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“It disrupts power dynamics”: Co-Design Process as a Space for Intergenerational Learning with Distributed Expertise

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Abstract: This paper examines co-design as a space for collaborative learning with distributed expertise across generations and roles. We address a fundamental need in co-design spaces: to develop and surface expertise relevant to the design task across a team. We examine how knowledge building is experienced in a design process that has asymmetric expertise among youth, educators, and researchers. We used co-design to engage educators and youth in collaboration towards designing an Artificial Intelligence unit that centers equity and justice. We structured for joint inquiry to facilitate collective learning. We conducted interviews with participants to understand how they experienced codesign. We found our approach allowed for collaborative learning and interactivity among participants with different kinds of expertise.

Introduction and Background

Successful codesign requires a range of expertise and perspectives; just how to do so in a way that disrupts and transforms existing practice presents every co-design team with a challenge. Two motives for co-design are (1) to create conditions for design where diverse expertise can be surfaced, leveraged, and transformed (e.g., Bang & Vossoughi, 2016) and (2) to redistribute social power (Huybrechts et al., 2017). Co-designers have devised different strategies to accomplish these aims, such as creating novel activity structures for eliciting multiple perspectives (Matuk et al., 2016), mapping values of co-designers (Ryoo et al., 2015), and structuring participation to center perspectives of marginalized groups and communities (Ishimaru et al., 2018).

We build on the need to address such issues in research on co-design within the context of an effort to broaden participation of historically marginalized communities in STEM through the design of a unit focused on the sociocultural, ethical, and political dimensions of artificial intelligence using a storyline approach (Reiser et al., 2021). This paper aims to contribute to literature of participatory design, by focusing on co-design process as perceived by participants, towards understanding how we might design intentionally towards creating a collaborative learning where distributed expertise is developed in an intergenerational context that includes youth, educators, and researchers and where there was limited domain knowledge across all role groups.

Organizing for Intergenerational Codesign to Build Shared Expertise

To support codesigners in building expertise that could be distributed across the team, we created multiple specialized activity structures within the context of a week-long design workshop and the preparation for it (see Table 1).

Table 1
Co-Design Workshop Activities Aim and Structures

Aim	Activity Structures
Clarifying purposes	Engaging with everyday technologies Unpacking the AI goals together (subgroup)
Organizing for intergenerational design	Course to learn how to write storylines Organizing small groups where youth worked together as a group
Learning about AI	Identifying AI experts to join space Stations for learning

In this paper, we present the analysis of interviews conducted with participants to investigate how participants experienced the distribution of expertise and being in an intergenerational environment in co-design.



Methods

In this section we describe the context of this study and participants, procedures of activities, instruments we used to examine participants' experience in co-design activities using interviews as an instrument, and the analytical approach used to examine their experience. We addressed the following questions: *How were participants' values reflected in their experience of co-design? What relationships did this co-design process afford or constrain for participants? How did their experience compare to other experiences involving building with others and youth?*

Participants

In this co-design workshop, eight educators and five young high school students (TS = teacher and student participants) participated in a five-day co-design workshop aimed at developing and designing an artificial intelligence unit that centers issues of equity and justice in artificial intelligence. Teachers' backgrounds and disciplines varied, and included High School English Language Arts (ELA), Middle school World Geography, Middle School Math, History, and after-school education programs focused on Media Literary and Agency. We invited high school students to join this co-design process as we wanted to attend to young people's voices and at the same time co-construct knowledge with them. Two months after the co-design workshop was completed, we invited all TSes for interviews. Twelve of 13 TSes were interviewed for addressing the research questions of this study. We also invited AI and AI Education experts to share their expertise in the workshop, two representatives from the district partner and four AI researchers who are experts in technology and artificial intelligence education. Four facilitating researchers led the co-design workshop to develop a storyline.

Data source

To address questions raised in this paper, one researcher conducted 12 interviews with teachers (n=7) and high school students (n=5) two to three months after the completion of the workshop. The protocol included questions designed to elicit participants' experience of the workshop, how it compared to other activities like it, key moments of the workshop, and the ideas they were exposed to or developed as part of the workshop. In addition, we asked participants about needs for teaching and learning if the units were used in their classrooms. All interviews conducted using an online conference application due to COVID-19. The interviews were recorded and transcribed using professional transcription services. One researcher reviewed the transcription for accuracy.

Analytical approach

To address our primary research question, we centered our analysis of interviews on (1) values participants reflected about their experience, (2) relations they described as were afforded or constrained in the co-design workshop, and (3) how this experience compared to other experiences they had in relation to work with others and building collaboratively. We conducted an inductive analysis that aimed at identifying themes and categories related to the three research questions.

Findings: Participants' Experience of Co-Design Workshop

Values and care in co-design

Throughout the workshop participants and researchers discussed norms and guiding equity-oriented principles in the co-design process and the ends towards which this learning space was organized (e.g., designing ethical AI literacies curriculum). We found that values and acts of care were enacted in different ways by teachers, researchers, and students, according to interviews with participants.

Multiple participants described that the co-design space was one where participants *showed respect for one another, felt welcomed, and positioned as valued co-designers*. Participants said that care and respect were values evident among teachers, researchers, and young students in ways that ideas were taken into consideration and invited in the space, and participants' backgrounds and prior experiences even as non-experts in the subject matter were respected. For example, one teacher mentioned "we were treated like professionals the whole time....it felt like it was leaning into everyone's different expertise." Notably, this teacher was someone who did bring significant expertise as a technology instructor in their school, specifically related to AI.

Relationality in co-design

Participants observed that relationships evolved in the space, and they said that co-design was a safe space to build relationships across people with different kinds of expertise and ages. These relationships developed between participants also included thinking collectively and individually about communities they work with (e.g. teachers, parents, students, communities of color).



When *building relations* in the space, participants said facilitators encouraged and designed for communication among all participants. Such interactions supported participants to learn about one another and build relations with one another. For example, a student asserted, said “I really liked how we could interact with other people and learn more from them [working together in groups].” Participants said that the co-design workshop was a *safe space* where they could “take risks without feeling embarrassed.” A key part of that for participants was that participants felt they could seek help and pose questions, without the risk of judgment. One teacher who acknowledged they do not have expertise in AI, said “it gave space for everybody else who didn’t know and knew they didn’t know and felt uncomfortable by the fact they didn’t know, to kind of grow.”

As described earlier, the space brought participants with diverse and varied expertise and experiences to the space. We found that this diversity and variety allowed for fluid positionalities to be enacted and at the same time disrupted relations between teachers, students, and researchers. In other words, *the positionality of participants in relation to others* took different forms depending on type of activities and discussion topics, that is, participants described their role in relation to others in different ways taking different positionalities.

Uniqueness of experience: comparing this experience with other experiences

In analyzing how participants compared co-design to other experiences, we focused on how participants experienced the redistribution of power in the context of knowledge building compared to other experiences. Participants’ experience of the co-design process and outcomes was described as different from other experiences in educational settings or professional settings (like curriculum design, professional development) when it comes to who is involved in the co-design process (e.g., diverse people including students) and the intentionality in co-design method (e.g., using storyline approach).

Participants described co-design as offering an opportunity to think about educational possibilities that were different from their previous experiences. For them, the co-design process was *disrupting the status quo* for what counts as design of curriculum and learning environments. For example, one teacher said, when asked if they would recommend this session to other educators, “Because it disrupts...it disrupts power dynamics. It disrupts our notion of what curriculum can be and look like. And then I think ultimately it infects the K-12 space with something that actually seats or has the potential to seat young people as co-conspirators in developing their own learning.” This alternative possibility was also shared by students, who experienced the opportunity to build with teachers and have a say on the curriculum design process as a unique learning opportunity in which, “they [the teachers] were learning from us as we were learning from them” reflecting on the difference between power dynamics they often have with teachers versus during the co-design session.

Building collaboratively as a process and outcome

Participants described the co-design space as one where they were *building together*. Participants described the co-design space as affording collaborative building and thinking with others and building relations among participants through interactions during activities. Interviewees recognized that the process of building together involved them exchanging and navigating their varied expertise, experiences, and voices towards engaging in activities. Importantly, building together connected to who is in the room is enriching to the teachers and students experience. That is, the presence of participants of color who shared common cultural practices as expanding of what counts as diversity beyond the expertise in the space. One teacher, for example, described that an essential aspect of building with other participants was having people with varied expertise yet also a representation of people of color, “I also think, there were quite a few people of color in the room. I personally, as a person of color like when I’m designing, I like to be around other people who look like me and who have other experiences like me and it always enriches the session just like immediately.” One student described an example where participants constructed an idea when exchanging perspectives and discussing, this example not just illustrate the notion of building together, but also building together with youth ideas in particular, “The discussion boards we did on the Jamboards, we all put our thoughts into it and we could see clearly our different perspectives of it. When we were saying stuff, the adults branched off what we were saying. So they understood where we were coming from and they started discussing more about it, so we added more into the conversation.”

Participants described different types of ideas that were constructed with other participants and researchers. The participants described content related ideas (e.g., learning about racism in games), learning about co-design structure and process as a methodology, and ways to use materials and tools used in activities. One idea that resonated with multiple participants is learning about sociocultural dimensions of AI, such an idea was constructed in discussions among participants and researchers. For example, one teacher said, “the way there was that woman who did this research about how the facial recognition software mostly only worked on white faces, because of the data set was from only white faces and things like that. The way because the data that the AI uses



is from our racist history, it is reproducing that racism in a way that's neutral, because it's a computer program, that was a big take away from me.”

Conclusion and Future Work

Several intentionally designed activity structures supported the development and elicitation of expertise in an intergenerational context. We found that these activity structures helped create a “safe space” for collaboration and knowledge building among participants around justice centered topics that matter to participants. In addition, positioning all participants as “not expert” in AI facilitated participation across generations and across the research-practice divide. For young people, the intentional design of the space did not require youth to think like adults; rather, intentionally designing spaces where they can maintain who they are, and assert their childhood/youth-hood as to express their perspectives (e.g., Cortez & Lizárraga, 2020).

Such findings are an invitation for co-design researchers to attend to equitable participation and ethics in structuring collaborations in co-design processes. Such a lens can disrupt power dynamics among participants and create a possibility for varied positionalities and ways of knowing and being to build knowledge collaboratively. In this paper we attended to the experience of educators and young participants in the co-design process as it is narrated by them. Future work we aim for will be centered on identifying and connecting between participants perceived experience and the actual engagement in situ.

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