from home felt guilty for encouraging their children to consume more media as a method of ‘passive parenting’: “I think I would always tend to see screen time as more of a last resort, and it has been more of a resort in lockdown” [P6, Int2]. Children are able to independently access and use screens from a young age, and this was used to divert attention away from their parents (“a distraction, in a sense” [P5, Int2]) and other, potentially loud, activities (“it’s a good way to keep them quiet, even if it’s just ten, fifteen minutes” [P1, Int2]. Fathers reflected on the difficulty of occupying their children throughout the day, and the supportive role that technology can play: “It’s pretty difficult to keep them active and their minds occupied throughout the day without relying on screen time a little bit more than we would in the usual day to day.” [P13, Int1].

Consistent with previous literature [8, 15], the practice of babysitting using technology was present in these findings, although the number of activities it was used for had increased significantly within the context of COVID-19. This was a direct result.
of changes in the life/work dynamic in many of the participants’ homes. Screens were used more often as a last resort or when a child’s attention had to be diverted in ‘emergencies’, but were used in a more sustained way as a means to quieten, distract and occupy children as a part of the new ‘normal’ family dynamic.

4.2 Barriers to Non-Digital Activities, Both Technological and Situational

At the time of data collection, non-digital activities that used to be possible were severely limited due to social distancing and lockdown measures in the UK. Some fathers reminisced about pre-COVID times and the outdoor, non-digital activities they could engage their children in: “I’d like it to be the way it was. I’d like us to be out all day, you know with a picnic and that sort of thing but that’s not possible at the moment” [P7, Int1]. Lockdown meant that even outdoor activities that were still possible were very different or hard to execute, as taking young children out of the house meant controlling the child’s distance from other people: “I have found it hard to take them out and get them out for walks and stuff on my own” [P5, Int1] and “you tell a two-year-old that she’s got to stay away from people and, you know, give people two metres, it’s very difficult” [P5, Int2]. Participants described a fear of taking children out of the house to engage in non-digital activities: “The furthest my kids have got is to the bottom of the cul-de-sac on the road […] we’re scared to take them out” [P3, Int1] and “You’re just so worried about bumping into people. Literally, you’re so worried about other people, about other people coming near you and coming near the kids, because you’re so scared about it [the virus] being passed on to you” [P9, Int2]. In some situations, staying at home and using technology with children was considered a safer option.

Due to restrictions on activities outside of the home and balancing working from home/parenting responsibilities, fathers reported using screens instead of engaging in non-digital activities and spending quality time with their children. This contravention of boundaries led to feelings of guilt and/or shame for some fathers: “I do feel bad in the respect that maybe I could’ve got them out and about more, you know into the countryside and stuff like that but with our situation” [P8, Int1]. Others expressed that they would prefer to see their child engaging in activities that were more active, or not a ‘waste of time’: “[screen-viewing] just doesn’t sit right and I suppose I’d rather they were more active than spending all of their time in front of the tele” [P1, Int1].

Whilst there were conflicting sentiments surrounding increased screen time during the pandemic, many fathers were actually in favour of using technology to promote quality time with the family. Many felt this to be an attractive option as long as the time spent doing so is limited or moderated: “Any other device to promote family time is fine. In moderation, it’s fine” [P1, Int2]. Some reflected on existing technologies used to connect as a family (e.g., “we watch a film together so we do use technology, and obviously sometimes me and [CHILD’S NAME] will sit there and play Mario Kart together” [P4, Int2]). Some fathers gave specific reasons that they would use technology to promote quality time, for example, if they felt it was necessary or if it added to their family connection. Some suggested that an app similar to the “Virtual Garden App” would help to facilitate family time: “I think if it was engaging like that garden app then I think that would be useful” [P14, Int2]. However, other fathers placed higher value on using non-digital means to encourage family connectedness (e.g., by going out and doing other things).
doing activities together). These fathers emphasised the importance of bonding without technological support: “spending time together and talking is as important as it is sitting in front of the tele and relaxing together” [P19, Int2].

Some participants reported concerns that screen viewing itself was a barrier to engagement in off-screen activities; for example, some fathers observed that ‘too much’ screen time gave rise to obvious changes in child wellbeing during non-digital activities. Particularly, with increased opportunities to observe child behaviour during lockdown, some fathers noted a connection between perceived poor behaviour and screen viewing. The links reported included children showing resistance when screens are removed, mirroring negative behaviours they see on screen (such as using bad language), or displaying changes in mood post-screen time: “If it’s something like the Teletubbies which she is engaged in and you just close the tablet down then she can get agitated” [P14, Int2]. This finding has been reflected previously in a study on mothers’ perceptions of screen viewing, which found that switching a child’s attention from SV to other activities can be a source of tension [8]. Fathers were also concerned that screen time could have a negative impact later in the day: “So when you remove screen time, then you will notice that they will be short tempered” [P7, Int1].

4.3 New Struggles for Non-Digital Activity Idea Generation

Parents of young children vary greatly in what types of experiences they value for their children, and therefore vary the types of experiences that they offer [15]. In this work, the “Activities App” prompted discussion surrounding idea generation for non-digital activities, with fathers specifying that they use the internet, social networks, and word of mouth for this purpose. Fathers reported a broad range of influences over their non-digital activity choices: most commonly cost and weather, but also educational value and perceived enjoyment. Some participants suggested that the amount of time a parent spends with their child could impact the types of activities the parent would suggest doing, indicating that fathers would particularly struggle with this: “fathers probably are generally less likely to spend as much time with their kids. So, yeah, they struggle with the idea generation” [P1, Int2] and “mums probably have a more detailed… they know more of what’s surrounding them, in regards to activities for kids” [P5, Int2].

Further, COVID-19 social distancing and lockdown measures severely impacted fathers’ activity choices, with some noting that “a lot of stuff [activity decisions] is taken out of your hands” [P14, Int1] and “the catalogue of choices has dramatically, you know, decreased” [P15, Int1]. Participants also described being stuck in the house and constantly having to think of new non-digital activities to do: “We can’t do what we want to do, so having to basically think on our feet and fill hour by hour with whatever we can find in the house” [P19, Int1]. These issues together sometimes led to issues of identity, as participants connected these quality time activities with their sense of what fatherhood is: “It’s [COVID] made it [choosing activities] really, really difficult in all honesty. It’s been one of the most difficult periods I have had as a father” [P5, Int1].

Fathers’ struggles to generate non-digital activity ideas led to a perceived increase in screen-based activities, particularly as the availability of technology in the home was not influenced by lockdown measures: “at the moment with the lockdown, obviously not too much to do, so they do spend quite a bit of time on it [screens] at the moment.” [P10, Int1]. Most participants lamented the reduced physical exercise that their children were
engaged in because of the reduced activities they could do outside with them: “Obviously in quarantine they’re not doing as much [physical activity] as they, anywhere near as much as they normally do” [P10, Int1]. Participants also felt that their role as a father includes encouraging their children away from screens towards non-digital activity choices, because children would always opt for screens if given a choice: “if I let them, they’d probably just sit there either on their phone, or watch TV, or something” [P10, Int1]. This connection between fatherhood and non-digital activities was expressed by many participants: “I think there’s this kind of, sometimes there’s this kind of definition to father/child relations where the dads do the big outings, the football matches or whatever” [P8, Int2].

Fathers were open to using technology (such as the “Activities App”) to help them to think of activities to do with their children. Many participants indicated specific times or situations that they would use a technology like this, for example when caring for their children over the weekend or when a partner is at work: “my wife will be working sometimes, and I’ll be left with the kids. And I don’t have all the ideas of what to do with them” [P1, Int2]. Participants also perceived the value in supporting fathers specifically with these kinds of technologies, citing that fathers are less likely to have an existing, fatherhood-based support network than mothers: “…dad would use it [the app] more, but mum can rely on own knowledge ask parents or friends” [P14, Int2].

Overall, fathers expressed a range of influences over their activity choices, but felt that COVID-19 had presented limitations for the kind of activities they could engage in. Fathers struggled to generate new ideas that were both safe and indoors, citing that mothers are usually better placed for this job, leading to an increase in technology use and a decrease in outdoor/physical activities. These activity limitations paired with the new stressful life/work home dynamic was a source of pressure and identity questioning for some participants. Others also felt that their role as a father includes a responsibility to encourage children to take time away from screens. Fathers perceived a gap for fatherhood supporting technology in the realm of idea generation.

4.4 Higher Levels of Technology Use and Technology Monitoring

Participants reported that technology use increased during the COVID-19 lockdown, with most suggesting that their children “are spending a lot more time than they would normally on screens” [P2, Int1]. This increase in the amount of time children spent using technology was consistently perceived as impactful on the family and home dynamic: “it’s a constant battle for us, we are concerned they are spending too much time on their iPhone, or PlayStation or Kindle, so yeah we are constantly aware of that and trying to monitor it” [P2, Int2]. Many highlighted how they adapted their SV monitoring practices during the lockdown. When using the “Monitoring” prototype as a prompt, some fathers expressed a willingness to supervise their children’s screen viewing, although they generally reported that they like to trust their children with regards to specific content: “Do you want to be surveilling your kid or do you want to develop some kind of trust?” [P8, Int2]. Those with older children attempted to monitor their children’s use of digital devices in the home. Monitoring rules may be influenced by fathers’ personal perceptions of SV, the quantity of SV being engaged in, and a desire to know the type of content children are engaging in: “We don’t feel they should
spend too many hours a day in front of a screen and we want to know what they are doing with that screen whether its watching TV, playing games or what have you” [P2, Int1].

Screen viewing ethical and privacy considerations were more prevalent in fathers with older children, although fathers of younger children suggested they would consider this in the future: “I think this [SV privacy] would be more of an issue if you had older children, like a 13 or 14-year-old” [P6, Int2]. Fathers would like an awareness of screen viewing activities but would also like to let their children maintain autonomy and privacy in social media engagement: “I mean he has to have a certain amount of privacy, but he is only 9 at the moment” [P4, Int2]. Additionally, fathers recognized the potential contradiction of using screens to manage screen activities but did not necessarily think that this is problematic. Many highlighted that digital solutions such as the “Monitoring App” are the most efficient method for monitoring and managing screen viewing within the home: “As parents, you can’t always be watching them 24/7, and seeing everything that they're doing because, you know, you’ve got a million other jobs to do or get on with” [P5, Int2]. Fathers perceived this kind of technology as acceptable, in terms of using it to generate an overview of family members individual screen viewing activities. Some noted that they already had similar applications installed on their own devices: “I was looking at my own screen family screen time stuff, and some of it was very similar [to the “Monitoring App”] in terms of separating like games, social media, that kind of stuff, and putting limits on that, stuff like that” [P9, Int2].

Overall, for most participants’ children, “screen time is basically higher now than it was before COVID-19” [P3, Int1]. This change in household norms impacted family dynamics, particularly with regards to how fathers see quantity of screen time as something that should be measured. Although fathers suggested that children should have some privacy (dependent on age), they were interested in knowing how much and what type of screen time their children were partaking in, and would not mind using screens to monitor screens.

4.5 Technology Use for a Wider Variety of Purposes

Whilst fathers expressed that children’s technology use increased across all modalities during lockdown, the purposes for the screen use differed due to the changes in home dynamics. The “Virtual Garden App” prompted fathers to evaluate their perceptions of positive and negative technology use, particularly in relation to the changes in SV purpose during lockdown. It emerged that the context of screen viewing was strongly indicative of whether the SV was considered to be positive or negative. For example, online communication with extended family and friends increased during lockdown, and was largely viewed as a positive use of SV: “you can take a positive out of when he is on his computer, because you know socialising with his friends, he can’t do that at the moment” [P16, Int2]. Value and duration appear to be key determinants of this context, as well as content: “watching TV for hours on end or Netflix or YouTube or playing computer games, I suppose, is all quite negative. And positive, I can only really think educational or like mindfulness things” [P1, Int2].

The closure of schools and childcare led to a stark change in technology use regarding educational screen time: “what we are doing with the screens has changed as
well, I think, to be more, to support the home schooling” [P11, Int1]. Whilst the SV context was educational, fathers felt conflicted by the increased levels of technology use: “they are sitting on their laptops more often than they used to, because they‘re doing their homework on their laptops now” [P12, Int1]. The move towards digital-based education was a big shift for some households, with some fathers highlighting how their children were using new devices to support their education: “[Child] is now getting his schoolwork online so now he is having to use a laptop which he never really did before” [P11, Int1]. However, these new engagements with a broader range of technology were not always seen as positive, and were sometimes seen to be forced on families by education providers: “it’s as if the school is pushing us to use devices” [P7, Int1].

With more time spent using technology and schools encouraging SV use to support education, fathers reflected on their perceptions of positive and negative screen time for children: “I think it’s [lockdown] made me more in tune with it [the benefits of SV], because obviously they haven’t been going to school, so there has been a lot more screen time” [P9, Int2]. Most fathers identified specific instances of positive or negative technology use, although many suggested that this categorization is subjective and may in part be reflective of their own SV habits. One father reported how he did not feel that screens were inherently positive or negative - it depends on how the screens were being used, and the activities that were being undertaken on them: “But on the other side that I see it we have a lot of access to on the TV or tablets or be it whatever it is a very educational and you know stuff that is good for the children so I don’t think it’s all bad but I really, it all depends on what the screen time is” [P7, Int1]. Many fathers reflected on technology use to support education was a positive form of SV: “We’re looking at things like [BBC education show] for example, we’re using technology mediums in a positive way as well for the children both [Child 1] and [Child 2]” [P4, Int1]. Fathers had varied perspectives of the inherent value of different types of technologies, with many not perceiving different modes and types as equal.

Fathers reported that COVID-19 measures caused an increase in technology use in children across a range of contexts (e.g., education, socialising). Whilst education-based screen viewing was generally perceived as positive due to the apparent value of the content, some internal conflicts arose as fathers reflected on the balance of positive content versus the time spent using screens. Fathers identified inherent perceptions of positive and negative screen viewing, generally differentiable by the content and context. Some highlighted how these perceptions had changed during the pandemic.

4.6 Lockdown Limiting Self-Care and Influencing Stress

Whilst we did not initially set out to discuss self-care with participants, this was discussed at length in the initial interviews, which we then explored further in the second interviews with reference to the “Self-Care App”. Fathers discussed what constitutes as self-care for them, often providing specific examples of how they engage in self-care within their daily lives. Surrounding these discussions, barriers to self-care routines was a prevalent theme, and many expressed how they had already experienced a big shift since becoming a father: “I mean before [child] it’d be easy for me to just take as much time as I wanted to for self-care, but now obviously you are restricted”
These changes to self-care within the context of fatherhood were reported to be a consequence of childcare and household responsibilities; this was amplified with the pandemic-related changes in family dynamic with most families stuck at home: “It’s like one [school] holiday from hell” [P15, Int1].

Fathers reported changes to their personal self-care routines in light of COVID-19 (“because I haven’t been to work in all this time, so I probably have slightly more free time to do things related to self-care” [P1, Int2]), with many reporting a reduction in time spent on it: “It [lockdown] is quite relentless. And I think it can feel like entire weeks go by where you only had an hour to yourself” [P8, Int2]. Some participants suggested that their self-care has been limited due to the closure of places that they equate to self-care (e.g., gym, swimming pool, football, pubs): “Like I say things being closed down at the moment, it being the way it is, you are limited essentially” [P16, Int2]. Other self-reported barriers to self-care included laziness, work responsibilities and routine. Some participants described how they used workarounds to engage in some level of self-care, to try to counter a decline in mental health (but perhaps causing other issues): “in terms of time for self-care and mental health or whatever, it’s not sort of you know, declining in a major way, but I definitely notice more, yeah, more tiredness, or you know, trying to find time alone sometimes means staying up a bit later and then that has a knock on effect in terms of trying to work, and doing other stuff” [P6, Int1] and “it’s all or nothing that my gym’s been shut down, I can’t do that anymore. So I’m just going to give up. So I just started eating and drinking more” [P9, Int2]. Alongside this was a higher appreciation of alone time for some participants, and family time for others. There was also a contrast between some fathers finding time for self-care, but others noticing that self-care was not a priority. Fathers were receptive to the idea of the “Self-Care App”, with some suggesting that a self-care promoting app would create an intrinsic, psychological motivation to engage in these activities. Many also highlighted that being presented with a variety of examples of self-care in an app like this would provide them or other fathers with novel ideas for self-care activities (e.g., yoga): “if I had that app, I would certainly give it a go and I’d certainly try other things” [P9, Int2].

Some participants specifically mentioned mental health, and highlighted increased feelings of anxiety during the pandemic; this was no doubt mediated by a reduction in time available to spend on self-care. Some suggested that changes to their role as a father had impacted their stress levels: “I’m trying to describe what the effects of COVID and home teaching and being a dad in these circumstances, it’s quite hard for me to even, kind of, sum it up, cause I’m kind of a bit perplexed by it myself” [P15, Int1]. Some fathers shared specific emotional concerns related to the pandemic itself, and many reported feeling anxious about leaving the house. Other fathers felt concerned about what types of damage the entire shift in family life might cause to their children: “there’s also a kind of emotional and psychological challenge of wondering how this is going to affect, you know, affect my child in the long run” [P6, Int1].

Participants talked about the overall anxiety felt at a family level linked to everyday stressors (“the practical challenge, all the day-to-day things” [P6, Int1]) and how these feelings were accumulating as lockdown progressed: “We are treading water in this house over the last six weeks” [P15, Int1]. This is a time where social comparison or competitiveness would have been un-welcome, and fathers could be resentful of external judgement on their family’s technology use rules. This was a topic prompted...
using the ‘Virtual Garden App’. However, some fathers were enthusiastic about the potential to see and judge other family’s SV habits, joking: “I’d be shaming all the parents for not doing enough. And when they’ve let their garden go to sh*t, I’ll be saying, ‘Your garden’s sh*t, look at mine! You’re sh*t parents!’” [P9, Int2]. Others considered how this kind of comparison might contribute to negative mental health effects for their children: “if someone else’s garden is doing better or whatever, I know what type of person [child] is, [child] would get upset by things like that” [P16, Int2].

Pandemic-related anxieties resulted in less alone time for most participants, and fewer opportunities to engage in self-care activities that might benefit their mental health. Fathers identified what self-care means for them and how it coincides with fatherhood responsibilities. Particular stresses about new roles as a father, long term effects on children, everyday practicalities, and the pandemic itself led to many of the fathers talking openly about how their mental wellbeing had suffered during the lockdown.

5 DISCUSSION

Data collection took place between March and May 2020, a period of economic, familial, and health uncertainty, when the UK had social distancing and lockdown measures in place. During this time, fathers were quarantined at home with their families, experiencing a new life/work dynamic and spending more time with their children. The pandemic forced fathers to take on new household and parenting roles, in order to support their family and to accommodate familial changes, whilst in many cases still sustaining traditional responsibilities (e.g., wage earner) that were tied up with their sense of self and presentation of self [46]. This provided us with a unique context in which to explore fathers’ perceptions of technology use, fatherhood, and family dynamics in the home, and to better understand the potential role of technology in supporting fathers’ roles. Pre-pandemic research suggests that there is tension between the roles of the ‘new father’ with regards to cultural expectations versus the actual conduct of fathers [91]. This is influenced by little choice (both perceived and actual) with regards to flexible working to therefore reduce the traditional, masculine ‘breadwinner’ role [29]. However, our findings highlighted a lockdown-related exacerbation in fathers’ struggles with these roles, including maintaining a digital balance in the home, and how this impacted their mental wellbeing. It is important to highlight that while we do not consider technologies as neutral actors in our participants’ households [93], we do not frame participants’ technology use as inherently problematic or good for children.

5.1 Fathers as Gatekeepers to the Digital Balance

Alongside typical fatherhood roles, contemporary fathers are faced with the challenge of maintaining digital balance in the home. Previous work has outlined a spectrum from ‘gatekeeper’ to ‘scaffolder’ in terms of parental mediation of children’s screen viewing habits [19]; the gatekeeper restricts the child’s screen time with strict rules and monitoring, whilst the scaffolder takes a more supportive position in negotiating technology access. Fathers in this study demonstrated qualities for each of these roles,
with some enacting time and content restrictions on children’s technology use, and others taking a more nuanced approach (e.g., using strategic screen viewing to “babysit” their children). Our participants openly discussed how the pandemic had caused them to re-evaluate their screen viewing boundaries; as households adjusted to a new norm, pressures to consistently keep children busy caused fathers to transition from a gatekeeping stance towards a more scaffolding stance. As such, there were multiple examples of “scaffolding style” parenting by fathers in our work: screen viewing restrictions were relaxed, normal routines were abandoned, and fathers more commonly relied on screen time as a support to entertain or occupy their children (e.g., resorting to “the emergency TV” [P8, Int1]). Fathers were aware of this transition, and often referenced it with discussion of how rules ‘used to be’ compared to now (e.g., “I would always tend to see screen time as more of a last resort, and it has been more of a resort in lockdown” [P6, Int2]).

In spite of the COVID-induced movement towards a scaffolding approach, we also observed many gatekeeping qualities from our participants. Consistent with the literature [63, 56], many fathers in our work expressed interest in monitoring their children’s screen time to some extent, particularly the SV content and time spent using devices. We also found that screen viewing mediation was linked to the inherent value that fathers place on different forms of screen viewing, dependent on the context (similar to [87]). Despite some concerns surrounding child privacy and trust, fathers in our work were generally receptive to using apps to track children’s screen viewing – especially during times where parents are very busy and cannot physically be monitoring the child using the device. This suggests that whilst fathers may involuntarily move toward the scaffolding end of the spectrum during times of flux, a monitoring app (similar to that used in this work) may help fathers to retain and enact their typical screen viewing boundaries.

Consistent with previous work, our findings also emphasized how child age influences the context in which fathers view ‘acceptable’ SV behaviour [19]. This includes a reduction in the level of monitoring - or the intensity of gatekeeping - and an increased perception of the privacy required by children, contrasting with previous HCI research which found that parents monitor SV through a prism of negativity [75]. Representing these topics metaphorically through the “Virtual Garden App” facilitated fathers’ reflections on the digital balance in their own homes. If an app like this was developed in the future, it could provide fathers with a platform upon which to discuss the digital balance with their children in a way that is comprehensible to them. Specifically, fathers could address time spent engaging in technology use, the value of different SV content, and how individual family members together contribute to the digital balance of the household. This may be particularly beneficial, as previous work [10] outlined how teens perceive their parents’ discussion around screen use to focus more prominently on which behaviours to avoid, and not which behaviours are acceptable. The same study found that parents and children equally struggle to adhere to screen time rules within the home, so an app that tracked all family members activities may help to address rule adherence for all members of the household.

Our work also highlighted differences in technology use as a result of COVID-19. Whilst the traditional role of the father is associated with rule making, control and obedience-demanding [4, 54], the pandemic has emphasised some flexibility among
fathers in how technology rules are enforced. We have captured fathers updating their rules and perceptions of digital balance in the home to accommodate their children’s new educational, social, and childcare needs. Specifically, we found that fathers relaxed their technology monitoring and management practices during the lockdown, with many reporting that their children were engaging in more screen time than they would normally. This is similar to findings in previous research, which showed that that school closure (e.g., weekends, school holidays) influences parental practices relating to SV [38]. In a different study [56], parents shared how they relax screen viewing practices around rare situations that are particularly “...challenging, tedious, or frightening [for children]”, e.g., on plane rides, or during medical procedures and appointments. Given the challenging contexts surrounding COVID-19 – including those that may potentially frighten children, such as being unable to leave the home, attend school or see family members – it is unsurprising that fathers in our work also reported relaxing their own children’s screen habits. This was further exaggerated as the turning off of screens may normally be initiated using routine “end times” [56], which may have been harder to establish during the lockdown as family routines deviated from the norm.

Our work supports the evidence that changes in circumstance and context impacts fathers’ values around technology, but also suggests that fathers’ views and practices of child SV monitoring and management are more fluid than previously thought. These findings provide implications for technology designs that aim to support sustainable media practices; particularly, fatherhood-supporting technology should not lean heavily into either a ‘gatekeeper’ or ‘scaffolder’ approach for mediating children’s SV, as fathers move between the two in a context dependent manner.

5.2 Technology Design to Support Caregivers

Caregiving in a constrained setting (e.g., as a single parent, an informal caregiver) may lead to more challenging experiences that would benefit from technological support; the COVID-19 pandemic caused situational constraints for caregivers, and our participants juggled with parenting, household, and professional responsibilities.

Our findings build on previous work outlining opportunities to support informal caregivers [e.g., 9, 49, 70, 84, 94]. Many opportunities have been identified, including improving awareness of existing solutions, fostering meaningful interactions among caregivers, and drawing attention to caregivers’ own wellbeing [9]. The importance of caregiver’s wellbeing also emerged within our findings, as we found that fathers struggled to balance new responsibilities alongside maintaining self-care routines. One of our aims was to better understand how technology specifically can support fathers within their role as a caregiver. Technology solutions for caregivers to track their health and aid relaxation – similar to the “Self-care App” proposed in our work – have been found to be desirable as a means to support caregiver wellbeing [9]. We have built on this by identifying specific methods that an app could aid relaxation; particularly, by suggesting timed, varied self-care activities that the caregiver can easily access and follow. Another study proposed a digital system to indicate caregiver stress using colour intensities (i.e., light = calm, dark = stressed), allowing others to acknowledge the stress and respond [94].

Fathers are one of many types of caregivers who balance multiple roles simultaneously, so it is unsurprising that the potential role for technology to support this has already been highlighted [70]. We found that the difficulty in maintaining these roles was only emphasized by the pandemic, which resulted in an increase in ‘passive parenting’ among fathers as they used technology to entertain and distract their children. One study highlighted how digital systems could account for multiple responsibilities, for example, by allowing other individuals to track and monitor the caregivers’ roles [70]. In the context of fatherhood, this kind of technology might visualise the household chores, working and childcare responsibilities of the father, allowing other adults (and older children) within the family unit to step in and take on duties, in order to relieve some of the work burden. Similar work suggested the implementation of a warning system to alert other adults if the caregivers are overburdened [94].

One study [84] looked in more detail at the challenges faced by informal caregivers, including how sudden role-shifts induce the forced “learning” of new caregiving practices. The authors describe two stages of getting to grips with these new roles; the first is “coping” (realising that things aren’t going to change, feeling shame around certain new behaviours), and the second is “progressive acceptance” (realising the role is a fixed reality, becoming expert in new knowledge). We can draw a parallel between these stages and the COVID-induced new caregiving role placed upon fathers. We interviewed fathers within the early weeks of the COVID-19 pandemic, and found fathers describe themselves as stuck in the “relentless” [P8, Int2] situation, resorting to “the emergency TV” [P8, Int1] to help support their additional caregiving responsibilities. A quote from one father reads: “It’s not just trying to find something to do today, it’s trying to do that every single day” [P15, Int2]. This scenario closely resembles the “coping” stage. As the pandemic continued, we saw fathers challenge their perspectives around technology use, and begin to learn and evaluate how screen viewing can positively integrate into their children’s routines (e.g., home schooling, contacting friends). Whilst our study did not include interviews from the end stages of the COVID lockdown, other research has reported that parents found themselves surprised by how the pandemic positively impacted family relations [40]. Together, this exemplifies how fathers may have transitioned toward “progressive acceptance” as their new responsibilities become fixed over time.

Many informal caregivers are often unable to leave the home due to caregiving responsibilities – similar to how fathers in our study were unable to leave their homes during the COVID-19 pandemic. Previous work proposed that online social platforms have a particularly important role for fast, easy socialising during the infrequent breaks that caregivers have [94]. Alongside social support, there is evidence to highlight how these systems could be used for seeking information, personal experiences, tips, and advice [65]. In this way, it is clear that there could be numerous potential benefits of an online “social” system for caregivers, including for fathers.

One study investigated the acceptability of a sensor-based system that allowed caregivers to remotely monitor the whereabouts of older adults in their informal care [90]. Whilst this system monitored the physical location of the person being cared for, we proposed an app (the “Monitoring App”) that monitored the digital activities of the person being cared for (and other family members). Nonetheless, there are parallels...
between these monitoring systems in terms of the information they track for the benefit of the caregiver. In this work, the adults being monitored emphasized concerns for their privacy, suggesting that an alternative solution could be that the person being cared for discloses information periodically that reassures the caregiver [90]. In the context of the “Monitoring App”, this would mean that rather than have their devices monitored 24/7, the child would provide a routine update on the devices, online platforms and applications accessed. This would address the concerns we identified by fathers in wanting to trust their (older) children and provide autonomy.

5.3 Fatherhood, Identity and Supportive Technology

Previous research has highlighted the societal pressure on ‘good’ mothers to invest large amounts of time, money, and energy into child rearing [28], and how social norms that judge mothers do not prioritise the needs of children [38]. Within our research, we see some of these same judgements internalised within fathers. New societal norms regarding ‘good fathers’ (e.g., being involved in routine care, being present in the home [53]) have existed since the 1980s [64], but the reality of fatherhood often does not live up to these new norms and traditional roles can still prevail [91]. This mismatch has come to the forefront during the pandemic, where fathers have been expected to take on the role of the ‘involved father’, whilst also working from home and dealing with new financial/health concerns. Being a ‘good father’ deprioritises ‘the self’, being a good worker deprioritises the family, and despite new social norms, the traditional role of the father as the breadwinner has not completely disappeared [29]. Particularly, we captured conflicts between the various roles and responsibilities of the father, leading to substantial anxiety and stress in relation to home duties, screen time and children. Our findings suggest that this merge between new and traditional fatherhood can create an atmosphere that does not support the mental wellbeing of fathers.

In line with our research aims, we feel it is important to highlight the many potential gaps for fatherhood-supporting technology. While some examples of these technologies exist already, previous work [88] has outlined the problematic condescension and trivialisation of fathers’ roles within them (for example, using humour and gimmicks to attract fathers’ involvement in seeking pregnancy education). We observed that fathers not only perceive a gap for fatherhood-supporting technology, but would be receptive to digital solutions. Consistent with previous research observing a cultural shift towards the more ‘involved’ father [53, 91], participants in this study associated their role as fathers with performing shared, non-digital activities with their children. However, we also found that fathers struggle with idea generation for these non-digital activities, an issue that was only exaggerated by COVID-19 lockdown measures. This is in line with other studies that have highlighted fathers’ difficulties in obtaining information to support their roles as fathers, for example from peers and health professionals [5, 41]. In our work, fathers were open to using technology (such as the “Activities App”) to support idea generation, and highlighted potential situations for use and father-specific benefits of an app like this. These fathers believed that they are less likely than mothers to receive parenting-based support, and so need additional help.
In fact, literature has previously emphasised the potential role of technology in supporting fathers’ connections with one another [2, 3]. These works outlined how fathers use media to document their journey with fatherhood [2], access online and social support [2], and discuss potentially stigmatising topics [3]. Fathers feel constrained online by fear of privacy and perceptions of judgment [2], and have been found to access greater support through anonymous accounts [3]. These findings are similar to ours, where fathers’ expressed disinterest in sharing gardens with friends using the “Virtual Garden App”, for fear of being shamed for their parenting choices surrounding their children’s screen viewing habits. Together, these findings highlight the need for judgement-free digital spaces for fathers to openly seek advice and share experiences.

In addition to facilitating conversation between fathers online, technology also may play a role in facilitating bonds between fathers and their family members (including their children). Whilst previous work [56] found that parents made a sharp distinction between family time and screen time – i.e., family time should be without phones – our findings suggested that fathers perceived value in using technology to support family connectedness. We found that fathers were supportive of technology to support family time, given that it occurred in moderation, providing that the technology-facilitated bonding was engaging, necessary, or added to family connections. These findings are similar to a study that investigated how parents co-play a mobile-based game with their children [86]; here, parents felt that the game facilitated family bonding as they were able to enact more impromptu conversations and identify shared interests. In fact, the American Academy of Pediatrics also recommend that families participate in new media together, in order to promote positive media consumption and avoid potentially harmful use [14]. Particularly in the context of digital balance within the home, joint media engagement between family members may act as a mediator to more meaningful interactions and conversations. Our findings support this narrative, and we emphasize the potential for apps and similar technology to support family connectedness.

5.4 ‘New Fatherhood’ and Wellbeing Mediated by Technology

With the changing societal views on what a father’s role should be, alongside the increasing pressure of fathers having to balance self-care and time with their children, previous studies have found that fathers encounter trade-offs between engaging in acts of self-care (e.g., alone time) and other activities [5, 6]. These factors lead to fathers utilising screens as a distraction for their children, contributing to a sense of general guilt associated with fatherhood. Our work supports these findings and contributes a new understanding of how fathers’ self-care practices were impacted by COVID-19. Indeed, there are arguments that the societal shift to ‘new fatherhood’ relies upon an inevitable loss of time allocated for self-care, accompanied with a loss in autonomy, free time, and leisure [53]. This affect was heightened by the pandemic, as many fathers worked to balance their normal self-care routines with work schedules, household responsibilities, and time with children. In moments of stress and flux, we observed that self-care was the first thing to be sacrificed by fathers, as many were left without their usual leisure activities, impacting many participants’ mental wellbeing. In order to alleviate some of these stresses, fathers used screens to distract their children while they worked, to keep children entertained, and to maintain peace in the home.
Although many fathers believed this was necessary, it led to a level of guilt and shame that these practices were not (and are not) sustainable. Fatherhood-supporting technologies, such as the “Self-Care App”, can aim to reduce fathers’ concerns by augmenting the need to engage in these routines with ease. Our work also highlights how such technologies could encourage fathers to explore new means of self-care and create an intrinsic motivation to do so. As such, we emphasize the potential role of technology in alleviating the stresses of fatherhood, particularly under strenuous circumstances.

Fathers’ individual experiences of digital balance and self-care during this time might have been affected by both individual family stressors and their personal attitudes towards engaging in screen time for self-care purposes. Fathers must decide to what extent the digital balance in their home can be shifted in order to maintain time for personal care and alone time. This will also be affected by factors such as partners’ working patterns, age of children in the household, and individual attitudes towards ‘positive’ and ‘negative’ screen usage, which is in line with HCI work that discusses the role of technology in balancing wellbeing [17, 83]. By using the prototype apps, we were able to encourage participants to reflect on these issues, facilitating explorative discussions regarding fathers’ lives, experiences and needs.

5.5 Fatherhood and Technology in Changing Contexts

The primary aim of our research was to empirically investigate fathers’ perspectives surrounding technology use, fatherhood and family dynamics during the COVID-19 pandemic. Studying fathers’ lived experiences with technology and parenting during a time of exacerbated family dynamics allowed for unique insights from fathers actively reflecting on their roles, providing implications into design of technologies for an understudied group, beyond the limits of the pandemic. The data in this study is saturated by fathers’ perceptions of their own lives in a changing landscape. While the research was conducted relatively early on during the pandemic and period of the first UK lockdown, it is notable that this had not yet transformed a shift in thinking about children’s digital engagement, even though it had affected their everyday practices. Fathers largely continued to impose a clear boundary between ‘digital’ and ‘non-digital’ activities and, as discussed in related research, struggled to navigate the perceived dilemmas associated with digital access [66]. We found that as a result of this, screen viewing naturally came to displace many of the routine activities within fathers’ and their children’s daily lives – a displacement that was out of fathers’ control. However, given we have seen how COVID-19 also incited a change in the types of child screen viewing, it is possible that the screen time had altered to become an “important enough” activity that parents would consider a “good” use of time (e.g., schoolwork, online calls with family members).

A previous study [63] outlined how fathers recognise both the utility of smartphones (e.g., for email, weather calendar events) and their apparent necessity in everyday living (e.g., to set alarms). Fathers in this work also felt that disconnecting from the digital world is neither doable nor desirable given modern expectations surrounding communication and connectivity, i.e., “what if something happens and X person needs to contact me”. Staying connected to others became especially important during the...
COVID-19 pandemic, as the potential for health problems among the population increased dramatically. Hence, it is unsurprising that fathers in our work reported an increase in online communication with extended family and friends during the lockdown. This theme was also prominent in how fathers spoke of their children staying in touch with school friends (“...you know socialising with his friends...”; P16, Int2). In this way, COVID-19 increased both the need and desire for digital connectivity.

Similar to our findings, previous literature has revealed how parents perceive some types of screen-viewing as “bad” and other types as “good” [26, 56] (e.g., schoolwork, extracurricular commitments, and parents’ work were reported as “legitimate” reasons for screen viewing [26]). In a study on parents’ perceptions of young children’s social media use, many parents were concerned that while it may not be inherently bad, screen viewing could displace more important activities that may be a better use of time [56]. Screen time has previously been shown to displace sleep [68], time spent with family [89], schoolwork [89], and physical activity [34]. Unfortunately, UK government rules within the pandemic limited how people could spend their time, e.g., the reduced contact with others outside the household, or the requirement that people stay at home. We found that as a result of this, screen viewing naturally came to displace many of the routine activities within fathers’ and their children’s daily lives — a displacement that was out of fathers’ control. However, given that we have seen how COVID-19 also incited a change in the types of child screen viewing, it is possible that the screen time had altered to become an “important enough” activity that parents would consider a “good” use of time (e.g., schoolwork, online calls with family members).

Further, previous literature outlines how “strategic” screen viewing is often used when parents are tired or “REALLY need a break” [56]. Fathers in our work discussed how the COVID-19 lockdown felt “relentless” [P8, Int2], how they rarely had “an hour to [themselves]” [P8, Int2], and how they noticed “more tiredness” [P6, Int1]. With increased home-schooling, working from home, and government limitations on physical outings, fathers were faced with fewer opportunities to distance themselves from the household and to take a break. As such, it is unsurprising that this theme of “passive parenting” emerged so heavily in our interviews; Our work has seen this idea extended in order to suit changing family dynamics.

The global pandemic imposed unexpected scenarios beyond an individual’s control; fathers experienced specific changes in their home, work, and personal lives. Whilst this changing landscape took place on a large scale, we know that small-scale changes in fathers’ lives can also impact family dynamic and technology use [12]. This means that findings from this study can provide insights on the effects on fatherhood and technology from a range of life changes (e.g., new care giving roles, new members of a household, job loss, bereavement, or divorce). As such, it can only be advantageous to study individuals lived, personal experiences and perspectives surrounding significant changes, such as the COVID-19 pandemic, as implications from these studies may be able to provide guidance on a smaller scale. Further, as both fatherhood and insights into the widespread effects of COVID-19 are evolving fields of research, using research into technology use not only sheds light onto the unique pressures facing the family
dynamic at this time, but also provides evidence for future areas of technological innovation.

5.6 Limitations

Regarding limitations of this work, we recognize that our sample was not representative of the diversity of the UK. Of the 19 fathers engaged that engaged in interviews, only one was unemployed, and no fathers were from a Black, Asian, or minority ethnic background. It is likely that a more varied group of participants would provide different insights than those within this study. Notably, this largely middle-class sample of fathers and families had relatively good access to digital technology within their homes and so were not on the ‘wrong side’ of the UK’s ‘digital divide’ [77]. We also note the large range of child ages within this study; a narrower range might have allowed for less generalized findings, more specific to a particular age group. Moreover, our prototypes were all mobile phone applications, where non-technical solutions or other forms of technology might have engaged different reflections from fathers in the follow-up interview. The use of the prototypes was also limited to enrich the final interview, whereas technology probes deployed into participants’ lives might have uncovered more robust findings about the lived experiences with these interventions.

6. CONCLUSION

Fathers’ insights are understudied and underreported, despite evidence that fathers’ perceptions can be predictive of children’s health behaviours. This study used semi-structured interviews with 19 fathers during COVID-19 lockdown measures to address two research aims: to investigate how fathers’ perceptions of technology, fatherhood and family dynamics within the home were affected by the pandemic, and to better understand how technology may be used to support fathers in their role as caregivers. In initial interviews, fathers provided personal insights into: (1) using technology to occupy children, (2) links between screen viewing and home dynamics, (3) the impact of COVID-19 on self-care, (4) and struggles with idea generation for non-digital activities. Pandemic-led changes in family dynamics and technology use exacerbated fathers pre-existing screen viewing concerns. These themes were explored further in second interviews (n=12), using four mobile phone application prototypes to provoke reflection and deeper exploration. Consistent with previous research, participants in this study associated their role as fathers with engaging in shared, non-digital activities with their children. We found that COVID-19-specific changes (e.g., social distancing measures) caused a decrease in many non-digital activities outside the home, and an increase in screen viewing as children turned to technology for socialising and education. Despite outlining how technology use can be perceived as ‘positive’ or ‘negative’ depending on context, fathers observed marked feelings of guilt and shame as children’s quantity of SV increased. In addition, fathers reflected on the levels of screen monitoring within the home that was acceptable to them, and raised concerns for children’s privacy (particularly in older children). Fathers’ perceptions and concerns with technology use were exacerbated by the impact of COVID-19. This work was able
to highlight opportunities to support fathers using technology, with particular reference to monitoring screen viewing practices in the home, supporting non-digital activities, and improving self-care routines. Whilst research findings were amplified by the COVID-19 lockdown, studying a time when fathers are deeply engaged in parenting with technology provides a source of design implications for fatherhood technology that can accommodate other family dynamic and technology shifts.

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