

Madness to the methods: Speculating approaches to study and nurture children's designer and Maker identities

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As our relationship with digital technology radically changes during this pandemic, it becomes imperative to reimagine new ways of interactions and collaborations. It is also important for children grow from passive consumers of digital technology to active designers and Makers. Typical research approaches for inquiring or probing children's digital technology identities include interview-, reflection-, and hands-on creative-types of methods. But how will these methods fare in a future that is online or hybrid? In this paper, we present the outcomes of a workshop that employed critical design fiction with Child-Computer Interaction experts to speculate on how such methods can be applied in the future, in online or limited access scenarios, to study children's designer and Maker identities. We focused on approaches that are empowering, albeit provocative. We call for researchers working with children to reconsider and expand their methods repertoire to keep in tune with the changing times.

CCS CONCEPTS •Human-centered computing~Human computer interaction (HCI)~HCI design and evaluation methods

Additional Keywords and Phrases: Critical design, critical making, design fiction, designer identity, maker identity

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1 INTRODUCTION

The global situation with the corona pandemic shocked and affected the lives of most. The sudden shut down of schools, universities, and workplaces made individual digital skills and abilities suddenly extremely important. We were forced to take a digital leap. As the role of digital technology increases in each of our lives, it is crucial we can offer the needed tools, abilities, and mindsets, especially to the young generation, for now and in the future. Research has argued teaching digital technology use skills is not enough to empower children to manage and master in the future technology-rich world (e.g., Iivari & Kinnula 2018, Iivari et al. 2018, Iversen et al. 2017); instead, children need to be offered skills to make and shape such technology and its trajectories and a will to do so, i.e., to adopt an activist stance towards design and technology. Hence, it is important for children to develop a digital technology identity within which they can engage in changing, transforming, and mastering it

within their day to day lives (Chu et al. 2017a, 2017b, Chu et al. 2015, livari & Kinnula 2018, Iversen et al. 2017). Yet, studies focused on understating and nurturing children's designer and Maker identities are relatively few.

Identity is a complex concept examined within numerous different disciplines in human sciences, most notably within psychology and sociology, but also within many others (e.g., Buckingham 2008, Eccles 2009). "Who am I?" is a central question in relation to identity as well as "Where do I belong to?" "What kind of things am I good at?" "What do I value in life?" (Carter & Grover 2015, Chu et al. 2017c, Eccles 2009). Such kind of fundamental questions around our identities are characteristic for the human being and thus concern us all: we position ourselves in relation to others and reflect on our characteristics, strengths and weaknesses, common and distinctive features. Such questions also concern our children: identity formation starts from an early age (e.g., Buckingham 2008, Eccles 2009). Therefore, identity should be a concern also for Child Computer Interaction (CCI), FabLearn, and Computing, Design and Making in education research, aiming at understanding and supporting children's engagement with and through digital technology. Indeed, identity has aroused interest in such research; however, thus far the concept seems to be underutilized. In computing research more generally, one can find a variety of meanings and usages of the concept: identity has been approached from numerous viewpoints and theoretical lenses (e.g., Carter & Grover 2015, Schultze 2014, Whitley et al. 2014); hence, the current results are scattered. Further still, a mixed bag of methods and approaches has been employed for studying children's digital technology related identities (e.g., Chu et al. 2015, Chu et al. 2017c, Coenraad et al. 2019, livari et al. 2014, Iversen & Nielsen 2003, Thanapornsanguth & Holbert 2017, Marshall & Rode 2018, Vacca 2017, Winkler et al. 2009). As children's relationship with digital technology likely becomes ever stronger, it is imperative to have the means and tools for understanding and probing how they position themselves in this transformation.

We consider it CCI and Computing, Design and Making in Education researcher's responsibility, given their expertise, to explore, strengthen, and augment individuals' children's relationship with digital technology. During the circumstances of the corona pandemic, as individuals' relationship with digital technology changed almost suddenly (e.g., livari et al. 2020), and continues changing, we have a newfound responsibility, and opportunity, to explore where we go from here. With children's everyday experiences changing dramatically from schools with teachers and peers to online sessions at home with their families (e.g., livari et al. 2020), we focus our attention on children's evolving relationship with digital technology, and how now more than ever, there are opportunities, if not an obligation, to make this relationship go beyond passive consumerism to active designers and Makers. We see the identity concept as particularly useful here, as it enables inquiring longer-term consequences of digital technology, design and Making in people's lives – hence, it enables raising awareness of the profound effects our practices may have on the society and our digital futures.

In this paper, we build on current understanding of how researchers have approached the topic of children's designer and Maker identities, namely through interview-, reflection-, and hands-on creative-types of methods. Using critical design fiction in a workshop with CCI researchers, we envision what could and should change in these approaches as we have been living through a pandemic that has made us reliant more than ever on digital technology for normalcy. We maintain we need to be going online with and digitalizing our method repertoire equally to what is happening in all other spheres of our life. We present the findings from critical design fiction workshop and discuss their implications on research on children's designer and Maker identities. The main research contribution of this work is adding to ongoing discussion in research interested in the current extensive digitalization of children's everyday life and more broadly in the societal implications of our practice.

2 RELATED WORK

In CCI and Computing, Design and Making in Education research, some studies have already touched upon the issue of children's identity. In relation to use of digital technology, it has been pointed out that toys as well as different kinds of learning tools may enable identity reflection, exploration, and enactment (Ackerman 2005, Boone et al. 2018, Winkler et al. 2009). Children's engagement in online environments has been linked with their identity construction (Bers et al. 2001, Emanuel & Fraser 2014, Kafai et al. 2017, Parker et al. 2013). The relationship between children's digital and physical identities has been explored (Emanuel & Fraser 2014). Technologies enabling identity exploration and construction have been studied with children (Bers et al, 2001, Wyld 2017). Children's identities have also been argued to shape their view of technology (Vacca 2017).

In the design context, participatory design has been considered as a site for children to enact their identities, project future identities, and utilize aspects of their identities in design (Coenraad et al. 2019). Several studies in the context of Making in education have touched upon this topic. The relationship between Making and children's identity and nurturing of a Maker mindset and identity in children have been discussed (Chu et al., 2015, 2017a, 2017b, 2017c, livari et al. 2018, Katterfeldt et al. 2015, Litts 2015, MacDowell et al. 2017, Marshall & Rode 2018, Martin 2015, Rode & Cucuiat 2018, Ryoo et al. 2016, Thanapornsanguth & Holbert 2017, Walsh 2017, Weibert et al. 2017, Wyld 2017). Making should lead to building deep and sustainable learning that engages both mind and body (Katterfeldt et al. 2015). Maker mindset is seen as "playful, asset- and growth-oriented, failure-positive, and collaborative" (Martin 2015). Maker identity is argued to require self-efficacy (I can make), motivation (I want to make), and interest (I like to make) (Chu et al, 2015). Self-efficacy as well as self-identification and sense of belonging with the Maker movement and community are required important elements (Chu et al. 2017c). livari et al. (2018) argue that these characterizations apply also in the case of designer identities: self-efficacy (I can design), motivation (I want to design), and interest (I like to design) as well as self-identification and sense of belonging with designer community are essential in building a designer identity.

Several types of methods and approaches have been utilized for studying and nurturing children's identities, varying in their level of engagement and criticality. We broadly categorize them as interview-, reflections-, and hands-on creative types of methods and present a brief overview of each.

2.1 Interview-based methods

Interview-based methods, sometimes in combination with other methods, are common in CCI, also in exploring children's identities (Parker et al. 2013, Doorn et al. 2014, Duytschaever & Conradie 2016, livari & Kinnula 2018, Thanapornsanguth & Holbert 2017). These include interviews, focus groups, and surveys, all of which are researcher-driven. The questions or interview themes are usually pre-defined, and participants have limited possibilities to affect the outcome. Interview type methods can include direct or semi-direct questions to seek qualitative and/or experience-based responses (e.g., Parker et al. 2013). Interviews are commonly used in qualitative studies to examine the experiences, perceptions, and contexts around complex and abstract concepts – such as identity. As interviews are used in many different disciplines, interview techniques might be adopted from various fields. For example, Thanapornsanguth and Holbert (2017) used a semi-structured cognitive-clinical interview format where they exploit the practices of psychological research and practice.

Usually researchers interview children, but peer interviews where children interview other children have also been explored (Parker et al. 2013, Doorn et al. 2014, Duytschaever & Conradie 2016). Parker et al. (2013) asked children to interview other child-participants, inquiring about their experience (likes, dislikes, and wishes)

of using an application, called TalkBack, that provided information on food items, during an exploratory study at a summer camp. Using peer interviews and feedback on the process, researchers found topics that the participants found interesting (Parker et al. 2013). Interviews are also used in combination with participatory design methods (e.g., livari & Kinnula 2018) and Making sessions (MacArthur et al. 2019), where participants discuss and/or reflect on their experiences. Discussions (or reflections) after participating in an activity have been motivated by a "post-structuralist approach", where it is important to understand the object produced as part of the workshop or activity and the approach taken to create the object (Zwick & Dholakia 2004).

Surveys and questionnaires are the typical method for data collection in quantitative studies, where it is desirable to gather data from many participants, thus covering breadth instead of depth regarding the topic under study. When it comes to children, pre and post questionnaires are commonly used to capture their experiences of an activity or event as well as experiences with technology, an application, or tool (e.g., Parker et al. 2013). Pre and post experience surveys have also been used to inquire participant experiences and identities after Making wearable LED slogans for bags or clothes (Winkler et al. 2009) and after creating low-fi prototypes of applications geared towards understanding family, and identity, conflicts within minority communities (Vacca 2017).

2.2 Reflection-Based Methods

Reflection-based methods are employed in two main ways, to study and probe existing understanding of participants' own designer and Maker identities, or after a hands-on experience with design and Making, asking the participants to reflect on their experiences. Noteworthy is that these types of methods are participant driven as researchers cannot particularly influence the outcomes, and the outcome depends on the participants' activity. In previous research, reflections were initiated through audio or video diaries, or other digital cultural probes (Iversen & Nielsen 2003, Wyeth & Diercke 2006, Gourlet 2018). Diary methods in general demand little resources from the researchers and minimize the researcher's influence on data; however, problematic might be the lack of researcher's control as well as the resource-demanding nature of the method from the research participants' point of view (Carter & Mankoff 2005, Rubio et al. 2013). Other disciplines such as sociology, then again, see video diaries not just as techniques for collecting data but rather as tools for participants' experiences, feelings and identity work, and worth study as such. livari et al. (2014) used video diaries for studying children's digital technology identities. They identified seven major subject positions which the children seemed to draw upon while producing their video diaries. These were the news anchor, stage performer, storyteller, diarist, and pupil as well as child and peer. The authors argue that besides providing data on users, user experience or usage habits, videos and diaries can reveal additional information on participants' positioning and genre repertoire available for self-presentation and identity construction that is taking place.

2.3 Hands-on Creative Methods

Hands-on creative methods, where children participate in relevant workshops and activities within or outside the classroom, have been widely used. Such creative methods employ a constructivist approach towards learning and identity, where Maker identity is equated also with self-efficacy (I can make), motivation (I want to make), and interest (I like to make) (Chu et al. 2015). These characterizations translate also to design and designer identities: self-efficacy (I can design), motivation (I want to design), and interest (I like to design) (livari et al. 2018). Hands-on creative methods are participant driven, requiring more effort from the participants than

from researchers, while allowing participants to exert more control to shape the project goals and outcomes. There can be various creative applications employing hands-on techniques, including crafts-based methods for Making, creating personas, and storytelling, as described next.

Craft-Based Methods and Making: Crafting and Making include a variety of participatory design approaches with school children, including creating a board game with sessions at a Fab Lab (Iivari & Kinnula 2018) and creating a board game at a summer youth program for refugee children (Lee & Worsley 2019). Another approach focused on how participants attending a Maker Faire or Maker sessions navigated and negotiated their Maker identities within the community, e.g., gender-based identities with quilt-making vs game jams sessions (MacArthur et al. 2019), hands on programming session with girls (Root et al. 2019), or visitors trying hands-on electronics and circuits and reflecting on their experiences (Meissner et al. 2019). This also includes a three-year long study with schoolchildren developing “computational communication” through creating a project portfolio using e-textiles and reflecting on their experiences and growth (Lui et al. 2019). Patchwork is an interactive construction kit which enriches learners’ experiences with identity reflection and expression (Boone et al. 2018), where the learner is scaffolded through both learning electronics as well as identity reflection and formation. In Bags-of-Stuff, a low-tech prototyping design technique, participants are given access to crafting materials like felt, pipe cleaners, ribbon, and popsicle sticks and asked to create a physical artifact based on a given prompt (Yip et al. 2013, Coenraad et al. 2019).

In addition to the hands-on methods described above, participants’ identity has been explored in other ways, such as through reflections on the Making activities they chose to accomplish (Marshall & Rode 2018) or through participant observations (Ryoo et al. 2016). Latina teens, through participatory design sessions, engaged in brainstorming and creating low-fi paper and wireframe prototypes for application they would like to build (Vacca 2017). Similarly, in a project on upcycling and Making, researchers used a variety of hands-on, reflective, and storytelling methods with participants living in a refugee area (Weibert et al. 2017). Researchers have also conducted Making workshops with children and adult family members, exploring how both the child and adult explore, discuss, and reflect on their experiences, skills, learning, and consequently identity, during the Making activity (Sheridan et al. 2019, Sadka & Zuckerman 2017). Children discussing and reflecting on their participation in design and Making activities, while actively engaged, allows them to also express their identity (Branham et al. 2014, Wardrip & Brahms 2015, Park et al. 2013). Marshall & Rode (2018) studied the role of gender in Maker identity formation and how masculine characteristics of Maker spaces create challenges for feminine identity construction and expression. MacDowell et al. (2017) worked with young girls to nurture them as “makers, coders, and inventors of media and technology” and overcome “traditional gender and generational stereotypes” in Making environments. Walsh (2017) engaged with high school students, nurturing them as expert Makers, by creating tactile audio books using 3D printed pages for visually impaired children.

Creating Personas: Creating a persona is a well-known user-centered design method where a typical, yet fictional, user is described. Variations of this are identified within CCI research where children are asked to co-create personas after reflecting on certain aspects of their lived experiences, e.g., through hands-on design workshops and stakeholder interviews of vulnerable children (Wärnestål et al 2014, Itenge-Wheeler et al. 2018). However, our focus is on personas created to reflect on children’s designer and Maker identities. This includes, for instance, Coenraad et al. (2019) who used the concept of a “likely learner” for studying children’s emerging identities, where likely learners are ideal school students. The created personas were not direct representations of the participants, but a tool for them to reflect on their identities and characteristics they consider important in

a learner. In addition to likely learners, the authors also used bags-of-stuff with children to formulate other characters, comparable to personas, for instance, designing a strong female figure “social activist fashionista”.

Storytelling: Storytelling is a widely used tool in learning, from social and language skills to writing and reading comprehension (Peck 1989). Storytelling activities are a familiar way to encourage creativity in children, as also seen in HCI studies (Zarei et al. 2020, Multisilta et al. 2017). Storytelling and narratives are not necessarily true stories or direct reflections of one’s own life, but they provide a mechanism to reflect on one’s situation in the lifeworld of a web of stories (Mills et al. 2010, Halverson 2004). According to Bers and Cassell (1998), storytelling is a particularly good medium for identity studies as it enables exploration of a person’s inner world. In their study, children created storytellers as well as stories for these characters. Stories both enabled children to study their own identity and present themselves to others. The invented storytellers, on the other hand, reflected children’s fears, feelings, interests, and role models (Bers & Cassell 1998). Storytelling and Making were combined in Chu et al.’s work (2015) where children first brainstormed a story and made a storytelling theatre set up during two Maker workshops and then enacted the story using the fabricated set up. The authors argue that Making activities should be designed to support children’s Maker identity emergence. Lamarra et al. (2019) engaged children to design a mobile game for “civic or social issue within their community” using storyboarding as a technique. They found that participants became more active in expressing concerns of the civic issue they worked on, shifting their perspectives on the issues, and behaving almost like activists.

3 CRITICAL DESIGN FICTION WORKSHOP PROCESS

Inspired by previous research on children’s designer and Maker identities, we conducted an online workshop employing critical design fiction to consider how these methods can be adapted to the current situation, which has been strongly shaped by living through a pandemic, and for the future. The workshop consisted of two-sessions (90 minutes each), with a third shorter follow-up session (about 30 minutes), with 4 researchers (one of whom did not participate in the first session). One of the four researchers moderated the sessions and took the lead on the workshop – its planning execution, analysis, and paper-writing. The moderator invited all participating researchers to co-author this paper. All authors are associated with the same research group. All researchers have extensive experience within CCI working on topics of empowerment and inclusion, design and Making, neurodiversity and technology, conducting field work in classrooms, schools, after school clubs, and Fab Labs, using a variety of qualitative, quantitative and design research methods, such as those categorized in the paper. Two of the researchers have over 10 years of experience working with children and schools while the other two (including the moderator) have over 8 years of such experience. The moderator has previous experience running critical design fiction workshops with university students and contributed to an entire series of workshops on Researchers’ toolbox for the future co-conducted with another researcher-participant who is an expert on critical design and children, and children’s designer and Maker identities (interact.oulu.fi/researcherstoobox). The other two researchers were familiar with design fiction prior to the workshop. All the researchers were impacted by the pandemic as schools went online and they were thus already considering alternative ways to pivot their research online, as were researchers everywhere else in the world. Thus, the workshop outcomes also served to feed their plans for conducting online studies with children.

The moderator used MS PowerPoint slides to structure the workshop where an overview of critical design fiction was provided in the first sessions. They emphasized that critical design fiction is a means to explore and imagine provocative or preposterous futures of technology (10-100 years) through scenarios utilizing various

design artefacts, and with regards to the workshop, the focus was on provocative and/or empowering critical design fiction. Given its online nature, being conducted within the initial months of the pandemic, a semi-structured discussion format was selected for the workshop. The discussions were mostly friendly, with participants adding to and building on the previous points, highlighting both strengths and weakness of an approach, The goal was to be critical of the approaches being suggested, by bringing out their weaknesses, and also suggesting provocative approaches by asking what-if questions to challenge assumptions – such as if adult-practitioners should be replaced entirely by apps or other children and if empowerment is the end goal, then should children be deciding the topics of study and become co-researchers. Thus, new approaches and methods being suggested were critically dissected for strengths, weaknesses, underlying assumptions and how they could change in the future, and thinking from the perspective of children such as why should children participate in any studies anyway? The framework delineating methods into interview-, reflection-, and hands-on- types in the future was also questioned during the workshop.

The first session began with a discussion on critical design fiction, what it means and how it can be employed as a method in the workshop (inspired by e.g., Blythe 2014, Markussen & Knutz 2013). Next, in the remaining part of the first session and in the second session, researchers considered each type of method (interview-based, reflection-based, and hands-on-creative types of methods) starting with examples from previous work (as also presented in this paper in section 2) and speculating on how the methods can be adapted in the context of the current pandemic, and 5 and 10 years from now. Researchers used the following questions as guidelines for these discussions: (a) *Taking stock of the past*: What are the benefits and limitations of this type of method? What should change in the future when employing this type of method? (b) *To speculate on the future*: what can be an alternative future for conducting research with children? How has the pandemic changed the children's interaction and relationship with technology now and possibly for all futures? (c) *To be critical and provocative*: what if this is the new normal – how can everyone adapt? What would it mean then to think of designer and Maker identities? What would identity mean in this new normalcy? (d) *To consider empowerment*: What is the current status quo and what could it be in the future?

At the end of the second session, researchers summarized the discussion from both sessions, and further reflected on the overall workshop to summarize the main findings. A third follow-up session was conducted to revisit and further reflect on the opportunities for designing and Making during the pandemic. The workshop sessions were audio recorded and one researcher took notes during the sessions. From the researcher notes and the audio recording, a summary of the workshop was generated (not transcribed verbatim). This summary was thematically analyzed by two researchers (the moderator and one participant-researcher) in a shared document, with the final analysis presented to all co-authors for comments and feedback. Thus, workshop participants have commented on the analysis and reporting of the workshop outcomes. While many variations of the methods were discussed, those that align with the study's aim of critically exploring methods that can be used in today's situation and in the next five to ten years are presented in this paper.

4 FINDINGS

The workshop examined how on-going extensive digitalization shapes the life of children of today, i.e., their living and learning; who are the stakeholders involved in the day-to-day teaching and learning; what are their daily struggles or challenges; and how do they affect children's digital experiences and their relationship with digital technology? The goal was to consider future scenarios that are empowering and provocative, in that they

question the role (and need) of researchers, and other adults, allowing for more participant driven approaches. We present a summary of the findings next.

4.1 Interview-Based Methods

The researchers questioned whether interviews would remain relevant as technology advances say 10 years from now, as human-human interaction might dramatically reduce - children might have AI friends with whom they discuss personal and education-related matters, safely and privately. However, interviews provide a mechanism to probe, negotiate, discuss, and ask the WHY questions, and to arouse responses from interviewees through human-human interaction and intelligence, so they are likely to stay.

Going Online Now and in the Near Future: The physical location of interviewees and interviewers becomes unimportant. It becomes possible to conduct interviews in situ and not after the fact. In the context of designer and Maker identities, one usually expects that participants feel a sense of self-efficacy and competence in the task they are engaging with. An interviewing application can ask participants in situ if they are enjoying their current activity, and whether they like or dislike it. There can also be different characters that ask these questions, such as someone with an angry voice asking why are you doing it this way? Considering surveys, the traditional smiley-o-meter responses can also be replaced by a variety of characters or avatars, some familiar some new, such as animals or masked singers, where participants are asked reasons for their selection, indirectly revealing aspects of their identity - how they see the world and themselves. Online interviews can also be conducted by interesting and fascinating characters rather than boring adult researchers, such as Artificially Intelligent (AI) chatbots, a horse, masked singers, a potato, or other popular characters. How children respond to these characters may reveal something interesting about their identity, too, e.g., by asking why they chose a certain interviewer-character. This might sound provocative, but even today Snapchat filters provide mechanisms for people to interact and communicate with each other using different characters or face-accessories through Augmented Reality (AR). Thus, interviews can be conducted using AR applications with both the interviewee and interviewer taking on and exploring different roles and identities.

Considering Empowerment and Provocation: While it might be interesting to study how children talk about certain experiences, e.g., what they reveal and what they hide, interviews are inherently limited in the type of data that can be gathered: they reveal mostly what the interviewees wish to reveal. Topics such as designer and Maker identity can be difficult to tackle. One way to overcome these limitations is by empowering children and making interviews participant-led. Participants can answer questions together with their peers through discourses around not only the responses but the questions themselves: their relevance, how they are (or are not) understood, and what are better ways to inquire about the topic. With automated data collection methods, questions can be changed on the fly using vocabulary that is familiar. Further in the future, children can be encouraged to talk-back to intentionally change the questions, take control, and tell researchers what they like to talk about, or what they like to be asked, adapting the interview agenda. In this way, children become designers of the interviews as they participate in them. Similarly, in surveys, participants could alter the questions through their responses, revealing new themes and ideas to the researchers. If children are interested in design and Making, the tools can also be opened to allow tweaking or redesign. However, this might encourage hacking (or trolling) and gaming the system to break it, resulting in data that is unusable. A balance between providing control to researchers and offering flexibility to participants is required for interviews to remain relevant and engaging, and to collect rich experiential data. While going online is not a giant leap from

where we are currently; the need, and desire for interviewers and interviewees to be co-located, co-present, and use their real identities may be disappearing.

4.2 Reflection-Based Methods

The first thing to consider is what type of reflection are we aiming for – a reflection on activities or events that occurred in the past (pondering) or reflection in action currently occurring (similar to thinking aloud). Another type of reflection can be projection, that is, asking participants to consider how their thinking, or in our case identity, is reflected in an artefact, such as a sculpture or drawing that they are making or have made, or that they select from a set of given options, and explain their selection. We discuss these different types of reflections, and how they can be used with children to study designer and Maker identities.

Thinking about Now and in the Near Future: Reflection-type methods are participant-led, but participants can forget to mention things or record events; therefore, automating data collection is a practical solution. Reflection-on action can be supported through such technology by recording the scenarios where there is a lot of excitement and asking participants to reflect on what they were experiencing, thinking, and feeling after the activity is over by showing those recordings. This is similar to current life-logging methods, but there are obvious safety, privacy, and ethical concerns that need to be addressed. Reflection-in action can be disruptive, so instead of asking children to read or write something, they can make audio or video recording in situ where they talk and think aloud or take pictures. This can be especially suitable for young children, allowing them to express themselves in various ways. If we consider the near future, it is possible to have helmets or other wearable devices, such as smart watches, that can measure for example physiological data and based on certain thresholds, like being excited, can ask relevant questions from the participants. The main differences between reflection-based methods, and interviews, is that reflections aim to stimulate the participants' thought processes and contemplation on issues, not just reporting of facts or offering fast and easy reactions. Reflections may also be spread over time to capture multiple instances and scenarios, where participants need not rely only on their memory of an event or experience. Reflections can be focused on looking at a transformation or change in a person and how they see themselves before this transformation and discuss what caused it.

Considering Empowerment and Provocation: Considering empowerment, reflection-based methods can be used to strengthen understanding and experiences, and align with more therapeutic-type of methods, where the intent is to not only to question, but to find solutions. With therapeutic methods, the main idea is that there is someone who listens and builds a relationship with the participant, and provides the right tools for reflection, and finding strengths and solutions to navigate life. While such intelligence is just around the corner for AI chatbots, the ethical, privacy and safety issues regarding these approaches require further attention and discussion. We further considered group and community-driven reflection-based methods where one can crowdsource information, connect with like-minded people and communities, and peers for support and collaboration. This can be especially interesting for studying designer and Maker identities, as identity itself is a social construct which can be understood by recognizing ourselves with respect to others, e.g., asking how one is different or similar to another person, who or what do I represent. It can also be possible, and provocative, to encourage to intentionally meet people who are different from us to become more empathetic and expand our own world views. When it comes to children, such methods must ensure their privacy and safety.

4.3 Hands-on Creative Methods

Identity explorations show that identity can also be understood as being performed when doing things and living one's life. Thus, for studying designer and Maker identity, children can participate in designing and Making and reflect on their experience, feelings, and thoughts. We took this as a base and discussed hands-on creative methods for the situation now and in the future.

Thinking about Now and in the Near Future: Hands-on creative methods usually employ several aspects of interview-and reflection-based methods - interviews can be conducted after participation in a design and Making activity or participants can reflect on their experiences before, during, and after participation. Thus, from interview-based to reflection- and hands-on creative methods, participants' experience with design and Making, and also their responses are becoming richer. In hands-on creative methods, there is an external stimulus, an event, or an activity, that supports transformation. This stimulus is supporting, changing, and/or strengthening a participant's designer or Maker identity. Even before the pandemic, design and Making could be conducted remotely, e.g. through online computing and programming applications, DIY YouTube tutorials and videos. Children can also design and create artefacts by upcycling materials available at home. Further, they can collaborate with peers, researchers, and others through online tools, such as Teams or Zoom. It is also possible to design everything digitally online and then have a researcher print and post the materials. Digital storytelling, personas, characters, or avatars, and reflecting on these digital artefacts are all possible activities. Current research is active in devising novel ways for engaging in design and Making online. Hands-on creative methods are already in essence participant-led with little researcher control over the designed artefact and outcomes, therefore, going online does not necessarily change this dynamic. However, the types of tools or opportunities children have access to depend on their teachers and families' technical expertise, resources, and attitudes.

Considering Empowerment and Provocation: When considering empowerment, participants can become designers also of the tools and methods being used. For instance, adaptive-type technologies can support participants in developing methods and their own research trajectories. Further, we can engage participants towards critical and speculative design approaches, for instance, asking them to consider their lived experiences during the pandemic and thinking, and questioning, where should we go from here for e.g. schooling and learning 5 or 10 years from today. Asking children to be critical (questioning what is going on today) and provocative (considering dramatic changes for the future), is empowering and provocative in itself. Other methods to ask children to critically examine the present and future, can be live theatre or dramatizations. For instance, participants can experience a live scenario by actors, e.g., of bullying at school, and be asked to reflect on and critically discuss and examine that experience and their own previous experiences. They can be asked to express themselves with creative and artistic tools that they enjoy engaging with, such as writing poems or letters, although, interpreting such data may be difficult and tedious.

When we start thinking about the future, all the methods discussed thus far, including interview- and reflection based, blend into each other. In interviews, we probe or query previous lived experiences, in reflections we probe a continuum of experiences to discuss change or transformations, and in hands-on methods we provide opportunities and avenues for a transformation or change through participation in an specifically designed event or activity. When considering empowerment, the goal is to transition from researcher-led directions and goals to participant-led goals and methods. This becomes especially important as our experiences during the pandemic shape, and maybe forever change, our relationship with technology from a good to know how to use to crucial to control, design, and master.

5 DISCUSSION

In this paper, we discussed a variety of methods used to study and nurture children's designer and Maker identities and presented the results of critical design fiction workshop focusing on envisioning future methods to elicit children's designer and Maker identities, methods that could be used online when face-to-face access is unavailable, and users are off-limits as during the pandemic. We also speculated which of these adapted methods will be used in the future, to empower, albeit seemingly provocatively, children in not only developing a designer and Maker identity, but through increased control and influence over the goals, methods, approaches, and outcomes of research they participate in. Our study generates several research implications.

A call to study and nurture children's designer and Maker identities. We should focus our attention to the evolving digital technology identities of children. Digitalization is transforming our lives at such a fast pace that this is going to have identity consequences that we should be inquiring and understanding. We need to emphasize also more proactive approach towards digitalization, in line with the Scandinavian participatory design tradition (e.g., Robertson & Simonsen 2012, with children e.g., livari & Kinnula 2018, Iversen et al. 2017); children should be invited, through encouragement and offering them appropriate skills and competencies, to start making and shaping their digital futures, not only accepting them as is. They need to be invited to look critically at digital technology and its affordances and embedded values (e.g., livari & Kinnula 2018, Iversen et al. 2017) – they need to be developing (critical) designer, Maker, and activist identities. However, we acknowledge that not every child in the globe needs to develop such identities to manage and master in their future life, while we maintain that such identities are valuable for many. Moreover, depending on a child, one of these identities may be more appropriate than others and it is not necessary to embrace them all. Despite these issues, we see the need for progress along this path. There is emerging interest on this topic already, while there are many limitations in this research still.

A call for our research methods to go online. The pandemic brought forth the need to seriously reconsider our research methods and our prevalence with face-to-face interaction, for example in interviews, but also in crafting and Making. HCI studies have already been conducted through online interviews and surveys as well as online/virtual ethnography/nethnography, while with children there still is a heavy focus on co-located research, design and Making (e.g. Chu et al. 2015, Chu et al. 2017c, livari & Kinnula 2018, Iversen et al. 2017)). We, as experts in computing, education, and future of CCI, should however be actively responding to the radical digital transformation occurring in all of our life spheres and developing our methods for this new normalcy. This concerns our research and design methods, to be used with children as well as with adults. It is a great research challenge to develop our research and design practices in a way that augments our interactions with the young research and design participants the most meaningful ways. Very valuable studies on empowering children through design and Making have been conducted, and we should be able to continue this also in the future world. This paper speculated on how this could be accomplished now or in the relatively near future. We hope this gives food for thought for researchers to reimagine their (online) method repertoire and associated tools.

Introducing identity as a central concern for our research. We underscore the effects of digitalization on children, their everyday lives, and the society as well as the value of the identity concept for our research: it enables to study longer term and societal consequences of our practice. Such foci have remained quite neglected in the existing research, even if the concept of identity has received attention (e.g., Chu et al. 2015, Chu et al. 2017c, Coenraad et al. 2019, livari et al. 2014): research has not reflected much on our role as shapers of children's identities through design and Making processes or through their outcomes. Through our

design and research practices, we may be aiming at and/or potentially initiating significant transformations in children's lives and we need to be paying closer attention to what we initiate, how it unfolds and with what kind of consequences. These considerations immediately beg the question of ethical and responsible research. Indeed, these need to be considered before any action is taken.

Reconsidering our method repertoire for studying and nurturing designer and Maker identities.

Previous research shows that even if many studies speak to the importance of nurturing children's designer and Making identities, many of them lack a systematic study on identity. The categorization of the methods into interview and reflection based and hands-on creative ones indicates quite a lot of diversity from which to choose. Using a combination of the methods is also recommended as each method enables and supports particular kind of insight but is limited in many other respects. However, we wish to underscore that this method repertoire still needs development: the specific methods should be critically scrutinized from the viewpoint of their underlying assumptions about the identity construct. There are yet many limitations in the ways we approach such a rich and complex concept in collaboration with children. For the future development, reference disciplines, such as psychology and cultural studies, are to be consulted (Buckingham 2008, Eccles 2009).

Taking advantage of critical and speculative methods when reimagining our method repertoire. There is a method repertoire for envisioning, reflecting on, and probing the future that we could utilize when developing our own research practice, not only when engaging in design or design research practice. Such methods include, for instance, Critical Design, speculative design, design fiction and reflective design (e.g., Iivari & Kuutti 2017, Auger 2013, Blythe 2014, Lukens & DiSalvo 2012, Markussen & Knutz 2013) that enable to provoke, to bend and violate cultural norms and rules, to show alternatives, to deconstruct the existing notions as well as to consider speculative futures and alternative presents. So far, they have not been used a lot with children (Iivari et al. 2021). We experimented with one way to augment our research practice in connection with research on children and their designer and Maker identities, considering our method repertoire from the viewpoint of extensive digitalization and children's empowerment. This is a call for action for researchers to make use of the design method repertoire in developing their research practice: the way we utilized design fiction may pave the way for envisioning alternative research practices: more empowering, intelligent, provocative, flexible ones.

6 CONCLUSION

While children might already have an intimate relationship with technology (as digital natives), this relationship is changing from gaming and playful interactions to 'adult' type of uses, from consuming to design and Making. How the pandemic has shaped this relationship in the future is yet to be seen, but one thing is certain – researchers need to respond to this dramatic change by empowering children as regards digital technology in a more serious sense: encouraging children to adopt a more proactive and critical stance towards such technology through design and Making. To provide researchers tools for studying children's designer and Maker identities, we conducted a workshop to critically examine and speculate on how current methods could be extended from face-to-face interactions to online, designing, and Making, now and in the future. In the workshop, we used critical design fiction scenarios with a focus on empowerment. Our goal is to empower children in both their educational and computational learning journeys, and with this work we reimagine how to develop a designer and Maker identity - with children having an increasing control and influence over the goals, methods, approaches, and outcomes of research they contribute to, no matter how provocative the approach and its outcomes from educational and computational perspectives.

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