Child Centred Ethics (CCE): A Practical Framework for Enhanced Child Participation in HCI

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Abstract

Following a review of papers in the ACM DL on ethics and children, this paper shows the growth of interest in this area, summarises the literature found, and then, using detail from 26 papers that offer practical advice, distils a Child Centred Ethics Framework that maps literature onto ethical concerns in relation to the practical application of ethics with children. The framework offers questions and solutions for researchers from the first inception of a project to the dissemination of the results back to the children. The framework is offered as an adjunct to an ethics / IRB document in that it places the child's experience at the centre of decision-making allowing fuller exploration of aspects like assent, anonymity, inclusion and contribution. As a practical resource that researchers can use, the framework is presented as a living document waiting to be owned by the community.

CCS Concepts

• **Human-centered computing → HCI theory, concepts and models**.

Keywords

Practical Ethics, Ethics, Children, CCE Framework

ACM Reference Format:
Janet Read, Matthew Horton, Daniel Fitton, and Gavin Sim. 2025. Child Centred Ethics (CCE): A Practical Framework for Enhanced Child Participation in HCI. In *CHI Conference on Human Factors in Computing Systems (CHI '25), April 26–May 01, 2025, Yokohama, Japan.* ACM, New York, NY, USA, 16 pages. https://doi.org/10.1145/3706598.3714248

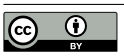
1 Introduction

Ethics has been central to HCI for very many years and within CCI (Child Computer Interaction) it is especially critical. As the CCI community has grown, the ethical dilemmas in HCI have shifted; while we grapple with big questions about robots and AI in the lives of children, we also have real concerns around how we interact with children and how we use their time.

The CCI community has not been slow to study ethics; since the inception of the Interaction Design and Children (IDC) Conference in 2003, more than twenty workshops (e.g. [4, 49, 92, 113]) and over a dozen courses and tutorials (e.g. [96, 115]), as well as numerous panels (e.g. [32]) and SIGs (e.g. [67]) have taken place at ACM, and other, conferences.

Many such courses and workshops have focused on practical ethics with attendees looking for concrete solutions to help them work with children in effective and child-friendly ways; these attendees typically are not looking for ways to complete IRB forms, they are looking to improve the experience of children in their studies while optimising their research work. Many CCI practitioners are sole CCI folk in larger HCI communities or, even more problematic, in disciplines where CCI or even HCI research is very much an unknown. They will plan their study, complete an ethics / IRB form (which will ask questions exploring why the research is worth doing, who will do it and where, what data will be gathered and how it will be cared for, what documentation will be given, what any potential risks are, how they can be mitigated and what the expected outcomes will be, and where used), and then wonder why they are having practical difficulties [25]. This is because an ethics / IRB form takes an adult's perspective, with a focus on institutional risk management. Taking an adult's perspective, and positioning the child as vulnerable, has the effect of erasing the child from the process and doesn't explore the 'situated ethics' around the detail of what actually goes on in the event [17].

The practical application of ethics with children is the focus of this paper which aims to provide signposting and practical ideas for CCI researchers who are not just hoping to clear the IRB hurdle, but are reaching for solutions and wanting to carry out high quality research which provides the most positive and beneficial experience for child participants. Our approach to collating this guidance is to examine a subset of ACM literature from the last twenty years to bring together 'nuggets' of practical ethics and to arrange the main findings into our main contribution which is an initial Child Centred Ethics (CCE) Framework, built on a practical timeline, to help researchers in child centred work. While our



CHI '25, Yokohama, Japan

ACM ISBN 979-8-4007-1394-1/25/04
https://doi.org/10.1145/3706598.3714248

search methodology captures papers that mention ethics broadly, works not directly related to "practical" ethics are not included in the proposed framework which is intended as a 'go-to' resource to be used alongside a good understanding of the literature in this domain.

In the course of examining literature, we highlight papers and contributions from four areas of ethics in CCI which feature prominently in the literature; these are Ethics of Participation, Ethics Education, Ethics Reflection and Review, and Ethics Solutions and Societal Implications; we offer the summaries of papers in these categories as additional contributions to the framework to help others find work that relates to their interests.

2 Background work

Frameworks and guidelines for practical ethics are hard to find in HCI, mainly because, in most instances, especially with adults, all that is needed to run a study is the detail as found in an ethics / IRB application. Critiques of ethics tend to focus on areas of concern rather than on practical solutions and so drawing out the salient points in terms of practicalities is not straightforward; this provides one reason for review papers, like our own. Examples of critical papers include Race et al. [91], who have some really important things to say about, how, when working with participants, someone needs to ensure that all the participants feel valued during the study, that they are all listened to and Vandenberghe and Slegers [127] who stress the importance of being transparent about the value of research when informing participants. Practical solutions would point to how these important concerns can be realised.

Recent research in HCI has increasingly emphasised ethical toolkits as products to explore the impact of ethics. This is especially prevalent in the AI domain, where the aim is to foster discussions about the societal and moral implications of AI use [12, 71]. Suggested solutions for this include approaches such as leveraging games to facilitate team discussions [137] and introducing roles like "ethics owner" within project teams to ensure accountability [94]. These efforts aim to encourage designers and developers to critically reflect on the ethical dimensions of their work, however, there remains a gap in practical toolkits designed to help researchers systematically consider ethics throughout all stages of the research process. This is particularly important when working with populations, such as children, where practical ethics must address unique challenges.

In CCI, concerns around the ethical participation of children in HCI research and design has been discussed in relation to values and philosophy [33], different user groups [25] and different technology contexts [141] and this discussion has been situated in different research and design settings [122]. The CCI community has also explored ethics in literature reviews (e.g. [38, 124], [60] and journal special editions, all concerned with ethics around HCI with children and interested readers seeking a general understanding of how the CCI community positions its ideals on the ethical participation of children can find mature and nuanced discussion in these papers.

That aside however, the CCI community is aware of its limitations in terms of what it has so far contributed on ethics. In Antle and Hourcade [5] 2022 paper, the authors write that "*The CCI community has engaged continuously but not deeply nor systematically with important ethical constructs that are deeply relevant, not just for research and technology design with children, but for all humans. In particular there is a lack of published material on this topic.*" They call for the community to be more reflective in discussions of procedural ethics, for a dedicated space in CCI publications for explanations of ethical decisions that were made, and a need for more universal guidance and CCI specific, theory grounded frameworks, to guide ethical investigations.

The researcher perspective in CCI is important as they will decide not only on study methods but also on the most appropriate ways to engage children. In Eriksson et al. [25] students doing HCI with children struggled to know what to tell children to obtain consent and had difficulties with children wanting to participate when there was no room. A workshop on what to teach in CCI also flagged a shortage of clear instruction and practical help [125] and only one of the two CCI textbooks, currently available, has a chapter on practical ethics, with this being fairly out of date as ethics thinking has evolved [46, 75].

Our work seeks to further the consideration of practical ethics in CCI by exploring what the community is doing in relation to practical ethics; we contribute a framework that can be used to guide ethical investigations in a practical way [5] and summarise papers that have an ethics focus as found in a review of papers in the ACM DL.

3 Selection of papers

To establish what the CCI community has published on practical ethics, a decision was taken to initially search the ACM DL for papers that could be presenting ethical toolkits and processes for children. Starting with the year in which IDC was formed (2003) and ending with 2024, a search in the ACM DL was initially made for papers that referenced "ethics" in their author keywords and mentioned "child" or "children" in the abstract. This search criteria was chosen as it was assumed that a paper offering something new in terms of ethics would include the word ethics in the keywords, the choice of child in the abstract limited the selection to papers that concerned children. This search resulted in 96 papers. Sixteen of these were incorrectly found by the search engine (viz. child was not in the abstract) and 1 was an abstract only so was not included. Of the remainder, 15 described workshops, 7 described courses, 4 described SIGs and 2 described panels leaving 51 papers that potentially described processes or approaches that would inform ethical practice with children in HCI.

As this first search resulted in a relatively small number of papers, the search was expanded to look at papers in the ACM DL that alternatively (but not additionally) mentioned ethics in the abstract; this search, for those with "child" or "children" and "ethics" in the abstract, but not in the keywords, delivered another 90 papers of which 23 were incorrectly found by the search engine (viz. child was not in the abstract), 4 described keynotes, SIGs and panels, 9 described workshops, one was a proceedings, two were abstracts and one was written in Spanish. This left 50 that potentially described processes or approaches that would inform ethical practice with children in HCI.

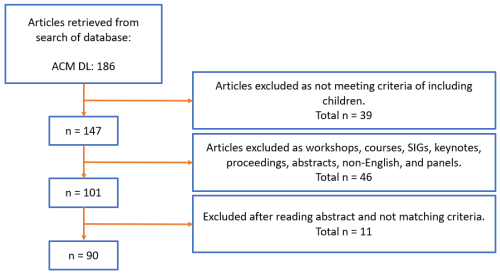


Figure 1: Papers Filtered in the ACM DL for Ethics and Children

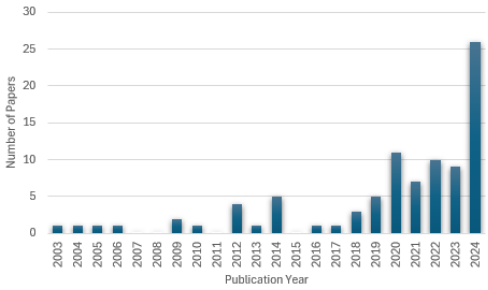


Figure 2: Papers Published in ACM Conferences by Year

3.1 Removing papers based on reading the abstract

The abstracts of the 101 resulting papers were examined to remove papers that were not about ethics with children in the context of HCI / IDC; 11 papers were removed. Watson et al. [136] and Veale et al. [129] were about child abuse / protection, which is of course an ethical concern but not relevant to the ethics of working with children. Massimi et al. [76] was about about end of life care and had referenced children in the abstract as an example of a population outside the normal 'adult' scope but was about adults only; two other similar papers were removed [52, 85] both being concerned with cyber and dark things. A 2010 paper by Halpert [42] was also excluded as it was effectively a two page industry paper about a cyber solution that could support children. Mackenzie [70] was removed as, on inspection, as it was about sex workers, Spiel [117] was not included as it was a short paper from a distinguished paper award that had built on earlier (included) work [118]. And three papers studying university level students were also rejected at this point - [16, 87, 90].

From the abstracts, it thus appeared that the remaining 90 papers had something to say about ethics in CCI and therefore had the potential to contribute insights on practical ethics (see figure 1). To demonstrate the velocity and density of these papers - which can give a snapshot of CCI ethics concerns within the ACM DL over the twenty years in question, the papers were initially catalogued by year published.

4 The velocity and density of ethics papers

In the first eight years of this search, (2003 - 2011), only seven papers were found (see figure 2). Friedman et al. [34] was the earliest of this group and Kahn et al. [55] and Melson et al. [78] followed on. In 2006 cameBrynskov and Ludvigsen [14], followed by two in 2009, [103, 106] and then one in 2010 [89]. The period 2012 - 2019 saw 20 more papers with four in 2012,[29, 31, 79, 120] followed by one in 2013, Read et al. [101], and then five papers in 2014 [69, 100, 126, 128, 135]. With no papers in 2015 there was one in 2016,[77], one in 2017 [44], three in 2018, [57, 86, 118] and five in 2019 [10, 13, 36, 40, 59].

2020 to 2024 saw many more papers; in 2020 there were nine regular papers, [2, 7, 15, 21, 27, 35, 109, 119] and two systematic literature reviews on ethics in CCI [56, 124]. 2021 saw seven papers, [1, 39, 65, 82, 83, 95, 130] with 2022 having ten papers - [6, 8, 19, 37, 81, 88, 99, 105, 123, 133]. There were nine papers in 2023 - [18, 26, 28, 30, 45, 54, 73, 74, 98, 140]. 2024 saw the largest number of papers (26) for any single year - [3, 9, 11, 22, 47, 48, 50, 51, 53, 62–64, 66, 68, 80, 97, 108, 110, 111, 114, 116, 121, 132, 142–144].

Figure 2 shows a steady increase in papers on ethics over time; the large number in 2024 can be partially attributed to a growing interest in AI but also to a more engaged research community with regards to ethics and children.

5 The content and variety of ethics papers

Each of the 90 papers listed above was examined to determine what it brought to the table about ethics processes and ethics toolkits for improved participation of children in HCI. The method employed here was to read each paper and summarise the main contributions, where they existed, towards better practical ethics for child participation; 26 papers brought such practical insights. For the 64 papers that did not bring specific practical insights or solutions, a codebook was iteratively developed to enable these to be summarised against four criteria: Ethics of Participation, Ethics Education, Ethics Reflection and Review, and Ethics Solutions and Societal Implications (see figure 3).

Figure 3: Content and Variety of Ethics Papers

5.1 Ethics of Participation

Twenty one (21) papers described user studies or design studies with children and were captured in the search as they had either discussed some ethical implications or had highlighted ethical practices in their work.

In this category, there were some papers that clearly described ethical work with children in a variety of guises. Straten et al. [119] describe a study with the Nao robot which highlights "active informed consent" and verbal consent as processes used in the study. Mott et al. [81] clearly describes using the CHECk toolkits to background their work with children in a robot co-design task and consent with small children, and mitigating for it, is featured in [11]; O'Brien et al. [83] made a robot and tested it with children who used an ethical canvas tool to explore what they had designed.

In [30] co-design with parents and children helped develop a social robot system for use in healthcare settings to distract children. The authors seamed ethical concerns of such technology into the outcomes from the co-design. Two papers, [35, 36], that follow on from one another describe first the outline of, and then an evaluation of, a game to help children better understand social networks. Ethics in this context primarily relates to the ethics of keeping children safe. Kahn et al. [55] reported a study of preschoolers reasoning about robotic pets with the ethics here being about the ethics of the technology and the paper by Melson et al. [78] reports from the same study describing how 72 children played with dog robots and reflects on, from an ethical position, how the children played. Two papers exploring children's critical thinking highlight ethical practice in setting up studies describing a close collaboration with the teachers, ensuring *"all researchers followed a responsible and ethical approach"* while *"taking deliberate steps to ensure participation was equitable"* [50] [51].

Studies where the authors were exploring an ethical dilemma or technology included Vasalou et al. [128] who ran two design workshops with children in London where they contributed ideas for a serious game based on the Day of the Dead in Mexico. The focus of the discussion in this paper was on the ethics of cultural appropriation. Ali Mehenni et al. [2] describes a study with three conditions that looked at children's responses to nudges; this work relates to ethics in so far as the authors want to further explore ethical nudging; in Cagiltay et al. [15], a PD session with six families is described that explores the use of social robots in families; issues around privacy and ethics are drawn out in the ensuing discussion.

Software products designed to improve understandings of ethics are described, and evaluated, in Zhou et al. [144] and Shrivastava et al. [114]; the former explores ways to help children understand filter bubbles and the latter explores ChatGPT with children. Similar work had children evaluating an interface that taught them the concepts of dot-products and AI recommender systems [143]. Wang et al. [132] describes a software product, and associated worksheets, for children to use with their parents to help them better understand data; this paper nicely describes how the participating children were recruited from different schools to get a more diverse population for the study.

Three papers described studies where the ethical components are less well defined but relate to the need to consider ethics in design of AI related technology. Malvi and Lee [73] used co-design to explore ideas for an AI robot to help children with art, Voulgari et al. [130] describes a game to teach ML and reports a survey with adults and children evaluating the game and Hu et al. [48] describes a user study with children to explore a conversational agent interface to explore resilience with children; in these three papers there does appear to be scope to write more about the inclusion of the children and the extent of their participation and they do highlight that in a general search on ethics it is likely that some papers will surface simply because there are ethical considerations in working with children.

On reflecting how it was that papers in this category had highlighted ethics, the inclusion of robots and AI in many of the studies provides one explanation and it is important for researchers to be mindful when studying such technologies with children, that extra care might need to be taken. Several papers here were also exploring ethical situations with children and this is an important area in CCI that also needs careful consideration where researchers need to think carefully about content and process.

5.2 Ethics Education

The 14 papers in this category either described STEAM / STEM style workshops where the content of interest was about ethics or described software or systems designed to teach children about ethics or educate them in ethical aspects.

In two papers related to the same project, Mitchell et al. [80] and Dong et al. [22] describe a robot / AI club that ran as part of a STEAM programme that taught children about ethical issues around AI and robots but also gathered feedback on their understanding. Other examples of ethical issues being interleaved into STEAM type activities included Schaper et al. [109] who used food traditions and robot reflections to consider a range of moral and ethical issues with children, and Knowles et al. [59] who used scenarios of different children within an IoT design activity to highlight potential risks of IoT to help children think critically about such things. In Ali et al. [1], school students explored generative AI in a series of workshops with the aim to learn about the ethics of these systems and in Lee et al. [65] children aged 10 - 14 participated in a 30 hour digital literacy course with ethics being a component of the course; the students were found to be engaged and able to have conversations about ethics topics. Twenty two middle school children worked through an AI infused curriculum that was evaluated with students completing post tests and this was shown to be effective in opening students to ethical issues around AI [108]. Sharma et al. [112]describes four workshops with children that were designed to help them think critically about ethics. and in Landesman et al. [64] 14 to 18 year old teens were taught about ethics and data that they generated with an example of good practice being how the youths assented to different levels of participation (the same study is essentially described in [63] and [62]).

Papers with slightly more focus on design ethics included Mannila and Skog [74], where over 1000 children worked in workshops on smart technology - reflections from the event highlighted that more time was needed for ethics instruction than they expected. N. Antle et al. [82] and Antle et al. [6] which are both from a project on bio-wearables. describe how a set of concept cards were used as a tool to help children think about design ethics.

As with papers in the Ethics of Participation section, the papers in this category were mainly found in the review on account of the focus of the activities being AI, robots and similar and, similar to those in the earlier section, the main ethics concern is to present such concepts to children carefully. There were also papers in this

group that were teaching children more explicitly about the ethics of technology; this is a growing and important area of CCI.

5.3 Ethics Reflection and Review

Twelve papers that reflected on ethics from an adult perspective or reviewed ethics with children are included in this category. These did not include papers directly describing studies with children as part of any reflection.

Wang et al. [134] is a review of 188 papers on children's AI systems that results in a Code for age appropriate AI; there are many ethical aspects highlighted in this paper including inclusion, privacy and fairness. Gao [37] reviews children's technology and highlights the need for close attention to ethics when gathering information and using information in educational settings. In a similar but very focused vein, Meyers and Bittner [79] reviews environmental information sites designed for children writing that *"the activities these sites choose to convey environmental thinking often conflict with underlying principles of sustainable living"*. An interesting treatise on ethics in Brazil is the content of Carvalho et al. [18] which talks about ethical challenges and institutional review boards in this context.

Kim et al. [57] is a theoretical paper that explores morals based on how children think; similar to this is the thought piece from Kaczmarczyk [54]. Pihkala and Karasti [88]'s reflection on PD considers past projects including one on gender with children in the context of the MeToo movement. One valuable reflection from this work is on the need to *" carefully respond to and move with the things that surfaced."* when working with children; the paper is an informative read for those doing PD with children. Reflecting on two gaming and digital experience camps, Rusnak [106] theorizes about how children are being transformed by digital technology, describing this as *"being thinged"*.

Adults and parents feature strongly in four papers that each bring useful findings to the CCI community; Friedman et al. [34] reported an examination of online forums with adults to explore relationships with robotic pets and in Baumer and McGee [10], blogs from parents of children with ASD were examined and the authors discuss the ethics of using such child-related data when the children have not themselves consented. Twenty four parents in the US were surveyed in Hourcade et al. [47]'s paper on ethics of XR; the parents were clearly considering ethics as it relates to children, and the ethics of VR was explored in a survey of 55 parents and 67 children in [53],

Collectively these papers provide a wealth of information, perspectives and positions on the ethics of both the involvement of children in CCI research but also on the specifics of the impact of new technologies on children's lives. The papers highlight concerns about the use of children's data without their consent as well as the worries that parents have for their children's interactions with technology.

5.4 Ethics Solutions and Societal Implications

Several papers (17) described products or services intending to provide solutions that were either ethically interesting or ethically motivated. Note that if the authors of such papers specifically engaged with children as participants in this work then those papers will have already been described in the subsection on Ethics of Participation above.

Contributions here ranged from ideas to fully formed products. Underwood and Finney [123] is a short paper describing an idea for an IoT system that children can use without some of the issues around privacy and data that can get in the way of IoT exploration; in Andreeva et al. [3], an ethical codex is described for a NAO robot system that might eventually help children with speech difficulties. Gil and Arnedo-Moreno [39] created a game to explore the ethical design of video game play and in an earlier related paper [40] a survey was used to explore how many hours children had played a popular video game; neither study engaged with children but the topic was clearly important. In the same vein, Flick et al. [29] is a design piece of a resilience lamp that helps children with screen time management.

Some systems had ethical undertones that would need exploring in the implementation of such systems as there are situations where harm could ensue; one was an AI system that could potentially generate predictions for SATs [66], another sought to automatically monitor and predict the learning power of left-behind children [68], and a third aimed to use a robot to teach children verbs; the robot's performance was evaluated in the paper Tanaka and Matsuzoe [120]. Baines et al. [9] is a study on the use of generative AI for the development of images for storytelling applications for children which did not involve children but clearly had them as potential end users, similarly Hossain et al. [45] describe a system to help hearing impaired families communicate - ethics in this context is highlighted as something than can then be explored if the system is implemented. In Fatima et al. [27] the authors designed and described a system that used AI to deliver stories to children in their parent's voice - the main focus on ethics in this work was that the stories would have ethical content in them.

Societal implications of technologies for children are explored in Borgos-Rodriguez et al. [13] who study online content with interviews with six parent content creators in order to explore adults' use of videos of their children with developmental disabilities. In a similar vein, Sebastian et al. [110] describe a workshop for teachers in the global south, a two day event which resulted in a keen push for ethics to be part of a solution for children. The use of children's data in AI and ML was explored in Bae and Xu [8] where the ethical discussion is mainly in relation to possible bias in the data that was being used to train a system for road safety for children.

Some papers surfaced important contributions towards ethics in research; Henkel and Bethel [44] describe how robots can be used in interviews with children in medical settings and how their appearance and characteristics can help children's experiences. In a related methodological paper, Figueiredo et al. [28] used auto generated personas to explore children's potential reactions to video ads. Wong et al. [139] describes work with adults relating to children's privacy where the focus was on the possible harm and benefit of the technology.

6 Practical Ethics for Child HCI

We highlighted 26 papers as all having something very tangible to say about the practicalities of involving children in HCI research. We describe these in this section in the order in which they were

published. On reflecting on the general content of these papers along the twenty year trajectory, and to assist the reader in parsing this content, we have also chosen to title different groups of papers with themes that seem to be emerging which also helps the reader get a sense of ethics themes over time.

6.1 Thinking about why? and with whom?

In 2006, in a paper describing the design and evaluation of games that 'mock' Brynskov and Ludvigsen [14] critique their own work in terms of whether it is okay or not to build such games. They write that *"As we design digital, pervasive technology for children to use, we may be at the risk of letting technology shape children's lives without a close scrutiny on the values implicit in the design."* This challenge, to think very carefully about values and impact, is very important in CCI. With children's welfare in mind, Rode [103] expressed *"deep concern"* about the lack of ethics in HCI with regard to user testing in a study of children, parents and domestic privacy. The call from this paper was for the community to worry much more about ethics and, in reading between the lines, to put the child's situation at the heart of ethical thinking, with a particular focus on disadvantaged communities. A reflection piece on the One Laptop per Child (OLPC) project asked a similar, although differently framed, question about technology and children [89]; this paper called for researchers to balance the costs and benefits of technology especially with groups of children from less wealthy places.

6.2 Thinking about communication and children's voices

Frauenberger et al. [31] gives a good account of some of the practicalities of working with children in design. There is reference to info packs given to children in advance of gathering consent which imply something more child friendly than that which is ordinarily required in an IRB application; they also write of observing classrooms in advance of doing their work with children and how, in their dissemination to researchers they captured their own deliberations on video, writing that *"methodological transparency in making design decisions are key to justifying the outcomes..."*; this foreshadows later work in IDC and CCI on justifying how children's outcomes are used. The following year Read et al. [101] was published; this was a short paper that delivered two child centred checklists (see one below) for use before doing design work with children; the checklists examined the researchers' values while also encouraging researchers to think about how research is communicated to children:

- Why are we doing this research? What do we tell (the children)?
- Who is funding the research? What do we tell (the children)?
- What might happen in the long term? What do we tell (the children)?
- What might we publish? What do we tell (the children)?

6.3 Thinking about the values of the children and telling them what we have found

Four practical papers, and one theoretical paper, followed in 2014, Van Mechelen et al. [126] applied the CHECk tools from [101](citing that work) in a participatory design context and highlighted four additional challenges:

- not only what, but how should children be told
- the values of others in the team, not just researchers, should be discovered (suggesting that more than one person should fill out the CHECk toolkits and then that the team might discuss)
- values might change during the project
- children's values are not accounted for in the questions

The main solution offered in this paper was to use 'dynamic' storylines to help talk with children about values and the value of participation. Working with 8 - 12 year children who were being treated for cancer, led Wärnestål et al. [135] to focus on being very adaptable in work with children especially being prepared to change group sizes and composition; this was the first paper that we located that explicitly suggested to go back to children to understand findings; they write how they made video and other materials which (see also [31]) *" enabled communication of participant's reflections on summarized results and interpretations that had been made by researchers and designers throughout the process"* .

6.4 Thinking about the experience on the day and the way children's contributions are used

Lindberg et al. [69]'s paper on ethics in participatory design with children explored six considerations related to the child's experience that were potentially problematic; these were the power balance, informed consent, equal say, place, emotional load, and group size / composition. Solutions offered in this paper included using familiar activities and flexible activity execution. Being flexible is a core tenet in research with children as the researcher has to be able to adapt quickly to situations that are not planned for (see also [105]). Other solutions offered in this paper included working in pairs, using proxies if studying sensitive content, reciprocating (power) where possible and summarising children's contributions. This latter point, around children's contributions was the main focus of Read et al. [100] work which delivered a method, TRAck (tracking, representing, and acknowledging), to track and account for children's ideas at the analysis stage of a PD activity. The rationale for this being important in this paper was that for children to be fully informed about the work they were doing there was a practical and ethical requirement to be able to explain and justify the treatment and value of children's ideas. The authors show how ideas from four different groups of children could each be examined in an inclusive and representative way while also being useful towards design.

6.5 Thinking about power balances, inclusion, agency and dissemination

Citing [101], a 2016 paper from McNally et al. [77] brought an original slant on practical ethics with children by surveying 12

former members of the University of Maryland kids design team around how they now, having stopped being child design partners, thought about consent, dissent, anonymity, power, experience and the use of ideas. From this study important observations included that the members had felt some difficulties 'dissenting' from the design activities as they had to stay in the sessions till their parents collected them. They also had thoughts on the attribution of ideas and anonymity; with suggested solutions being to keep anonymity of individuals but credit the team, establish an end point for long projects, clearly articulate how ideas are / were used, and being sensitive to, and therefore practically enabling, dissent. Spiel et al. [118] paper introduced "micro-ethics" which can be loosely described as "ethics at every interaction". Questions raised in this paper included challenges about who was being included, how they were represented in the study and what was returned to children; practical solutions included 'ongoing' consent - that being ensuring that the child is still consenting, and having child led PD (this speaks to incorporating children's values as seen in [126]). Of the papers examined this was the first to highlight the professional conduct of those adults involved in the research, framed in the context of doing no harm, but implied to suggest that importantly, without adults being aware, those micro ethical issues may get lost. In a CHI best paper, Peacock et al. [86] provide a rich narrative about a project in which they looked at urban design with youth in the UK - this paper is strong on warning against tokenism in participation with children, saying that proposals had to translate into something meaningful for the children. They worked with teachers to design sessions (which is a recurring theme in several papers); and they included children in dissemination of their own results by having them run a "town-hall" meeting to which urban planners and the like were invited.

6.6 Thinking about meaningful participation and ethics as a moving target

In 2020, DiPaola et al. [21] studied design ethics with children. This paper used the ethical design matrix from Cathy O'Neil with children using the matrix [84]. This paper is included here as it is an example of children using this matrix (see figure 4) to explore their own, and others', values which was highlighted earlier as being very important ([126]).

The same year saw Van Mechelen et al. [124]'s review of ethics in CCI which, while very comprehensive and well worth the read, is mainly looking at how the community does ethics with an emphasis on how it is reported and thought about. Key takeaways from this paper are that CCI has a lack of definitions and shared theoretical grounding for ethical work. Also highlighted is that many ethical actions and activities get 'black-boxed' in the statement about IRB, and so the way things are done is not shared in the papers. In the context of transparency and also in order to help novice researchers make sense of how experienced individuals do things, we agree with the ideal that this box be opened and more detail added to papers about ethics. A second review paper that year, [56] revisited the values and ethics of IDC papers building on a paper from ten years earlier; this paper writes of ethics as a *"moving target"* which certainly supports our own position in this paper that the framework we are proposing needs to be a living

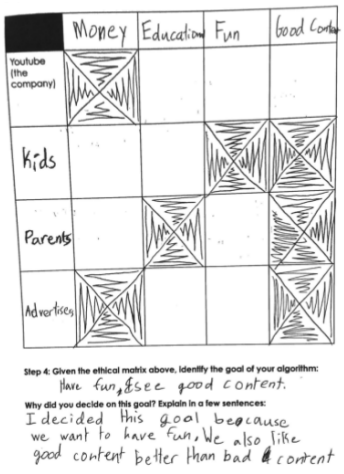


Figure 4: Example Ethical Design Matrix

document. They highlight the gap between formal ethics and what is needed for work in the field and also encourage the community to both consider the negative effects of children's participation but also highlight that in IDC and CCI it is sometimes necessary to allow children to participate in meaningful ways even if they don't have parental consent - this raises the horny issue of participation versus permission. Implied in this paper is also a call to ensure we wrap up our studies well by deleting what is no longer needed. In a great example of participation beyond tokenism (see also [86]), in a study with 12 - 18 year old youths, Badillo-Urquiola et al. [7] had the teens designing their own research instruments. In a three step process the teens were introduced to the topic and asked to think about it from their own perspective, they then thought about what they might share about this topic and then went on to design an instrument (diary) that could be used in the research; one of the teens' ideas was to be able to review their own data before it was submitted. In terms of Hart's model of participation [43] - this idea, of co-designing the research methodology, is very powerful in terms of empowerment and agency.

6.7 Thinking more about value, reporting back and critical reflection

Read et al. [95] builds on the concerns about the value of contribution raised by [77] and [118] in an exploration of the divergence and convergence of ideas when groups of children are working alongside, and over time, on a design challenge. The main observation here is of the value of 'post-event' critical evaluation of the value of the design activity and an acknowledgment that the collated time used by the children, in the activity, has to be justified. In exploring time spent, the paper offers a solution in the context of children doing design. In [20] a research protocol was published ahead of a future study. The protocol highlights many aspects of practical ethics like ensuring the value to the children, the value of any outcomes and ensuring reporting back. It highlights the importance of planning for different communities. The paper in 2022 by Read et al. [99] on reporting back to children offered a list of questions to ask

when planning a study to ensure that after the study children were better informed of their contributions. The questions suggested are:

(1) CAN - Can I report back to children? (If not, why not?)
(2) DETAIL - What should be reported back to children?
(3) MEDIA - How should this be reported back?
(4) DATE - What time-frame will be used for the report back?
(5) ACTION - What, if anything, should be changed in the study, or captured during analysis, to make reporting back easier?

This paper highlighted that academic papers do not report on how children are informed of the outcomes of their contributions while also making a call for the community to include this in the 'selection and participation' section found on CCI papers since 2014. Transparency was also a theme in a survey of CCI researchers in [105] which highlights how studies can go wrong. This is a very important part of thinking about ethics and clearly relevant. The practical call from this paper is for researchers to both acknowledge and report failures in order that lessons can be learned.

6.8 Thinking about anonymity, data and getting the materials right

The main thrust in Escobedo et al. [26]'s work is towards actively engaging with teachers when planning and doing studies with children in schools. In their work they shared protocols and consent forms with staff in good time so they could be changed. Small CCI, in 2023, was a paper that described a study in which no personal data was captured whilst empirical results were gathered from young children [98]. The main ethics takeaway from this paper is the method used to carry out a between groups study, with a direct focus on allowing children to not participate. Whilst not offering any easy solutions, this paper showcases how, within a study, with children, the needs of the children, and the research team can be met.

A study which did not engage with IRB but was nonetheless ethical is described in Thompson et al. [121]. This very interesting work describes data gathered during a public engagement event and is directly relevant to many similar events but may only apply in a UK context. The authors gathered anonymous feedback on 'medical' wearables under the PPI protocol for participant involvement in healthcare research [1]. Whilst other countries may not be able to operate in this way, the paper does remind us to ask - is IRB needed? Citing [124] and [99], a framework, with advice for implementation, for child-centred work is proposed in Södergren [116]. This framework comes from a lengthy study on how to promote sincerity in work with children. The framework covers the lifecycle of a project and has the following steps with the practical ethical interpretation of each step added.

(1) Preliminary efforts; Formulating a preliminary ethical orientation for research - deciding on possible data collection methods
(2) Multisensorial body - Data collection attention to sensitivities and range of expression-skills of user - being aware of children's different abilities and skills
(3) Specifying lens of value - exploring values
(4) Mapping elements of intuitive interaction
(5) Research situation - practical attention to the location
(6) Impact - of the activity and the materials on the children
(7) Code of conduct - a set of rules for the event
(8) Aftermath - going back to the children

[1] https://www.hra.nhs.uk/planning-and-improving-research/best-practice/public-involvement/what-do-i-need-do/

6.9 Thinking about children doing dissemination and better understanding data

The ethics of dissemination are specifically a focus in Zaman et al. [142] where there are a set of nineteen considerations proposed including asking what benefits children can get from being involved in dissemination but also stressing the potential problems of ensuring dissemination is true to the project. This paper includes suggestions to help children be involved in deciding what is disseminated as well as being actively involved in its design and delivery. The last paper to bring practical advice is [97] which describes a STEM activity with children in schools. Much of the paper has an ethical focus but the main contributions towards practical ethics are the activity described at the start of the study that helped children understand data, and the continual attention to data being free to be handed in or not. The opening activity, which could easily translate to other situations, had children filling in a sheet with personal data on it, children rating games with numeric scales and children giving some ideas. The outputs from these activities were used to frame the conversation about different types of data and what 'assenting to hand data in' meant.

7 CCE: A Practical Ethics Framework for Enhanced Child Participation in HCI

We present an initial version of a Child Centred Ethics (CCE) framework, informed from a review of conference papers within the ACM DL, that can help researchers think about children in their work whilst also pointing to useful papers, tools, and ideas, to assist in that endeavour (see table 1). This framework is presented here as a living document ready to be further populated, by the CCI community, with papers, tools and methods as they are found and developed.

The framework is intended to be useful as a road map, a tool locator, an inspiration and as an aide-memoire; for experienced researchers it will hopefully prompt new questions and encourage enquiry into research to find solutions appropriate to their specific context, for novice researchers it will point to literature that can give sound practical advice and can give confidence and direction.

The framework is not intended as an alternative to an Ethics / IRB form or application. We are aware that in most such processes, researchers are expected to have a detailed plan of their study, 'ready to use' consent forms and information documents, and should be able to explain how data will be managed, why the research matters, and what they will be doing to safeguard children. Having filled many of these forms in ourselves we are very aware of the limitations of such processes; the CCE Framework is intended to position the child's experience at the heart of some of the decision making and detailed planning, to maintain awareness throughout research of the needs and diversity of children, and to promote critical reflective activity.

Table 1: CCE Framework

When	Refs.	Concerns	Questions to Ask	Tools (T) and Ideas (I)
Pre-Planning (before IRB)	[19, 116]	The value of **Inclusion** of children.	Is it appropriate to include children in this work?	Group meeting (I)
	[103, 121]	**Diversity** of children in HCI research.	Can a broader selection of children be included? Can Public engagement be used?	Collaborations (I) Choices outside IRB (I)
	[14, 89]	Technology and **harm** / appropriateness.	Is it appropriate at this time and with these children?	Adult review (I)
	[117]	Skills and training of participating adults.	Do the intended adults have the requisite skills?	Skill audit (I), Courses (I)
	[7, 97, 98]	Minimal and appropriate **data** collection.	How much personal data is needed? Can children be included in the design of data collection?	Analysis review (I) Pilot (I)
Planning (beginning IRB process)	[99]	**Informing** children of outcomes.	How and when will we report back to children?	Reporting back checklist (T)
	[26, 101, 126]	**Communicating** research.	Will children understand what participation involves? Will children understand what is expected of them?	CHECk toolkit (T) Check with teachers (I)
	[124]	Meeting **children's values**.	Can children's values be sought and included?	Visit children (I)
	[116]	Matching **activities** to abilities.	Can we discern the different needs of children and design activities for them?	Talk to adults (I)
	[69]	Avoiding **failure**.	What flexibility is there in the activity design?	Back up plan (I)
Pre-study (just before)	[31, 97, 124]	**Informed assent**.	Can we teach about research data? Can children understand what they are participating in and why? Will they understand the technology or technical language?	Games (I) Child friendly info packs (I) Check with adults (I)
	[21, 126]	Capturing **children's values**.	What are the children's values in relation to this research?	Ethical Canvas (T)
During Study	[56, 77, 97, 118, 124]	**Participation** and Inclusion.	Can children participate even without adult consent? How are children aware participation is optional?	Design activities in for such situations (I) Active dissent (I)
Immediately After Study	[118]	Critical **Reflection** to Learn.	Did anything go wrong?	Maintain event log sheets (I), Debrief (I)
	[118]	Validity of **consent / assent** given earlier.	Do children still consent after participating?	Assent form (I)
Soon After Study	[105]	Learning lessons and documenting failures.	Was the study a success?	Critical reflection (I)
	[100]	**Value** to children.	Did all children contribute effectively?	TRAck (T)
During analysis and write up	[31, 77, 95]	**Attribution** of children's contributions.	Can paper show a clear line from child contribution to results? How can children associate with the paper?	Ideas (T), Video analysis process (I) Consider naming school or similar (I)
	[124]	**Integrity** of publication.	What ethical aspects should be reported?	Use IDC statement (I)
When results are known	[99, 116, 135]	**Reporting back.**	What can we tell the children?	Reporting Back Checklist (T), Video (T)
	[56]	**Privacy.**	Is there any residual data needing removing?	Delete (I)
	[86, 142]	Enhanced **Agency**.	Can children help disseminate?	Town Hall (I), child designed dissemination (I)

7.1 Examples of how the CCE Framework can be applied and used

At a meta level, the CCE Framework 1 shows the stages of planning and completing a research or design study with children, highlights ethical concerns which arise from the literature and poses practical questions that researchers can ask in their work to identify and explore associated issues related to child participation. Our intention is that researchers, at each phase in their work identified in the 'When' column (Table 1,) ask these questions of themselves or of colleagues/students as soon as is practical and use their answers to consider their plans and actions critically and objectively. Researchers should be open to the fact they may need to change or adapt their initial plans to more effectively support child participation in their work.

For example, in the Pre-Planning stage if the initial intention is to recruit from a single nearby school, the question *"Can a broader selection of children be included?'* may prompt the researcher to consider other schools and other recruitment possibilities to gain insights from a more diverse range of children. If the intention is to work with neuro-diverse groups of children or those with behavioural difficulties, the question *"Do the intended adults have the requisite skills?"* should prompt the researcher to consider carefully situations that might arise during the study and determine whether training or advice should be sought in order to ensure the child participants are adequately understood and supported. This highlights an interesting example in which IRB would, of course, ensure that risk and legal responsibility were appropriately managed but where a researcher may choose to take additional measures based on the CCE Framework to ensure the best possible experience for child participants (and ultimately help ensure a more successful study).

When designing study materials the question *"Can we discern the different needs of children and design activities for them?"* may help the researcher question whether study activities will work successful for the target age group, and the individuals (who may include children speaking different languages or children with sensory disabilities) and seek advice from teachers or experts if unsure. When preparing to deliver activities to children, the question *"Can children understand what they are participating in and why?"* may inspire the researcher to think carefully about how to most effectively explain to children what they will be contributing, how their contributions will be used, and what positive impact this might have on the world. In answering these questions we should try to take the child's perspective wherever possible. For example, if a research study carried out in a school context includes use of generative AI the question *"Can children understand what they are participating in and why?"* becomes especially important; will children understand this is a research study and that they are not being unintentionally given permission (and training) by adults to use AI in a school context?

In order to classify emerging issues when answering these questions, we encourage the assigning of severity levels to enable prioritization if necessary. The highest priority has to be for 'major' issues which could directly or inadvertently harm children or expose them to risk (we would hope these issues would typically be identified at IRB review level). The next level is for 'moderate' issues which result in the child participants not being afforded appropriate consideration or respect, such as failing to ensure that all children in a group can participate effectively in the activity or wasting children's time (e.g. by conducting poor quality research or collecting data which will not be used). The final level is 'minor' issues where the researcher could take action to enhance the experience of participation for children, such as reporting back findings or involving children in the design of data collection.

7.2 Limitations of the CCE Framework

The CCE Framework is based on a review of around 100 papers published in the ACM DL over a twenty year span. There are many papers on ethics from other disciplines and other venues that will naturally contribute other insights but we have not located any that provide a targeted resource like the one we present here; most often papers on practical ethics are presented as case studies, [23, 72] as instructions and insights without pointing to specific tools [93, 102, 138] or are the subject of books [41, 58, 61]. Within HCI, there are relatively few papers specifically on practical ethics (35 in the ACM DL of which only a handful relate to the ethics of participation and only one, [18], refers to children), so it is the case that finding the 'nuggets' that fit into HCI work with children is not an easy task. Our approach, which was to search the digital library for papers that referenced the word "ethics" in keywords or the abstract, and "child" in the abstract will have excluded many papers that discuss important ethical considerations such as privacy, security policing of children, diversity, equity, and inclusion, designing for all, developing critical literacy, etc. We acknowledge this limitation of this work but point interested readers to the papers described here and in other papers to encourage academics to be as informed as possible in regard to all the nuances around ethical work with children. To build an initial practical framework as is presented here, we had to limit our search; we encourage the community to add to it at https://chici.org/ethics/.

The CCE Framework has not been optimized for any country / culture, nor for any specific situation of study - extensions could look at, for example, the practicalities of doing ethical work in public spaces, or in differently resourced venues (see for example [107]). Given that different countries have different ethics / IRB protocols, [24], we cannot specifically say what, in the framework, might or might not be typically included in an institutional review - what we do stress is that the framework is intended to put the child's experience at the centre of planning and thus, actions around explaining research well, and including children in aspects like dissemination to adults, are very important to highlight.

7.3 Further Development of the CCE Framework

We have published the CCE Framework at https://chici.org/ethics/ and share it as a living document with the CCI community and invite their efforts to further populate it with exemplar papers, tools and ideas. We hope to encourage transparency, especially towards the pre-publishing of research plans and research failures [104, 105, 131] and encourage authors to report their experiences in their papers, or to our website, (for example noting which issues were identified and how they were prioritised) along with any new

questions that proved valuable, any new tools innovated or any new ideas they had along with lessons learned that may be of value to others.

We recognise that choosing to develop the framework from literature has limited its scope; we therefore imagine also running workshops and SIGs to further explore it alongside interviews with experienced and novice researchers in CCI.

8 Conclusion

Against a backdrop of extreme interest in ethics in the CCI and HCI community, and approaching this through the lens of the experience of children in HCI, we have examined twenty years of published work in the ACM DL on ethics and children and have summarised the literature found. In this summary, in addition to locating practical ethics papers, four themes of work were identified; Ethics of Participation (papers describing studies with children where ethics was mentioned), Ethics Education (papers that describe work with children in projects that are mainly around AI and future tech and the ethics of the same), Ethics Reflection and Review (papers that review literature or reflect) and Ethics Solutions and Societal Implications (which were a collection of different papers considering engineering and design solutions that did not include children in their work).

In examining the literature we highlighted 26 papers that provide practical tools and actionable advice for both novice and experienced researchers and we took those tools and insights and mapped them against one of the stages of a research journey to build a framework for CCI researchers to think with and reference. We have published that framework here as a living document ready to receive updates and adaptations.

We have discussed ways in which the CCE Framework can be used highlighting severe to mild situations where a researcher might do something differently having seen the Framework; we acknowledge that most of the severe situations would be scooped up by an IRB process but believe that the moderate and mild concerns would likely not surface with that sort of examination of action so commend the Framework as a starting point towards better child centred experiences in HCI. Our further work will seek to expand and refine the Framework with the CCI and HCI communities and explore its use in case studies.

Acknowledgments

Very many children have given us insights around, and opportunities to study, enhanced participation in HCI work as we have journeyed towards this CCE Framework; we cannot list them all here, nor their schools, but their input has been invaluable. At the same time we acknowledge all the children who have participated in the many studies that we report here that have contributed to the CCE Framework. Thank you all.

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