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# Conducting online participatory design from the United States with children in South Korea with a focus on cultural awareness

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## ABSTRACT

Participatory Design (PD) is a commonly used method in Western cultures with roots in Scandinavia. After the COVID-19 pandemic, many PD practitioners have transitioned to an online space, where researchers and participants from different geographical locations can co-design together. Yet, we do not fully understand how different cultures collide, mix and blend in the online co-design space. By understanding how one's culture influences the participation of a child, researchers can better structure sessions to elicit diverse input. This study examines a case study of researchers and participants from South Korea and the United States co-designing together. Close analysis of video recordings, analytic memos, and parent/child interview data demonstrates the ways in which children participated in design sessions. Facilitators paid special attention to various cultural sensitivities. Applying the theory of cultural awareness from public health literature, we offer implications on how scholars who are not fully embedded in the culture where co-design happens can understand other cultural norms and in response, create spaces in which co-design can occur successfully despite different cultural norms. Our findings show how different parts of the ecological systems from ideology, education systems, and ethnicity all influence children's participation in sessions.

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Participatory design; co-design; digital youth; user-centered design; children; cultural studies

## 1. Introduction

Participatory design (PD) is a method and a philosophy that aims to directly invite the end-user to the process of design. PD researchers have long strived to create new methods and techniques to work with and communicate with users, while taking into consideration the different demographic groups (e.g. elders (Brandt et al. 2010), animals (Webber et al. 2020), neurodiverse children (Frauenberger, Good, and Keay-Bright 2011; Makhaeva, Frauenberger, and Spiel 2016)) and environments where PD is conducted (schools (Dindler et al. 2005; Read et al. 2002), refugee camps (Albadra et al. 2021), libraries (Yip, Lee, and Lee 2020), and community centers (Yip et al. 2016)).

The PD method stems from the Scandinavian approach of including union workers in the process of design in order to support their agency. PD originated in the 1970s when Scandinavian workers faced threats of being replaced by new technologies (Kensing and Blomberg 1998). Over the years, PD has evolved and adapted to working with children as design partners (Guha et al. 2004; Yip et al. 2013b). Many early papers

regarding PD with children share insights on what children should offer for the design process, such as how the information they provide informs the design of future technologies (e.g. International Digital Children's Library (Reuter and Druin 2005), Nature Collections (Kawas et al. 2019), and examining creepy technology for children (Yip et al. 2019)).

PD scholars working with children, however, have noted that when design partners from different socio-cultural value systems come together, participants encounter additional difficulties (Winschiers-Theophilus et al. 2010). Through globalisation, more researchers have engaged in designing with people from countries or cultures different from their own (Diehl and Christians 2006; Röse 2006). Design methods and techniques developed in one culture sometimes have to be adapted in a completely different environment. As there are increasingly more international design teams across the world due to the ease of travel and development of information technology, there are more opportunities for different cultures to come together (Heimgärtner 2013; Khaliq et al. 2018; Lu, Chen, and

Epstein 2021). In this case, the implicit and explicit rules that are obvious to the participants from a local community may not always be obvious to the outsiders. Therefore PD researchers have conducted studies to better understand the influence of culture in conducting PD sessions in a country less experienced in PD concepts. Within these studies, scholars made efforts in modifying techniques to meet the cultural needs (Hussain and Sanders 2012a; Moraveji et al. 2007; Yasuoka and Sakurai 2012).

Additionally, due to the COVID-19, many studies including co-designing with end-users transitioned to an online environment (Fails et al. 2022; Lee et al. 2021) which opens even more opportunities to design with a larger demographic group representing diverse cultural backgrounds. Yet there is a dearth of research pertaining to how culture influences co-design in an online space. This is particularly important as in HCI previous studies have shown that culture influences people's interaction, behaviour, and perceptions with technology (Marcus 2010; Plocher, Rau, and Choong 2012). This suggests that not meeting such needs could potentially lead to misleading use of technology or also trigger negative feelings (Lu, Chen, and Epstein 2021).

To fill this gap, we have conducted a case study where university students who have experience co-designing with children in the U.S., design with children in South Korea. The purpose of the study is to understand how two different cultures affect the participants' behaviour, and gain insights as to the role the researcher needs to take to help negotiate and work through the conflicts, if any. We selected these countries considering the contrast in traditional values and power dynamics in interpersonal relationships, which will be further discussed in the methods section. Our paper aims to provide a lens using cultural awareness theories from public health (Resnicow et al. 1999) to actively recognise the cultural differences as well as actions that can be taken by co-design participants to effectively co-design despite those cultural differences. Our research questions are as follows:

## Research questions

1. What are the challenges and opportunities of conducting online participatory design (PD) with children in Korea?
2. How do we support design online with children in a Korean culture and education system?
3. What kind of improvisation needed to happen while doing PD with children in Korea, especially in an online environment?

In our case study, we focused on the process of developing, implementing, and conducting co-design workshops with children. We documented conversations with administrators, video-recorded all six co-design sessions (a total of approximately 540 min), interviewed children and parents involved in the co-design sessions. To understand the experiences, seven researchers wrote a total of 33 analytic memos. By analyzing the data collected, our goal was to understand how we, as PD researchers, confronted the challenges, noticed the opportunities, and compromised to successfully run the sessions considering the cultural values and tensions within the online space.

Our understanding of how PD scholars interact with the participants, the challenges they face, and how they adapt and improvise online will offer useful insights for scholars in HCI who do cultural studies with a global perspective. Our research focuses on designing with children in unique cultures and educational systems, and our findings make several contributions to the field. Theoretically, we explore the ways in which culture impacts the end-users' participation in product design sessions. We also examine the concept of design-partnership, specifically how it relates to testing culture and Confucianism values such as hierarchy, rank-order, and piety. In addition, we draw on interdisciplinary theories of improvisation to provide insights on how to design with children from different cultures in the online space.

Empirically, we examine how Korean children, who were situated in a different testing culture, perceived the design sessions. Through this examination, we gain an understanding of how culture influences the design process and how to modify design activities to be more culturally sensitive. Methodologically, we also explore how to improvise design activities in the online space while ensuring that participants feel comfortable sharing their design ideas. Overall, our research sheds light on the complexities of designing with children in diverse cultural contexts and offers practical strategies for doing so effectively.

## 2. Related work

In the following sections, we will discuss three main bodies of work. In the first section, 2.1 Participatory Design with Children, we discuss the literature about 2.1.1 Child and Adult Relationships when co-designing, 2.1.2 Moving to the Online Space, and finally, 2.1.3 PD with Children Outside of Non-Western countries with different cultural backgrounds. In the second section, 2.2 The Context of Korea, we provide the cultural context of Korea as a space for a case study. Finally, in our

third section, 2.3 Theoretical Lens, we provide the theoretical lens in public health that guides our findings.

## 2.1. Participatory design with children

### 2.1.1. Child and adult relationship

The partnership between adults and children with different stakeholders is of interest to many PD researchers (Frauenberger, Good, and Keay-Bright 2011; Holone and Herstad 2013; Yip et al. 2017). This is because the role of the adult researcher often strives to break traditional power dynamics, such as the adult being the expert. Yip et al. (2017) further investigated what it means to be equal design partners by unpacking the definition into four dimensions: relationship building, facilitation, design by doing, and idea elaboration. Yet, many of the studies that explore equal partner relationships are situated in Western countries, where there are relatively more democratic relationships between children and adults (Frauenberger, Good, and Keay-Bright 2011; Holone and Herstad 2013; Yip et al. 2017). The few studies that have explored PD with children in non-Western countries note how the relationships of adults and children differ from Western countries (Hussain and Sanders 2012a; Lee et al. 2019; Sung, Shin, and Kang 2003; Yasuoka and Sakurai 2012). In these studies, children often take on the role of the listener, and adults take on roles with more authority. In this work, we further investigate adult and child relationships where there are more unbalanced interactions. An unbalanced relationship occurs when a child or an adult is solely working on their own as opposed to collaborating. While Yip et al.'s model (Yip et al. 2017) informs us as to what constitutes an equal partnership, we do not yet understand how such themes are interrelated or how the model changes when working with children from different cultures with different norms and different languages.

### 2.1.2. Moving to the online space

The co-design sessions in this study occurred in the online space. When we consider the future of designing with diverse groups of children globally, the online space is appealing in that it is free from geographical barriers (Walsh et al. 2012; Walsh, Donahue, and Pease 2016; Walsh, Donahue, and Rhodes 2015). Designing in the online space also saves the time and energy of having to meet in a colocated space (MacLeod et al. 2016). We use the Improv. model that outlines the considerations that need to occur when co-designing with children in a synchronous online space (Lee et al. 2021). The model points out the need for more

improvisations in multiple aspects in online synchronous sessions. As sessions were not pre-recorded but live, we also dealt with many spontaneous occurrences.

The three themes of online improvisation for HCI are: (1) *Project Logistics* of understanding the methods of what and how interactions can occur when designing online, (2) *People and Setting* of understanding that children can join in a synchronous online space from multiple locations where their surroundings change, and (3) *People's Online Interaction* of being attentive that children have the autonomy of engaging or disengaging in sessions based on their interest and motivation. When analyzing the data collected, we were attentive to this Improv. model and took notes of any additional considerations that took place or belonged within the Improv. model of co-designing with children online.

There are different configurations of how a group can be formed within co-design, from working with a large group over a short period of time (Read et al. 2022) to smaller groups of children elaborating on ideas over multiple sessions while working closely with adult partners (McNally et al. 2018; Walsh and Foss 2015; Yip et al. 2013a). Read et al. (2022) conducted research on how to facilitate distributed large PD groups by introducing rapid co design methods (i.e. Tick Box Design) to one country to gain design ideas from another country. In our paper, we focus on how we can gain design ideas from children by understanding how to build relationships considering the cultural differences in a smaller group of children. In the case study of co-designing with children in Korea, we used the Zoom video chat platform. Because of Korea's high level of Internet connectivity, Korean children and their parents may have different usage of the computer compared to those from other cultures. For instance, Korean children, compared to many other countries, own digital devices at a very young age (Winskel et al. 2019). We have limited understanding of how such cultural contexts, specifically that of high internet usage, influence co-design. By understanding how such context influences this co-design environment, PD researchers may envision how children's interactions will change in general as the Internet accessibility improves for children.

### 2.1.3. PD with children in non-western countries

Even though PD originated in Scandinavian countries, many cultures from all over the world have utilised the method (such as in South Africa (Winschiers-Theophilus et al. 2010), Indonesia (Kusumaningdyah and Purnamasari 2018), Korea (Lee et al. 2019; Sung, Shin, and Kang 2003), Taiwan (Huang 2015), and Japan (Yasuoka and Sakurai 2012)). As the concept is loosely defined, there exist differing understandings of how

and in what ways people participate in PD. The studies that explore PD in non-Western countries state how these cultures are different from the Scandinavian culture, which has a more horizontal relationship among people. In a Japanese study, Yasuoka and Sakurai (2012) discuss the ideal condition for PD to occur. The authors conduct a case study of PD where participants work together to address the aftermath of a disastrous tsunami. The study shows how the characteristics seen in PD cases in Western societies note that there are three underlying assumptions of PD: (1) equality, (2) open discussion, and (3) commitments for participation, which can be difficult in Japanese culture. The article discusses how, despite Japan's movement for restructuring itself toward a horizontally structured society as opposed to a hierarchical society, it differs from Scandinavia, where open discussion is more generally accepted (Yasuoka and Sakurai 2012).

In understanding cultural differences, Hofstede (1980), created a framework with six dimensions to discuss differences across cultures. The dimension 'Power distance index' is the extent of a less powerful member accepting that there is an unequal distribution of power. Low degree has an equal distribution of power whereas, high degree accepts hierarchies. The studies above indicate how the dimension of 'Power distance index' is higher whereas Scandinavian society has a low degree of power distance. In our study, we will examine what modifications we can make to the sessions while understanding the cultural values to create a more equitable environment in a cross-cultural online setting where the geographical lines are blurred.

PD scholars have also noted implicit rules that are not always obvious to foreign scholars. For instance, in the Cambodia study (Hussain, Sanders, and Steinert 2012b), the author notes how, in Buddhism, people are expected to show gratitude. Criticising others in public is considered rude. As a result, the Cambodian participants were not accustomed to criticising others' ideas in public. To adapt to Cambodian culture, the PD scholars modified their methods and conducted one-to-one feedback sessions so that the Cambodian participants felt comfortable sharing ideas. Jang (2017) discusses cultural sensitivity through the two concepts of 'adapting' and 'translating'. Adapting is accepting and empathising with the host culture's implicit rules as they are, whereas Translating refers to strictly applying one's own cultural norms to judge others' performance. The authors' decision to implement one-on-one feedback sessions in the Cambodian study is an example of adapting. In our paper, we strive to explore ways we can 'adapt' as opposed to 'translate' by recognising and empathising with the implicit rules of the host country

(South Korea). While all countries will have their own unique culture and characteristics manifested when co-designing, we notice that there are more similarities among cultures (children from the United States showing similar engagement as children from Sweden, and children from Japan showing similar engagement as children from Korea and China). Therefore, our scope of this paper is specifically understanding the cultural differences of Eastern and Western countries.

## 2.2. The context of Korea as a case study

In this section, we will outline the reasons why we have selected Korea as our primary research setting and explain how our findings will contribute to the existing scholarly conversation on PD and cross-cultural design more broadly. In macro cultural psychology, studies recognise that every individual is unique and is a cultural player (Berry et al. 2002). These studies discuss how individuals participate in overarching social norms, concepts, and artifacts. Scholars in cultural psychology believe that, in order to understand human behaviour, we must understand the nature of psychological phenomena that make humans susceptible to cultural influence (Valsiner 2013). To give a holistic view of the world that children in Korea are embedded in, we discuss the Education system – the public school system for Korean children in South Korea and the overall testing systems in East Asian countries in the following section.

### 2.2.1. The education system: extreme competitiveness

For human development, Bronfenbrenner developed a theory on ecological systems that influence the child. Within the different Ecological systems, the *exosystem* (Bronfenbrenner 1992) is formal and informal structures which does not directly influence the child but has indirect influence as they affect other microsystems such as school and parenting. One example of an *exosystem* (Bronfenbrenner 1992) different from Eastern and Western countries is the assessment for higher education. Davey, De Lian, and Higgins (2007) examine the main Chinese entrance test (Gaokao) and how it differs from the test in the United States such as the Scholastic Aptitude Test (SAT). While the United States considers SAT scores as one of the factors among many for acceptance to universities, Gaokao is usually the main indicator. Other than Chinese (Gaokao), there have been many similar entrance exams in Eastern countries such as in Taiwan, Japan, and Korea (Suneung) where the test score is usually the main indicator for acceptance (Ozturgut 2011). Western countries such as the

European countries and the United States usually have additional indicators such as personal statements, extra-curricular activities (Billing 2004; Kiersma, Plake, and Mason 2011). While these may be considered in certain cases in Korea, the prime and dominating indicator is still the test score. In short, for the students and children residing in Eastern countries studies show how their stakes become higher and there is more pressure in achieving a good test score.

In Korean society, children are accustomed to standardised testing for educational assessment. Therefore, administrators and teachers emphasise rote learning and memorisation, which is a mechanical way of memorising facts to find correct answers with very few independent thought processes or meanings (Kim 2009). Hard work, effort, diligence, endurance, perseverance, and persistence are all common virtues that are emphasised by teachers and parents alike to their children (Kim 2009). However, cultural studies have shown that while such collectivistic norms can be crucial for economic success, this work ethic also functions as a stressor that makes it difficult to maintain a healthy life (Kim and Sung 2000). Even though the Korean national education reform committee has had interest in finding ways of increasing creativity in the academic community, prior research states that there is much left to be desired (Choe 2006). In this study, we were co-designing with Korean children who were embedded in this particular education system. Therefore, we were attentive to the tensions and opportunities emerging between learning content knowledge to playfully exploring creative approaches when co-designing.

### 2.3. The theoretical lens for culture study

We used Cultural Sensitivity (Foronda 2008; Pasick, D'onofrio, and Otero-Sabogal 1996) as a theoretical lens for analyzing the data. In the field of public health, researchers have discussed defining and building a framework for developing culturally sensitive practitioners. Cultural Sensitivity is conceptualised by two dimensions, which are (1) Surface Structure and (2) Deep Structure. Surface Structure involves practitioners making interventions to observable characteristics of a target population. For instance, it involves showing materials that include the people, places, and languages familiar to the target populations. Deep structure, on the other hand, involves cultural, social, historical and environmental and psychological factors.

In the field of PD, while there are studies that involve designing with multicultural ethnic groups, we lack methods and techniques that will enable practitioners to tailor the design process to be more culturally

**Table 1.** Key terms in cultural sensitivity.

Cultural Sensitivity	When cultural characteristics, experiences, norms and values, and relevant historical and social forces are incorporated into the design and the delivery of a program (Pasick, D'onofrio, and Otero-Sabogal 1996).
Multicultural	Practitioners' appreciating perspectives of multiple ethnic groups without the assumptions of superiority or inferiority (Pasick, D'onofrio, and Otero-Sabogal 1996).
Cultural Tailoring	The process of creating culturally sensitive interventions by adopting existing materials from ethnic populations (Merriam 2014; Ozturgut 2011).
Culturally Based	A program that combines culture and core values as a medium to motivate behavioural change. The literature states how culturally based interventions can be potentially effective, but they also have the potential to be culturally insensitive (Pasick, D'onofrio, and Otero-Sabogal 1996).

aware in the online space. Below in Table 1, we define the key terms that will be used in this study, which are based on public health literature, to guide our analysis.

## 3. Methods

### 3.1 Case study design

Our case study employed the method of Merriam (2014) as we share the epistemological view that reality is constructed by individuals interacting with their social worlds. In our case, the case study is about a participatory design team named KidsTeam that is being expanded to South Korea. In our study, 'context' plays a crucial role in terms of the people, time, and resources available. We use an exploratory case study which focuses on a single or limited number of cases (Ogawa and Malen 1991). An exploratory case study better fits our research than an explanatory case study as our goal is not to explain a causal relationship but gain a holistic view of the study. The purpose of the research is to better understand an emerging phenomenon and to generate new ideas.

### 3.2 Selection of the country

We have selected countries not from the same region but two different regions that manifest differences in cultural values according to prior literature (i.e. Western philosophy vs. Confucianism, egalitarian vs hierarchical values; different testing culture) (Burkhoff 2015; Chang et al. 2011; Davey, De Lian, and Higgins 2007; Zhong et al. 2006). The U.S. was a country that had a relatively balanced relationship between child and adult compared to South Korea, which is situated in an East Western Culture imposing a more hierarchical relationship between them. South Korea also has a culture deeply rooted in Confucianism which is known as a



trained at KidsTeam UW on how to be design partners using the method of cooperative inquiry (Cinquin, Guitton, and Sauzéon 2021). The researchers were a mix of undergraduate, master's, and PhD students.

In the Table 3, we share the information about our child partners who participated in co-design sessions and how many sessions they attended. To recruit children, flyers were co-created by the research facilitator and the administrator of the welfare center. All participants' caregivers have given informed consent to participate in the research. Considering the power dynamics, the facilitator discussed how participation to the session was optional even if their parents forced them to attend the session. To understand how the child was engaging in the session, the facilitator also communicated with the local welfare center manager who had a longer relationship with each child as a mediator. Therefore, we had instances, where the local facilitator called the researcher where the child was not happy being in a group with an older child. Therefore, the researcher intervened to create different groups.

### 3.5 Design sessions

We held a total of 6 co-design sessions from April to May 2021. All the design sessions were conducted online via Zoom. Co-design sessions were designed as an hour session, once a week. We sent arts and craft materials to the children in a small box to be used for design prior to the study. Each co-design session started with the question of the day as an ice-breaker, followed by a design activity. For the design activities all the participants were divided into two or three groups. Each group consisted of around five people (two adults and three kids), but the number of children and adults slightly varied depending on the attendance. During the design-time (about 40 min), each group did a design activity in the breakout room which is a function in Zoom where a separate space is created for a sub-group. To close the session, we came back to the main room (the whole group) and had a discussion for about 15 min. The facilitator led a discussion with all the groups, asking each group to share what they did during the design-time and how the activity went. The information about the weekly topics, activities, and used tools are described in the Appendix. Moving to the online space, our design team submitted an IRB that stated the need for the caregiver to be present in the physical space to ensure there would be an adult that can supervise while engaging in the design session. When meeting in-person our IRB did not have such regulation.

Some parents also had prior relationships with other parents therefore, had developed a space to discuss about the program with each other.

### 3.6 Data collection

We collected data by recording online Zoom co-design sessions, writing analytic memos, and conducting interviews. After each co-design session, adult participants added analytic memos about what they observed, how the co-design session went and what was interesting. We collected a total of 33 analytical memos. For each session at least five researchers at most six researchers wrote one analytical memos for the six design sessions. While the researchers who participated in the participatory design session were either native or fluent Korean speakers, we had two additional researchers who did not speak Korean but were in the process of designing the sessions and analyzing the data.

We also conducted semi-structured interviews with the children and parents after the end of the six co-design sessions. The interviews aimed to understand the experiences of being part of the co-design session with adults. Interview questions for the children had two parts – 'Children's personality and environment' which asked questions about the school education, family dynamics, their expressiveness, online connectivity, and creativity. For the second part of the question, we asked about the experience of co-designing with the adults such as their perception of interaction with other adults, parent's involvement within the session, and the relationship with other children. The interview questions for parents were designed based on three points – 'Co-design Session' (Knowledge of co-design session and Modification of the session), 'Personality of their child', and 'Educational environment of their child'. The interviews lasted for approximately an hour, and the participants received compensation of a 30 dollar gift card to a bookstore. We recorded the interviews and transcribed them in Korean.

### 3.7 Data analysis

All collected data were first open coded through inductive reasoning and then, the research team went through multiple rounds of deductive coding based on theoretical frameworks in the following areas: (1) the improvisation model of co-designing with children in a synchronous online space (Lee et al. 2021) and (2) the cultural sensitivity theories in public health literature (Resnicow et al. 1999). Each researcher was assigned at least one co-design session and annotated the entire session in Korean. Each video had at least three viewers.



The first viewer took the first round of watching and annotated the interactions that were occurring in the video. The second viewer watched the exact same video and filled in missing parts such as interactions and conversations that the first viewer did not write in the colour of blue. Lastly, the third viewer watched the entire session while comparing it to the annotations, and noting anything else that was worth recording. For interview data, the first author conducted all interviews with one more researcher present in the Zoom room. We had at least two researchers transcribe the recorded videos of the parent and child interview. For all interviews, transcribed video data, and analytic memos, there were two researchers who did open coding for one set of partial data to generate an initial codebook. This set of data consisted of all the compiled videos of a session and around two interviews from the child and their caregiver.

The seven authors of the paper met weekly for a total of 16 weeks. During the weekly meeting, we shared what we noticed in the interview, analytic memo and video data. We then generated a codebook based on the video and interview annotations, and analytic memos. We focused on figuring out quotes considered significant enough to be analyzed from the annotations and analytic memos, and we began to develop themes. After the iterative process of developing themes, we generated an initial codebook with eight codes. Once the initial codebook was created, each researcher was responsible for coding two video files that they did not annotate, two analytic memos, and one interview dataset. While coding the data, we had iterative processes for supplementing and refining our codes by sorting and comparing themes and codes. We share the initial codebook in the Appendix.

#### 4. Findings

This paper is an extension of prior theories on the considerations of conducting participatory design online with children (Lee et al. 2021). We use theories of cultural sensitivity to examine how we design with participants from cultures different from one's own. The cultural landscape of this paper includes the geographical location of Korea and Korean culture and the U.S. culture of co-design. While we acknowledge that there are multiple definitions of how we define the boundary of a culture, here, we refer to the shared culture based on nationality.

We identified three main themes of co-designing with children in Korea with a focus on cultural awareness. We had a total of eight codes that our coders noted 'interesting' in the session. What we identified

as 'interesting' were moments where we perceived interactions or behaviours that were different from what we usually observed while designing with the children in the US.

For each section, we use two theoretical frameworks to answer three of our research questions. First, we used the Improv. model (Lee et al. 2021), which specifies different aspects researchers should consider when co-designing with children online. Afterwards we share a vignette of what the session looked like. We reflect on the actual session using literature in cultural sensitivity to describe what the challenges and opportunities were in the online condition (RQ1). Lastly, we state how practitioners can be culturally inclusive by discussing the modification we made considering the cultural and online factors (RQ2 and RQ3).

##### (1) Project Logistics and Education System

**Connection to Improv. Model – Project Logistics:** Based on the project logistics theme in the Improv. model (Lee et al. 2021), it is important to plan out what is going to happen within the session and how we will communicate the topic with the children. **The authors' understanding of an ideal session** was that we would share open-ended questions to the children. Afterwards the children brainstorm with the adults and interpret the questions based on their prior knowledge and understanding of the world. The goal of every session is to learn about each other's thoughts on a problem and build upon them to create a solution. Our researcher in the team anticipated having random ideas that would flow in from the discussions.

**Vignette of what the session looked like:** In session 1, we tried to identify what social matters children cared about. The facilitator asked the question 'If we are creating a social robot that helps other children, what would that robot do?'. The main facilitator created a list of questions the children and adults would discuss together. For instance, in the session we had questions such as 'Since we are creating social robots that help other children, who/where do you typically receive help from?' The choice we had for the children was as follows: (1) your friends, (2) your family, or (3) a search engine Naver (a popular search engine site in South Korea). The goal of the first session was to not only build relationships but also discuss in groups and share ideas about what 'help' looked like. Many of the co-design sessions were designed to ask the children about how they perceive the problem and how they would co-design a solution.

**What we observed and learned:** After the end of the total of six sessions, we asked the parents about ideas on

how they would want to modify the design sessions. The majority of the parents stated they wanted to receive the questions the facilitators would ask beforehand. The reasoning was for the child to practice with the parent to formulate a 'better' answer. This was different from the parents we had worked with in the US. As some of the researchers in the team had an understanding of the culture of 'prerequisite learning', we asked parents to elaborate on this answer. **Prerequisite learning** (선행학습) is a common concept used among caregivers in East Asian countries where you learn class materials in advance (Park et al. 2015).

The parents' perception of prerequisite learning was prominent in the discussion during the interviews. For instance, Gyubin's mother stated that *'Many teachers in public school assume that the children already learnt class materials prior to coming to class. So they don't cover the materials fully'*. Shihoon's mother stated *'All the other children are doing it [prerequisite learning], it is natural to learn the class materials beforehand. If the child does not go to class without any knowledge, they often fail to follow class'*. Our researchers reflected on how much the parents were concerned about their child not being able to keep up with other children. We learnt from our interviews and conversations with the welfare center administrators that parents were not comfortable with the inability to predict the questions beforehand because they preferred and expected to be prepared.

We also noticed high demands for content knowledge in the session, such as facts about learning what a 'robot' is, or what 'power' is, as opposed to discussing open ended questions. This was evident even before the actual session when the facilitator was creating flyers for the program. The welfare manager stated how in the flyers there needs to be a statement of the exact learning outcomes from participating in the program. If not, she predicted that caregivers would not be interested in registering their children. In addition, due to the high Internet connectivity, online learning (e-learning) was also common for learning content knowledge. Therefore, in the interview, many parents shared that they found it unusual, compared to other online programs, that there were many questions being asked to the children.

**The Modifications we made:** In the flyers, we stated the direct outcomes of the program; specifically, how it would (1) raise a child's interest and understanding of science and technology, (2) develop the thinking process and skills for everyday problem solving, and (3) raise one's confidence by learning how to express oneself. The administrator also insisted on using graphical cues like arrows to highlight and emphasise the connections and improvement in these aspects.

To meet the demand of learning new content knowledge, we added slides to share some scientific facts and math materials prior to the session and had mini true or false quizzes. In session 2, the children were going to design a transportation system. Therefore, prior to the session, the adult facilitator added a slide discussing power, work, and time. Within the session the adult facilitator briefly stated the formula of power and gave examples. The adult facilitator also added a comment stating 'This is what middle school kids learn!' to the children who were 7–11 years old. Afterward, the adult facilitator gave a mini true or false quiz to the children stating that we are not here to test but this is just for fun. One of the children, Gyubin got the answer right and with excitement, told his mom next to him, 'Mom, I got a question right that was about something middle school kids learn'.

#### 4.1 Understanding adaptation through multicultural lens

Our researchers' lens of what an ideal PD session may look like, such as asking and being creative in the moment differs from what the children and parents in Korea expected of the program. Therefore, we were hesitant to share questions prior to the session. If the children practiced with the parents beforehand, it may not be their own thoughts but could be of the parents. However, in a multicultural lens that acknowledges the practitioner appreciating another person's culture without the assumptions of superiority or inferiority, we must acknowledge that in some cultures, people may feel more comfortable to have a discussion once one is ready and prepared. Our findings also show how the local education system influenced not only their decision to be a part of the sessions but also on how they were engaging in the sessions.

#### (2) Spectator's Influence and Child's Involvement

**Connection to Improv. Model-People and Setting:** In the Improv. framework, there is a theme titled 'People and Setting' which has two sub themes of (1) Technology Infrastructure and (2) Spectators. Technology Infrastructure explains how children are able to shift locations and bandwidth while online. The spectator refers to the people present other than the participants in the session (e.g. pets, siblings, and parents in the background of a Zoom call). In this section, we explain how the caregiver (mothers in our case) were influencing the session as spectators and how they were understanding what co-design is based on the Korean education system.

**Vignette of what the sessions looked like:** The opportunities of co-designing in the online synchronous space with high speed Internet was that many parents and children appreciated the fact that they were able to design with adults who were calling in from multiple states in the U.S. such as in Florida, New York, Washington. In one of the calls when the adults were introducing themselves we were able to hear voices of parents and children having conversation such as ‘Mom, that teacher said he is calling from New York!’ and the children also asked questions such as ‘Wow, what time is it in New York?!’.

**What we observed and learned:** We had an interview question about why the parents continued to send their child to the co-design program. One of the main reasons was the excitement of children being able to connect with teachers (in our case, facilitators) from abroad. We had many parents state ‘I hope my child studies hard enough to be smart like the teachers studying in the U.S.’. Many expressed how they wanted their children to study hard and become smart like the teachers studying in the U.S. Regarding the question on potential modification of the session for improvement, we asked how they would feel about it if we conducted the sessions in English instead of Korean. More than half of the parents stated they would choose English as opposed to Korean if there were two separate sessions for more learning opportunities. For the parents who had children on the younger side of the age stated it would have not mattered as their child was too young to understand English but would be interested in joining when they get older.

We also noticed from attendance that after the first three sessions, Shihoon no longer came to the session. Luckily, we were able to interview both the child and the parent. Shihoon stated how he wanted to come to co-design sessions but his mom forced him to go to math hakwon [a private institution] instead. When we interviewed the mom and asked her thoughts about the co-design program she replied stating:

I understand the values in KidsTeam but for Korea’s education reality you can’t survive the competition with the things you learn in KidsTeam Korea. You need the actual scores. It is not important that you are able to solve the problems. In Korea you actually need to show that you got the full 100 points in an exam. In elementary, they got rid of some tests, but still in middle and high school the score is important and that means a lot of memorization.

Correspondingly, in another interview, Joohyun, who was the same age, had full attendance. The mom stated that her son actually got good grades in school and that was the reason why she was able to give him time to

join this kind of co-design group where children were designing and having fun. She stated that if he did not receive good grades in school it would be difficult to send her son to this kind of program. From our conversation, we learnt that the mothers both noticed the value of collaboration, creativity or problem solving that we aimed at in the co-design sessions. However, it was the current education system the children were influenced by that made the parent’s hesitant to send their child.

**Understanding Adaptation through Cultural Tailoring:** Cultural Tailoring refers to creating culturally sensitive interventions by adopting existing materials from ethnic populations. Our team’s goal in forming a co-design team with the welfare center was to reach a diverse group of children. Our definition of what we meant diverse was loose but we trusted the welfare center that they would be recruiting children different in age and gender. However, reflecting back on the interviews we noticed how the education system in Korea did not only influence the expectation of the session, it also influenced who was able to join the program in the first place. In our case, they were children who were doing well in the education system (scoring high grades) and therefore, had the extra time to join.

### (3) People’s Co-design Interaction and Manners

**Connection to Improv. Model – People Co-design Interaction:** Based on the *People Co-design Interaction* theme in the Improv. model (Lee et al. 2021), when conducting synchronous online co-design with children, it states how children had more autonomy of what they wanted to do. For example, compared to the physical space where children asked the adults for permission to leave, in the online space, it was more simple to leave the session. Lee et al. also discussed the difficulties of behaviour management in chatting spaces (Lee et al. 2021). **Our understanding of an ideal co-design session** is when the children both have structure and freedom within the session. The freedom such as talking with friends or chatting privately gives the children a chance to build relationships.

A big difference in the session the researcher noticed in co-designing with children in Korea was the level of respect and manner each child showed toward the adult. Different from the Improv. model which states that children had more autonomy, in many instances the children often bowed to adults or asked for permission for many actions.

**Vignette of what the session looked like:** On the very first day of the session, when the adult facilitator opened the Zoom room 30 min before the session started, a mother and a child (Soyoung) logged on 20 min early.

When first joining, the camera was off and the mother was helping the child log in as there was a message 'logging on'. Soyoung's mother, without any introduction, stated 'Teacher, are you there?' The facilitator replied 'Yes, welcome to the co-design session'. From the first day, the facilitator automatically knew that the name the children would call the adults was going to be teacher ('선생님'). In Session 1, Dani wrote in an analytic memo, *At the end of the session the children all bowed saying 'Goodbye Teachers!', I guess we are teachers?*

In session 2, toward the end of the session all children and adults said their goodbyes and left the Zoom room. There were three children (Siyeon, SungWon and JooHyun) who remained in the main room. The main facilitator asked 'How did you all feel about the session?' The children replied 'good'. Sungwon asked 'When are we going to look at robots?'. The main facilitator replied 'Next week'. The main facilitator asked 'JooHyun and Siyeon, do you have any more questions?' they replied no and stated they were just sticking around. The main facilitator stated that she was going to go to the restroom quickly and left the camera on. There was silence in the Zoom room among the three children. Joohyun said out loud 'Ummm..I think I am going to go now'. 'Teacher?' The main facilitator was still absent from the room. 'Umm.. Teacher? I think I am going to go now'. But since there was no response back Joohyun remained in the room until the main facilitator came back.

**What did we observe and learn:** This instance shows a case of the child obeying and following the actions until there is approval from the adults. Even though the session had ended, the children who remained to stick around after the session were waiting until there was an approval from the adults to leave. In other cases as well, the researchers in our study noticed many moments of politeness and permissions of actions which was one of our codes in data analysis. Every time the children came into the Zoom session or were late, they also bowed to the adult facilitator, calling all adults 'teachers' and stated reasons for being late. It was not just the children but the mothers who were part of the co-design session often made statements such as 'excuse me, teacher'. If the child was not focusing on the screen, oftentimes we saw an adult's hand that would tilt the head of the child so they would focus.

Our researchers reflected on how the practice of politeness and manners the children were showing made it difficult to break the power dynamics. Later when we shared our findings to the welfare administrator she shared how in Korea, children were learning about manners and bowing also from Hak-won (an institution for after school learning), especially in Taekwondo. We also heard from mothers in the interview

that they would send their child to Taekwondo to learn manners.

**The Modifications we made:** Our researchers had long debates about how the children should address the adults in the session. While in the U.S. co-design team, it was natural for the adults to be called by their names. However, in Korea if the child met an adult for any educational or extracurricular activities after school they automatically called them teachers. Our researchers discussed whether we should incorporate new rules in our co-design session to ask the children to call us by our names or another title than teacher. Our concern with the word 'Teacher' was that it automatically brought up the power dynamics between the children and adults when our goal within the sessions was to build an equal partnership model between the adults and children. We explored if they should call us 'aunt', 'uncle' or 'sister' / 'brother' which was also a common term used to call someone in a friendlier way while showing respect. However, we were too distant in age and we discussed how it could be awkward for the child to directly state 'aunt' or 'uncle' without having any prior relationship. In order to still have some level of respect and a balanced relationship, instead of asking the children to call us by name we instead elevated the children's status by having adults use more formal language to the child.

**Understanding Adaptation through Cultural Sensitivity Lens:** Cultural sensitivity is when cultural characteristics, experiences, norms and values, and relevant historical and social forces are incorporated in design and delivery of a program. While our group strived to create a comfortable environment where children and adults worked as equal partners, the norms and values of respecting adults and hierarchy was something that the parents and children were accustomed to. We learned that in this case, it was more comfortable and natural for the children to call us teachers. This instance shows what prior literature states on 'adapting' as opposed to 'translating'(Jang 2017). If we were to translate directly our rules of how to create a space such as requiring the children to call the adults by name there may have been confusion on the child's end from being taught from home and school. Therefore, in this case our adult facilitators were improvising by going with the term 'teacher' and purposefully elevating the child's status by using formal language.

## 5. Discussion

### 5.1 Meeting the value of the host country

In the public health science literature, scholars have long worked on how the goals of public health can be

blended with cultural values and practices (Foronda 2008; Resnicow et al. 1999). In this paper, we explore how the goals of an online co-design blend with cultural values and practices by using the theories of cultural sensitivity in public health. In the space of public health, while there were attempts to modify designs and practices to meet the needs of a particular population with a shared ethnicity, we have less information about how cultures collide when we are in the online space. Our study was designed in a way that we were considering Korea as the host country and the researchers connecting from KidsTeam in the United States as the visitors. Therefore, the researchers were making modifications and learning about not just the surface level interventions such as having all the materials in Korean but also being attentive to the social infrastructure that the children were living in. Prior studies of scholars who have also done participatory design research outside of Scandinavia such as Japan, China, and Cambodia were all considering those countries as the host countries and therefore followed their rules (Hussain, Sanders, and Steinert 2012b; Paracha et al. 2019; Sung, Shin, and Kang 2003). An example of following the norms or rules in talking about food is how people in the United States call cut and fried potatoes ‘French fries’ whereas in New England people call them ‘chips’. The word ‘chips’ in the United States is different from what the English people call ‘chips’. Participatory design is also about finding the common ground of communicating with each other (Ehn 1993). Barendregt et al. (2016) for instance, emphasise the importance of communicating explicitly about the learning goals in participatory design. In this study, we learned that the learning goals our researchers thought of such as teaching children how to be designers and skills about sharing and expressing ideas were different with the needs of the children and caregivers considering the education system. This implies the importance of also negotiating what the learning goals can be with the local informal learning environment. For instance, as mentioned in the interviews parents discussed how skills such as being creative can be important but are not counted in the point system.

## **5.2 Understanding deep structure for intervention**

Creating an environment where people feel comfortable sharing and expressing their thoughts is an integral concern for participatory design practitioners. Prior literature has shown how scholars conducting participatory design in locales different from their own cultural background have to understand the norms and values that

would influence the participation within the in-person co-design sessions (Hussain, Sanders, and Steinert 2012b; Paracha et al. 2019; Sung, Shin, and Kang 2003; Winschiers-Theophilus et al. 2022). The results of this research highlight that our definition of what we call ‘comfortable’ or what we may consider a ‘diverse’ team may change based on the country the participants are in. Druin (2002) shared ways of creating an environment where the children and adults would gather to design together aiming to become equal partners (Druin 2002). Druin states examples such as working on the ground, adults wearing more casual clothes like hoodies, calling the adult by name and asking the child not to raise their hands (Druin 2002). However, through the lens of cultural sensitivity, we show that Korean society places high values in respecting adults and teaching their children manners. Therefore, it was natural for the children in the co-design session to call the adult ‘teacher’. While prior literature (Huang 2015; Kusumaningdyah and Purnamasari 2018; Winschiers-Theophilus et al. 2010) states the difference researchers noticed when co-designing with countries different from one’s own, our findings indicate how interventions can be made to existing programs in the online space by understanding the deep structure using the theories of cultural sensitivity. In addition, as our study was focused on the online space where parents were present, we showed instances of how parents were influencing the session.

In addition, in many cases, participatory design scholars are intentional when recruiting participants. Based on our study results, in order to create a more diverse group, we may have had to be more intentional about recruiting not only children who were doing well in the current education system and therefore had the time to join a design program but for children who were also not meeting certain school requirements (such as scoring low numerical grades). We also learnt that the mothers in this study felt more relieved and their participation worthwhile when certain content knowledge was taught within the session as opposed to discussing open random questions. Participants in different countries may have different expectations with regards to feeling more comfortable and willing to participate in co-design; further, diversity may be perceived differently in different countries. We believe a scholar who designs with children in another country should invest time in unpacking the meaning of ‘comfortable’ and ‘diverse’ as it will change depending on the deep societal structure that influences the participating children. We also found it crucial to understand the country’s educational system, notions of manners, and attitudes towards elders as it not only influenced the

participation of the children but as it also influenced the caregiver's permission in joining the program in the first place. Iversen et al. (2017) suggested the role of child as protagonist where children gain new insights into design and digital technology. However, in a country where the children are ranked by their numerical test scores and jobs are placed based on the schools' children attend to, there may be less need to obtain design skills and reflect on technology.

### 5.3 Autonomy and cultural expectation

For many scholars who utilise the method of co-design has a purpose in gaining a better understanding of the end-user (Cinquin, Guitton, and Sauzéon 2021; Frauenberger, Good, and Keay-Bright 2011; Yip et al. 2016) by exploring different methods to discuss the design challenge. However, from our data we have learnt that the same methods we have used in the U.S. sessions such as asking open ended questions seemed to have pressured some children and parents in finding the 'right' answer and showed how they wanted to be prepared with their answers. In addition, in a culture that is influenced by Confucianism, older people are often considered wiser than the younger ones because they have lived longer and hence gained more experience (Tamai and Lee 2002; Yang, Zheng, and Li 2006). Younger people are expected to listen to older people and follow. Since the facilitator and adults were older and studying in universities in the states we automatically and unintentionally gained more power. The concern is that this power dynamic could hinder children from sharing their ideas freely. We believe that certain behaviour may also be due to the education system mentioned in prior literature of the pressure of getting the answer 'right' (Xia 2009). The value of co-design with the children was to hear their random, out of the box thoughts, however we may need to think about the techniques we use when asking the children their thoughts when they tend to rely on the abundant amount of information on the internet. For instance, if the facilitator asks a question about a robot they want to create and the child finds a robot someone else created and shared on the internet, we need to rethink the ways we can continue to meaningfully co-design together. One possible direction is to encourage children to build upon what they found, in other words, citing and acknowledging prior examples or knowledge but asking them to add their own thoughts. In prior literature, especially in the field of education, there have been many cross-cultural studies where they state how East Asian countries are accustomed to rote

learning, in other words memorisation (Jang 2017; Kim 2009). From a multicultural perspective and taking into account the complexity of learning, we argue memorisation and standardised tests do not always inhibit creativity to co-design. We believe as opposed to banning the use of search or forcing the child to only share their own ideas, researchers can further explore what acknowledging prior ideas and remixing those ideas could look like when designing in the cultural space where memorisation was a culturally ingrained educational approach.

### 5.4 Future studies

We may also ask in the future when there is a mix group of different cultures, how we may decide on taking encounters of different cultures. Our study was exploring how we build relationships and learn about each other's world through synchronous video chat. Walsh, Donahue, and Rhodes (2015) explored how participatory design sessions were conducted in a gaming space where the children and adults were avatars. However, different behaviours or interactions may occur if the camera were not on and we were embodied as a different person. Our study results show the excitement of families and researchers who were connecting from different parts of the world synchronously. Future research work can also investigate how children from different time zones can work together as well in co-designing or what the session would have looked like if the facilitators did not know the host country's language.

## 6. Limitations

Our study was an exploratory study that examined the video, analytic memo, and interview data of the ten Korean children with seven adults from the United States for six weeks. The children and adults met once a week synchronously via Zoom, having six sessions in total. We believe more prolonged co-design sessions could have influenced findings. We also want to clearly note that the ten children involved in the study cannot represent all children in Korea. Rather, we highlight moments where our understanding of the co-design session differed from the demands of the families with the children in the US that the researchers were accustomed to working with. Through globalisation, we also believe that there are parts in the US that may have shown similar behaviour such as living in a competitive education environment or avid users of the internet. However, our goal of the study was to understand what cultural lens a facilitator can take in meeting the values of the

families they were not accustomed to working with in the online environment.

## 7. Conclusion

Through globalisation, many of the products and services we use today are not only for the local community but also for a wide audience. We envision more Human–Computer Interaction researchers to have projects that require the input of participants that are not within their local group for inclusivity. In our study, we used the online space as an opportunity to co-design with children who were on the other side of the world. Being on the other side of the world means different cultural norms may influence how people act and participate in the session. Not being able to respond and adapt to the differences can result in a lack of meaningful conversations for co-design and resulting in building technology that does not meet the needs of the end-user.

In our study, we aimed to find the challenges, opportunities, and compromises we, as facilitators, needed to consider in the co-design session. Druin's (2002) contribution to the HCI community was that with careful planning children can be design partners and discussed how it would be inappropriate to ask a child to do something they are not capable of. Therefore, called the need to explore what children have to offer at different ages. In our findings, we add that through the cultural sensitivity lens that there are more behaviours within the co-design session that can go against the cultural expectation (calling seniors by their name, more pressures of gaining the numeric score) therefore calls for a need for carefully crafting the sessions for design.

Our contribution to the HCI community is that we have utilised the cultural sensitivity theories in public health to provide valuable insights into how to be adaptive to accommodate families and children with different cultural backgrounds in co-design. The findings further our understanding of how the structural context in culture influences the participation of the children in co-design sessions in the online space. All our researchers did not want the child to feel awkward or worried about what they had to do in the session or feel pressured to do something different in the participatory design session that feels rude and inappropriate. While our study did not have all the answers to what new methods and techniques scholars can utilise, our approach of taking active use of cultural sensitivity attempts to not only simply design well with the children but to 'care' for the children and their long term wellbeing as they design.

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