The Need for Participatory Design Approaches with Children in Latin America

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Latin America is a diverse region with various cultures, identities, and narratives. Today we see the efforts of Latin American researchers to foster HCI in their communities as well as globally. While these efforts have resulted in significant HCI research contributions in different areas, the participatory design (PD) with children in Latin America lacks visibility and exposure in the international context. In this paper, I will review literature based on PD with children, HCI research in Latin America, and research in interactive systems, to shed light on the need for visibility and research in PD with children in Latin America. I searched and reviewed ten full papers to identify trends that are essential to PD with children, and to determine the gaps that contribute the lack of visibility of PD with children, particularly in Latin America.

CCS CONCEPTS • Human-Centered Computing

Additional Keywords and Phrases: Participatory Design, Children, Latin America (LATAM)

1 INTRODUCTION

Participatory Design with children is a central topic in the field of Human-Computer Interaction (HCI). While various participatory approaches, methods, and tools are continuously being established and applied by the Child Computer Interaction (CCI) research field, [1] research in participatory design with children is not as visible in the Latin American context. The Latin American community has shown a growing interest in the HCI field and has made significant contributions to the field, but there is still little visibility and limited access to the HCI work achieved in Latin America. In this paper, I will review the literature in the following sections to present the work done in participatory design with children, HCI within the Latin American context, and interactive systems for children. I will review these subtopics separately to ultimately connect them and form a narrative around the need for and potential benefits of research in the participatory design of interactive systems for children in Latin America. I am particularly interested in understanding and reviewing 1) What are the pressing and relevant trends in PD with children 2) What are the similarities and differences between PD with children in the Global North vs Latin America, 3) How can the HCI community continue to foster PD with children in Latin America. These questions can serve as a catalyst to an ongoing conversation about HCI in Latin America. As the HCI community expands, it is important to consider how this interdisciplinary community is broadening participation and actively considering HCI research within a larger context, whether it be social, political, educational, and in this case, geographical.

2 BACKGROUND AND MOTIVATION

Latin America (LATAM) is understood as the region consisting of South America, Central America, Mexico, and the islands of the Caribbean [13]. It includes about 33 countries where Spanish and Portuguese are the dominant languages, and it was developed from one of the largest cultural encounters between Europeans, native/indigenous, and African people [1]. Latin America is a region enriched with a mixture of cultures and identities; however, despite local efforts, most of the HCI research developed within LATAM still lacks international exposure [1, 14].

The observable beginnings of HCI in Latin America date back to 2001 when a small group of researchers from Latin American countries such as Mexico, Brazil, Chile, and Guatemala, as well as researchers from the United States, met at the Development Consortium held at the Computing Human Interaction (CHI) conference in Seattle, Washington [14]. This event was crucial for the Latin American community in HCI as it was the first step towards promoting HCI research in LATAM. Besides promoting HCI research, Latin American researchers also came together to identify improvements in participation, collaboration, and communication in Latin America [14]. One of the outcomes of this collaboration was the establishment of the “Congreso Latinoamericano de Interacción Humano-Computadora (CLIHC)” (in Spanish) or the “Congresso Latino-america de Interação Humano-Computador” (in Portuguese) which translates to the Latin American Conference on Human-Computer Interaction [1, 14]. CLIHC has been held biannually since 2003 throughout Latin American countries and has become a key conference to bring the Latin American community together [1, 14].

The Latin American community is growing in the HCI field now that there are more initiatives toward expanding HCI work from and to Latin America. For example, in 2018, Susan Dray led the SIGCHI Across Borders Initiative (SABI) held in Guatemala, where researchers discussed important issues such as the importance of journal publications, the cost of events' registration, challenges posed by language diversity, etc. [14]. The importance of journal publications as opposed to conference publications is specifically relevant to the content of this paper as it was difficult to find literature on the participatory design of interactive systems for children in Latin America. While there is Latin American HCI work related to this topic, one of the reasons why it is not visible is due to the difference in evaluation and publication models. Most institutions in the Global North evaluate researchers based on their research contributions made to well-known conferences such as CHI. This evaluation restricts many researchers from LATAM from being part of the international community given that research evaluations in LATAM are attributed to indexed journals. [1].

Latin America is an incredibly diverse region that also faces various social, economic, political, and numerous other challenges [1]. Because of these challenges, the community's efforts to foster HCI research are not only limited to producing work for the sake of research. These efforts also refer to fostering HCI research specifically *for* the Latin American community to understand the community better, and as a whole. Understanding the community through the HCI lens can, in turn, result in a positive impact on Latin America's social, economic, political, and educational activities and challenges [1]. In this paper, I will review literature that contributes to the participatory design with children and will form a narrative that embraces participatory design specifically for children in a Latin American context.

3 LITERATURE REVIEW

This paper reviews the literature on the subtopics of participatory design with children, including micro-ethics and co-design, interactive systems (for children), and HCI in Latin America. Ten full papers were identified and selected for this review based on the subtopics outlined previously. The goal of this paper is to provide a narrative around the need for participatory design methods with children in Latin America and to shed light on the efforts made in Latin America to provide visibility to the existing gap between the HCI research in Latin America and the HCI research in the Global North.

3.1 Methods

3.1.1 Sources

For this paper, I focused on searching for literature in the *Association for Computing Machinery* venue. Most of the sources are conference proceedings and the rest include online articles and one paper from the International Journal of Child-Computer Interaction. The conference proceedings include the 31st Australian Conference on Human-Computer-Interaction (OZCHI'19), the IX Latin American Conference on Human Computer Interaction (CLIHC '19), the 15th Participatory Design Conference (PDC '18), the 11th Nordic Conference on Human-Computer Interaction (NordiCHI '20), the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20), the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19), the Participatory Design Conference 2022 (PDC '22), the 16th Participatory Design Conference 2020 (PDC '20), and the 8th Latin American Conference on Human-Computer Interaction (CLIHC '17).

3.1.2 Search

I conducted the literature search initially using Google Scholar, IEEE Xplore, and the ACM Digital Library, but ultimately spent most of my search on ACM Digital Library. I also specifically searched through the CHI and CSCW conferences within the digital library. I used the following keywords to narrow my search: "participatory design" "interactive systems" "children" and "Latin America". I used these keywords together and individually in the search bar to collect a variety of papers given the difficulty of finding papers that included all subtopics. I also searched for papers that were published within the past five years to collect more recent findings. I included a couple of other sources including an extended abstract and other online articles to aid with the background section of this paper.

3.2 Results

The results section provides a literature review of the ten papers I selected. The subsections are organized according to the themes and trends that select papers follow.

3.2.1 The role of children in PD

Participatory design with children involves giving children a voice in the PD research process [2, 8]. Giving a voice to children also requires that researchers understand the role of children in these processes. Some papers drew on Druin's four roles of children which are user, tester, informant, and design partner [2, 8]. While Druin proposes that children play the role of the design partner, Pantoja et al introduce another role: play-based design. This is an age-appropriate design method to give 3-4-year-old children a voice in the design process by re-purposing the technology-supported make-believe play activities in the design sessions [8]. In this paper, the researchers conducted twelve sessions with four boys and three girls aged 4, and seven sessions with one boy and five girls aged 3.The goal of the research was to learn whether they could effectively use play-based design to enable 3-4-year-old children to contribute ideas for smart home technologies [8]. The researchers developed and used stories and activities in all sessions to introduce the children to the smart home theme to ultimately obtain design ideas from them. The researchers gathered a total of 32 ideas from both groups and concluded that the right combination of story, characters, prompting, and task-oriented activities yielded smart home technology design ideas. Connecting back to Druin's four roles of children, Pantoja et al also concluded that they would place children's role in play-based design at a point between informant and design partner [8].

Kender et al, on the other hand, introduce four different creative modes of children when doing PD research. The researchers identified the creativity of the storyteller, the scientist, the actor, and the explorer. The storyteller, for instance, thrives in front of an audience, creates fantastical storylines in their head, and re-combines stories and characters [6]. One of the points made in the paper is the possibility of there being many more creative modes out there worth capturing in order to better design participatory design [6]. It's important to question how the roles of children in PD vary across geographical regions.

3.2.2 The importance of context in PD with children

Some of the papers emphasized the role of context when conducting participatory design methods with children. Context in itself is important when doing participatory design research and it is especially important when working with children due to the contexts and spaces in which children access their free-time and play at the exclusion of adults [2]. Oftentimes, participatory design research with children is conducted in adult-led contexts such as museums, laboratories, libraries, universities, etc. [2]. This limits children's ability to fully engage with their surroundings and to experience their setting as naturally as possible due to assumptions and processes undertaken in adult-led contexts.

In addition, context also entails providing children with the necessary tools for them to feel comfortable in the "research" setting. In one paper, the researchers noted that they recognized the necessity of building the participatory workshop around the creative tools the children used to express themselves and communicate with each other which offered them a common space within which they all felt equally comfortable [6]. These papers covered the importance of doing participatory design research within a child's context; however, the papers did not expand on how context is influenced by geographical factors. One question that arises is whether geographical context influences how researchers should approach PD with children, specifically in LATAM.

In their talk at the 2021 Interaction Latin America Conference, Carolina Hepp and Fernanda Romagnoli identified three different PD strategies from a social perspective: PD should be managed, contextualized, and critical [4]. The contextualization part refers to researchers recognizing the existing resources in each context, including knowledge, cultural capital, and the individual contribution from each stakeholder. Hepp illustrated a case study for her project 'Escuela Sin Fronteras' which looks at the impact of migration on educational settings in Chile. In this study, boys and girls aged 11-13 were placed in a classroom context that specifically acknowledged their needs [4]. Hepp mentions that these children were constantly moving and interacting, and for that reason, the researchers organized the chairs/desks in a circle to allow the children to move and interact as they wished. On the other hand, the context in

which they professors engaged was more formal which allowed for more fluid conversations about interculturalism [4].

Based on the information above, context seems to be an important factor in PD with children. The complexity of context is that it can be interpreted in various ways such as a defined physical setting or it can refer to the underlying factors such as the available resources in each scenario. Understanding the implications of context can lead to a broader understanding of how to conduct PD with children in LATAM and other regions across the world.

3.2.3 Trust in PD with children

Trust building in PD with children was a central topic in the papers. Trust-building techniques include transparent and accessible forms of communication, a respectful approach to interactions, listening and responding appropriately, and taking time to build rapport [2]. While trust-building in a research setting is more natural between parents and children, children build up trust toward researchers in long-term collaborations [6]. Therefore, it is important for researchers to establish relations with children and between the children and parents to be able to move forward with the research activities [2]. This places an emphasis the role on the role that researchers play in understanding the relationships between children and their parents. When conducting research in nature-play contexts with nine 7–11-year-olds within a middle-class neighborhood in Sydney, Australia, Cumbo et al noted that the personal characteristics of adult researchers (e.g. gender and similar socio-cultural background) likely influenced the quality of relations established with parents and children which directly influenced how children participated in research [2]. Hepp and Romagnoli also claimed that contextualization in PD allows for instances of connection and trust, but did not uncover the common characteristics that the LATAM community and HCI LATAM researchers share that could potentially have a direct impact on how they interact and conduct PD research with children.

3.2.4 Ethical Considerations

Many of the papers covered ethical considerations when conducting PD research with children. One of the papers specifically covered micro-ethics for PD with marginalized children. Marginalized children come with specific circumstances that require careful consideration, such as children who have experienced seeking asylum, being disabled, living in a low-income household, being a person of color, etc. [5]. These experiences are often overlooked in research and policies and pose the concern of under-representation [5]. Doing PD research with marginalized children requires that researchers make decisions on the spot rather than check off a list of ethical principles. This paper draws on case studies from two PD projects: OutsideTheBox, where researchers codesigned technologies with autistic children, and MapSense, where they collaborated with visually impaired children. The researchers noted that both groups of children were met with adversarial attitudes by their peers [5]. Based on these case studies and on the spot interactions and decision-making, the researchers provide some strategies in micro-ethics to help others/researchers make these decisions. The strategies include navigating children's carers, prioritizing topics, completing a complex risk assessment, and making judgments, negotiating needs and being responsible, reinforcing personal relationships, committing to participants, and conducting embodied research [5]. This paper can serve as an inspiration to Latin American countries where children go through various experiences that are considered marginalized such as seeking asylum and living in low-income households.

In addition, other papers review ethical considerations when doing PD with children in general. For instance, Cumbo, Eriksson, and Iversen highlighted that an ethical consideration is being aware of how children can engage in "riskier" play activities in the presence of an adult by going beyond agreed boundary lines or carrying out more challenging and potentially dangerous play activities [2]. This important consideration was based within the context of the researchers, as a result, it is crucial that PD with children is expanded to other regions to shed light on additional ethical considerations and share this with researchers around the globe for future work.

3.2.5 Incorporating play in PD with children

Incorporating play is essential when conducting participatory design research with children [2, 5, 7]. Moriya et al developed an interactive floor projection system that projects animal footprints that respond to the player's movements [7]. The researchers found that this system has the potential to encourage the key elements of play which include interest, imagination, presence, and attachment [7]. One limitation of this study was that the system

could only detect a maximum of six people simultaneously. The limitation in the number of children that could participate in an activity at the same time was also a challenge presented in the play-based design paper [8]. As HCI researchers highlight the number of children being able to participate in a particular activity at the same time as a limitation, it is important to consider this challenge within the LATAM context. While the number of children is important, the HCI community must recognize that Latin America faces various economic challenges [1] and a question to consider in the larger context would be whether children *are able to* participate in a study or have other social or economic hinderances.

This study was conducted in Japan, and it can serve as an inspiration to conduct similar work related to interactive systems in another region such as LATAM. Evaluating this system with children in Latin America can bring visibility to the similarities and differences of the key elements of play that children prioritize when interacting with interactive systems. This could also help to identify the gap between social/economic hinderances and the potential benefits of interactive systems for children in Latin America. Pantoja et al indicate that ages 3 and 4 are a time for the development of curiosity, creativity, imagination, social play, cooperation, language, communication, and storytelling [8]. If introduced at the right time and at the right place, interactive systems could provide children in Latin American the benefits that other children are getting in other areas around the world.

3.2.6 HCI research in Latin American

One paper introduced the implementation of TorBook, a tangible book for older adults. Drawing inspiration from other tangible books such as TaBooGa, a hybrid learning application that incorporates tangible elements to navigate through the book to increase motivation in children, [3] Latin American researchers designed TorBook to help older adults identify a page they currently had open. Rodriguez et al contacted older adults though by placing posters around the university campus to invite them to participate a total of 20 adults between the ages 60 and 83 participated. Older adults felt comfortable using the book due to its natural interface, but there were some technical issues such as the use of magnets for this book [3]. The researchers emphasized their future work to continue refining this book, and they highlighted that they would work on evaluating the book in different contexts, as this interface may be useful for other populations such as children [3]. This paper is an example of how HCI research in Latin America is drawing inspiration from HCI research from the Global North and at the same time is utilizing this work to help the Latin American community. The intention of evaluating TorBook with children demonstrates the need of PD research with children in LATAM.

Cornejo et al also focused on Movement-Based Learning therapy to understand the motor sensory skills and academic performance of young children diagnosed with language and learning disabilities in Mexico [12]. The researchers recruited 19 children and their therapists who reported being familiar with video games/ electronic devices. They found that the children were excited about this form of therapy and enjoyed playing mini-games, but they did not find strong evidence about the relationship between motor skills and language and learning. A gap in this 10-week study is that there is no mention of any participatory design methods, which can be explored in future work. One thing that should be noted is that the intention of doing research for and with children with disabilities is consistent across the Global North and Latin America [5, 12]. The question is how can the HCI community continue to share and streamline information across regions to improve on and expand on this work.

In their community-based technology co-design paper, Reynolds-Cuéllar and Delgado Ramos discussed the analysis they collected from community-based PD and Co-Design programs in Colombia between 2015-2018 [11]. The focus of these programs was the International Development Design Summit (IDDS) which is a multi-stakeholder community-based PD program developed to introduce participants to fundamental aspects of theory and practice of PD. This paper focuses on the understanding and value of PD in a community-based context, and is a reflection of the PD work being achieved in Latin America by Latin American researchers. Researchers collected data from 236 participants using a self-perception survey which was administered at three stages during each summit and found a consistent increase in skills across all programs and across all skills [11]. The survey results indicated that international participants had the larges increase overall for all five skills but they were also the group that reported the smallest increase in intercultural collaboration skills with only 1.32% across all summits, and the highest increase in both technical skills [11]. This shows that there is still work to be done to bring the HCI community on an international level and highlights the motivation to continue HCI research and professional development in LATAM.

3.2.7 Fear preventing immigrant parents' technology participation

Wong-Villacres et al discuss the Parenting-Actor Network of Latino Immigrants in the United States. The researchers conducted a multi-sited ethnography across 12 locations in Atlanta, US which included five schools, an ESOL (English as a second language) department, a religious organization, and after-school centers. The participants included 30 parents, 25 staff members, 8 teachers, and other liaisons. The parents belonged to low-income groups [9] and their country of origin included Mexico, El Salvador, Honduras, and Ecuador. This paper touches on trends seen in Latin America when it comes to interacting with technology. One of them is fear towards both technology and social interactions as a key factor preventing parents from nondominant groups to access online (and offline) learning resources [9]. When thinking about this fear, it's important to consider that fear of technology must be taken into account when doing PD with children in Latin America. Does this fear from parents have an effect on how children from Latin America view technology and how they interact with interactive systems? How do cultural experiences and expectations affect PD sessions and how often do researchers take this into account? These are questions that we should consider in the larger context.

3.2.8 Peer Review in the Latin American context

One of the papers I selected demonstrates an alternative form of peer review. The goal is to use peer review as a tool that includes PD knowledge from Latin American perspectives to expand PD to global contexts. The researchers established this alternative form of peer review using the principles of citational justice, epistemic justice, emancipation, relationality, and positionality [10]. The citational justice principle relates to what literature gets left behind. This was especially critical for this paper as it was difficult to find PD research with children specifically in Latin America and it may just be due to the Latin American literature left behind.

4 DISCUSSION

Although the HCI community has done extensive research on participatory design with children, research in this field within the Latin American context is rarely visible. For this review, I was not able to find specific research articles that exemplified participatory design methods with children in Latin America, and this was the biggest gap I saw in the papers I selected.

While researchers do see the importance of context when conducting PD with children, this has been limited to the immediate context, meaning a child's immediate surroundings and environment. I did not find papers about how the Latin American context can shape the participatory design of children and I can only imagine the positive outcomes of connecting PD to geographical contexts. Interestingly enough, some of the papers from Latin American HCI researchers [3, 4, 8, 12] did not directly touch on the Latin American context and its impact on HCI research. While this may be due to avoiding the use irrelevant content, after reviewing this literature, I wonder how much more we would know about the Latin American context if we could see explicit examples of this in the LATAM HCI literature we read.

In addition, in order to understand how to conduct PD with children in LATAM, it is important to understand the role of children within the Latin American context. This was also not visible in the literature above. Literature from the Global North shows the role of children as users, testers, informants, design partners, storytellers, scientists, actors, explorers, etc [2, 6, 8]. However, there is little information on whether these roles are universal or if the roles can change drastically based on global regions.

The HCI research in Latin America above shows an inclination towards HCI research for children. I believe that if the HCI community continues to collaborate internationally, including practicing citational justice and actively fostering HCI research by LATAM, then a whole new world of PD with children in Latin America can be born.

5 CONCLUSION

While there is exemplary and significant work seen in the HCI community relating to the participatory design of interactive systems for children, there is not much research that shows PD with children in Latin America. As García et al put it, LATAM constitutes one of the largest groups of consumers of technology around the world and therefore, LATAM constantly experiences disruptions caused by foreign technology [1]. If the HCI community continues its efforts to work with LATAM these disruptions can turn into tools and significant opportunities for children in LATAM

and the LATAM community in general. With a better understanding of how we can approach PD with children in Latin America, we will be able to provide more visibility to not only this topic but the underexplored potential in PD with children in Latin America. Hepp and Romagnoli brought up the interconnectivity of wicked problems in LATAM such as poverty, education, immigration, health, etc. [4]. When thinking about children specifically, PD is an answer to these wicked problems because its intention to emancipate and empower future users of technology and its nature to support mutual learning between multiple stakeholders [2].

REFERENCES

[1] Adriana Alvarado Garcia, Karla Badillo-Urquiola, Mayra D. Barrera Machuca, Franceli L. Cibrian, Marianela Ciolfi Felice, Laura S. Gaytán-Lugo, Diego Gómez-Zará, Carla F. Griggio, Monica Perusquia-Hernandez, Soraia Silva-Prietch, Carlos E. Tejada, and Marisol Wong-Villacres. 2020. Fostering HCI Research in, by, and for Latin America. In Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems (CHI EA '20). Association for Computing Machinery, New York, NY, USA, 1–4. https://doi.org/10.1145/3334480.3381055

[2] Bronwyn J. Cumbo, Eva Eriksson, and Ole Sejer Iversen. 2020. The "Least-Adult" Role in Participatory Design with Children. In Proceedings of the 31st Australian Conference on Human-Computer-Interaction (OZCHI'19). Association for Computing Machinery, New York, NY, USA, 73–84. https://doi-org.proxy-bc.researchport.umd.edu/10.1145/3369457.3369464

[3] Iyubanit Rodríguez, Simón Rodríguez, Andrés Lucero, and Valeria Herskovic. 2020. TorBook: a tangible book for older adults. In Proceedings of the IX Latin American Conference on Human Computer Interaction (CLIHC '19). Association for Computing Machinery, New York, NY, USA, Article 14, 1–6. https://doi-org.proxy-bc.researchport.umd.edu/10.1145/3358961.3358966

[4] Carolina Hepp and Fernanda Romagloni. 2021. Diseñando La Participación: Estrategias Desde Una perspectiva social. ILA21. (November 2021). Retrieved December 7, 2022, from https://ila21.ixda.org/speakersesp/disenando-la-participacion-estrategias-desde-una-perspectiva-social

[5] Katta Spiel, Emeline Brulé, Christopher Frauenberger, Gilles Bailly, and Geraldine Fitzpatrick. 2018. Micro-ethics for participatory design with marginalised children. In Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1 (PDC '18). Association for Computing Machinery, New York, NY, USA, Article 17, 1–12. https://doi-org.proxy-bc.researchport.umd.edu/10.1145/3210586.3210603

[6] Kay Kender, Christopher Frauenberger, Johanna Pichlbauer, and Katharina Werner. 2020. Children as Designers - Recognising divergent creative modes in Participatory Design. In Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society (NordiCHI '20). Association for Computing Machinery, New York, NY, USA, Article 18, 1–11. https://doi-org.proxy-bc.researchport.umd.edu/10.1145/3419249.3420145

[7] Kodai Moriya, Takaya Iio, Yukiya Shingai, Tomoharu Morita, Fusako Kusunoki, Shigenori Inagaki, and Hiroshi Mizoguchi. 2022. Playing with invisible animals: An interactive system of floor-projected footprints to encourage children's imagination. Int. J. Child-Comp. Interact. 32, C (Jun 2022). https://doi.org/10.1016/j.ijcci.2021.100407

[8] Luiza Superti Pantoja, Kyle Diederich, Liam Crawford, Megan Corbett, Samantha Klemm, Kerry Peterman, Flannery Currin, and Juan Pablo Hourcade. 2020. Play-Based Design: Giving 3- to 4-Year-Old Children a Voice in the Design Process. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3313831.3376407

[9] Marisol Wong-Villacres, Neha Kumar, and Betsy DiSalvo. 2019. The Parenting Actor-Network of Latino Immigrants in the United States. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19). Association for Computing Machinery, New York, NY, USA, Paper 684, 1–12. https://doi.org/10.1145/3290605.3300914

[10] Pedro Reynolds-Cuéllar, Claudia Grisales, Marisol Wong-Villacrés, Bibiana Serpa, Julian Iñaki Goñi, and Oscar A. Lemus. 2022. Reviews Gone South: A Subversive Experiment on Participatory Design Canons: Dedicated to the Memory of Oscar A. Lemus. In Proceedings of the Participatory Design Conference 2022 - Volume 1 (PDC '22). Association for Computing Machinery, New York, NY, USA, 206–217. https://doi.org/10.1145/3536169.3537794

[11] Pedro Reynolds-Cuéllar and Daniela Delgado Ramos. 2020. Community-Based Technology Co-Design: Insights on Participation, and the Value of the "Co". In Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1 (PDC '20). Association for Computing Machinery, New York, NY, USA, 75–84. https://doi.org/10.1145/3385010.3385030

[12] Raymundo Cornejo, Fernando Martínez, Claudia Barraza, and Vania Álvarez. 2017. Indirect sensing surfaces to support Movement-Based Learning therapy. In Proceedings of the 8th Latin American Conference on Human-Computer Interaction (CLIHC '17). Association for Computing Machinery, New York, NY, USA, Article 4, 1–8. https://doi.org/10.1145/3151470.3151474

[13] Roger A. Kittleson. history of Latin America. Retrieved November 22, 2022 from https://www.britannica.com/place/Latin-America.

[14] Sane Gaytan. 2020. A brief history of the Latin American HCI community. (July 2020). Retrieved November 16, 2022 from https://medium.com/sigchi/a-brief-history-of-the-latin-american-hci-community-87c778369a14