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Moving From Co-Design to Co-Research: Engaging Youth Participation in Guided Qualitative Inquiry

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Abstract

The inclusion of community voices in research is important. Over the years, research training programs have continued to emphasize that engagement with communities at the focus of research can promote thoughtful, sensitive designs (Rivera et al., 2004). In this paper, we discuss a method for youth participation in the research process. In an attempt to move beyond "staged and superficial" participation in gathering youth perspectives, we advocate for including co-researchers in the development and modification of fundamental aspects of the research process, from data analysis to the development of additional research questions and collection methods (Guishard & Tuck, 2013). In the course of a study designed to enroll middle school students in participatory co-design sessions (Cahill, 2007) to aid in the development of educational technologies, it became apparent that our youth participants, as co-researchers, could also aid in the development, analysis, and coding of anonymized interview transcripts; development of themes; and creation of models for behaviors found in the transcripts (Docan-Morgan, 2010; Luchtenberg et al., 2020). Thus, this paper presents a practical example of a co-research process that includes youth participants, with an emphasis on training in qualitative coding and the fundamentals of research design.

Keywords

community based research, focus groups, methods in qualitative, inquiry, narrative, par - participatory action research

Introduction

This paper examines the benefits of adding qualitative co-research elements into an existing co-design study with youth participants. While co-research and co-design are related, the nature of the collaboration they encourage is different. Co-design focuses on working with participants to design a specific procedure or intervention for a population similar to that of the recruited sample (Barab & Squire, 2004). Co-research, on the other hand, involves working with participants on more fundamental aspects of the research process, such as development of research questions, data collection, and analysis (Hartley & Benington, 2000; Littlechild et al., 2015; Roggero, 2014; Spriggs & Gillam, 2019). Both of these types of participant-oriented research integrate the perspectives of research participants as representatives of a larger group of stakeholders. In this study, we found that even partially realized co-research involves the beneficial co-production of knowledge between participant and researcher, in addition to practical and positive outcomes for the analysis and a triangulation of research data.

An important first step in evaluating potential participatory elements in this research was to examine the more practical benefits that could be realized by the overall project. In this case, we found that our co-design project could easily include-co-research elements by focusing on the aspects of our inquiry that were already collaborative in nature, along with another

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potential onboarding point for youth participants: the qualitative coding components. In this paper, we will highlight the potential of integrating co-research elements in the co-design process, or in any other research paradigm that allows for negotiated knowledge production. This desire to include the perspectives of participants is inherent to a range of methods in the literature, such as the more emancipatory participatory action research (Galletta & Torre, 2019; McTaggart, 1991), pragmatic design-based research (Barab & Squire, 2004; Sandoval & Bell, 2004), youth participatory action research (Ozer & Douglas, 2017) and many unnamed derivations of each (Dewa et al., 2021; Luchtenberg et al., 2020). These types of participant-based research methodologies share two overarching goals. First, they stem from a desire to contribute something of value to the community being studied. Second, they emphasize that participants may offer useful perspectives, and other valuable elements, into the research process that researchers may not have otherwise considered (McLaughlin, 2005; Taylor et al., 2020). Inspired by these goals, we developed a mode for research participation and engaged in co-research with a small sample of 8th grade students (here after, youth co-researchers) from a majority Hispanic/Latino public middle school in the Southwest of the United States.

We implemented this co-research by enrolling existing research participant-students in a short training program to introduce them to authentic research experiences, as well as to teach them qualitative coding skills. Much of the extant literature on the enrollment of co-researchers, and more broadly on the co-production of knowledge, agrees that meaningful participation is the key to success in these collaborations. By including youth co-researchers in this manner, we intended to elevate their perspectives and provide them with an introduction to a valuable skill set. The development of these youth co-research extensions also served the larger goal of triangulating portions of our own coding work. This triangulated data would inform the results of the original co-design project (out of which this co-research effort grew), aimed at the implementation of an educational technology to improve help-giving within 8th-grade math classrooms (Webb & Farivar, 1994).

In this paper, we detail the decisions that led us to add youth participatory components, specifically the addition of co-researching elements and basic qualitative coding with youth co-researchers. We discuss the benefits of including student coding and developing co-research designs in projects that have already engaged with participants. Our youth co-researcher partners were able to provide insight into the design elements and an added layer of methodological triangulation to the coding of our interview data. Indeed, this project allowed for us to reflect deeply on the nature of our youth co-researcher's contributions to the coding of our data and the potential that the further expansion of co-research might provide.

UbiCoS

This exploration into youth co-research was embedded in an existing project to develop tools that help students help each other: a computer-supported collaborative learning environment called Ubiquitous Collaboration Support (UbiCoS). UbiCoS aims to support student collaboration adaptively across a variety of digital platforms (Ahmed et al., 2019; Mawasi et al., 2020). Existing adaptive collaborative learning support (ACLS) provides intelligent support to enhance collaborating students' learning outcomes. While various ACLS technologies show promise, they mostly focus on supporting students within a single activity in a given context, and do not consider that students are often collaborating across multiple educational platforms. With the growth of technology in classrooms, students often find themselves working in multiple contexts. For example, a student might work face-to-face with a peer on one task and then move to engage in an online discussion for homework.

To this end, UbiCoS encompasses three different learning environments, Modelbook, a web-based synchronous environment; Khan Academy, a question/answer-based asynchronous environment; and a virtual teachable agent, a web-based synchronous program coded to respond to explanations of problems from students. The particular collaborative skill that UbiCoS is interested in supporting is help-giving (Johnson & Johnson, 1990). The process of giving help encourages students to reorganize and clarify content, reflect on misconceptions, and fill gaps in their knowledge (Webb & Farivar, 1994). Through the UbiCoS environment, it is expected that students will engage in help-giving behaviors with their peers in Modelbook and with digitally distributed learners in Khan Academy, and practice explaining with a teachable agent, which prompts students to be more specific in their help-giving feedback via responses like "I understand the answer, but how do you solve it?" The hypothesis for this research is that working across multiple contexts will allow the transfer of help-giving skills from one platform to the others. In order to inform these technological interventions, the research team conducted four sessions to solicit feedback from middle school students (10 hours total). While the first two sessions represented co-design, with student-participants helping to refine the technological components of UbiCoS, the second set of sessions moved participants into the role of co-researchers—a shift in roles which will be further detailed below.

Our selection of UbiCoS co-design participants turned youth co-researchers was drawn from a majority Hispanic/Latino public middle school. This school has had a longstanding relationship with our research center. Additionally, the relationships that we built with these students in the co-design sessions assured us that the students were capable of engaging in the co-research activities we had planned for the data in the larger UbiCoS project. This long- and short-term development of rapport was integral to the UbiCoS project and made the transition from co-design research to co-research design a smooth one. Indeed, both phases of the research utilized what Jacquez et al. (2020) highlighted as necessary to any participatory research process: "inviting collaboration and valuing diverse expertise, and relationship building." (Jacquez et al., 2020, p. 1). In the section that follows, we will further detail how this shift between phases took place.

Co-Design Research to Co-Research Design

Design-based research can be broadly defined as being in the pursuit of "developing effective learning environments and using such environments as natural laboratories to study learning and teaching" (Sandoval & Bell, 2004, p. 200). UbiCoS is situated in the field of Learning Sciences, and as such the initial methodological justification for the use of co-design research in this study came from the field itself. An analysis of the proceedings of the International Conference of the Learning Sciences (ICLS) from 2012–2018 revealed that most researchers used the word "co-design" to describe the activities of research participants working to develop some sort of intervention for themselves or for a related audience. Participatory design or mixtures of "co-design" and "participatory design" were used interchangeably, but were less common. For example, Acosta and Slotta (2018) worked with a high school biology teacher to co-design a technology-driven biology curriculum and study the implementation of the designed materials. The teacher was selected based on her familiarity with the pedagogical model utilized in the intervention. The suitability of the teacher and her access to the target population made for an engaged co-design study. In this case, the use of co-design methods served to increase teacher agency and develop a platform for the development of new educational tools (Finch et al., 2018; Severance et al., 2018). With a similar rationale, we found that our co-design participants were familiar with the learning context and were members of our target population for the UbiCoS intervention. These considerations, while helpful, were just a small part of the move from co-design to co-research. In the section that follows, we detail our development of co-design sessions and our realization that the enrolled participants were capable of contributing to the project in new and different ways.

First, we will trace how UbiCos utilized co-design sessions to develop the technological supports to assist students as they collaborate across a variety of digital platforms. Like many design-based research projects, these goals represented researcher-driven, not participant-driven, production of materials, technologies, artifacts, and student understanding. The goal of the project was to understand the learning and help-giving processes that are likely to take place as students engage with the project's technological interventions. In an effort to expand the role of participants and create more meaningful engagement, the UbiCos project set out to enroll youth co-design participants to contribute ideas for the technological interventions that would be useful to other students in their day-to-day help-giving activities. For example, co-design sessions explored scenarios and prompts in which the youth co-design participants would be inclined to give or not give help. Sessions typically lasted about 2.5 hours, with activities designed by the research team based on which elements of the intervention needed attention at that time. In each of the two co-design sessions, participants developed fictionalized, composite personas based on characteristics related to help-giving behaviors. The personas would eventually be used to tailor the technological supports for different kinds of student characteristics.

We developed the co-design activities in an iterative fashion, with each session being modified or expanded based on the results and discussions of the research team. In the first co-design session, the research team developed preliminary personas and had students select which ones most closely matched their own characteristics. This proved helpful in refining what characteristics to include in the personas and ensuring that each persona represented a different set of characteristics. The second co-design session refined and expanded on the personas with two activities. The first activity in the second session had students fill in a "mad lib"[1] style student profile, selecting from a list of responses based on characteristics from the first co-design session. For example, to capture their feelings about helping others online, students were presented with a blank that could be filled with responses like, "he/she finds it hard to work online at all," "he/she usually participates and enjoys it most of the time," or "he/she doesn't usually participate if someone already gave the right answer." The following activity explored how the refined student personas would react in specific computer-mediated classroom scenarios. Students were prompted to decide what their persona might do in various group work situations, and to explain the rationale for their selections.

These initial sessions informed our understanding of collections of characteristics (grouped into personas) that might affect how students react during help-giving opportunities. These initial sessions and activities also allowed the research team to build rapport with the students, which we felt was particularly vital in our transition into their enrollment as co-researchers. Additionally, the sessions helped the students to become familiar with the content of the research project.

As we became more familiar with the capabilities of the co-design participants, we were continually pleased with the creativity and thoughtfulness of their contributions to the UbiCoS project. As we pondered and developed the next phase of participatory research, our though processes were guided by this fact, along with literature that highlighted the oft-unconsidered value of our participants' perspectives (Lindquist-Grantz & Abraczinskas, 2020; McLaughlin, 2005; Wright et al., 2021). Additionally, we wanted to provide a more direct benefit to our participants beyond monetary compensation and academic contributions to the demographic as a whole. The ability to shift to co-research as the research project developed was a benefit of having already engaged in the co-design process with participants. As Dewa et al. (2021) note in their exploration co-research in a mental health setting, "sharing power and decision-making between the young co-researchers and lead researcher became more substantial after each research stage, as our trust and confidence in each other increased" (p. 138). Mutual trust and confidence between the research team and our participants made for an easier transition into co-research. Similar to the understanding of co-research

outlined by Hickey et al., 2018, respecting and valuing the knowledge of each participant seemed to unlock the potential of our eventual co-researching process. In the section that follows, we detail our operationalized definition of co-research-oriented participatory design as we engaged in the implementation of enrolling and teaching youth co-researchers to code qualitative data.

Enrolling Youth Co-Researchers

After the first two sessions, we shifted our mode of engagement to co-research, with a goal of expanding the production of knowledge in the qualitative coding of interview data that we had previously collected. Often, the development of co-research is a fundamental part of the research design process from the beginning of a study, including the co-development of research questions, methods, and analysis. However, work from health researchers Luchtenberg et al. (2020) provides an example of a more targeted use of co-research, involving the analysis of qualitative data by children as method.

Of course, there is much diversity in the literature surrounding the enrollment of co-researchers and youth co-researchers. Learning sciences is not the only field where robust scholarship around various types of collaborative research takes place. Rather, co-research and other participatory designs can be found in fields like health (Wright et al., 2021), social work (Littlechild et al., 2015), and qualitative inquiry (Luchtenberg et al., 2020; Lyndon & Edwards, 2021). Indeed, much of the robust scholarship focused on co-research with youth participants comes from interdisciplinary research collectives on youth (Cullen & Walsh, 2020) and the health sciences (FløttenØ. et al., 2021; Hickey et al., 2018) in the form of community-based participatory research (CBPR) (Jacquez et al., 2020), youth participatory action research (YPAR) (Cullen & Walsh, 2020; Ozer, 2017; Ozer & Douglas, 2015), and simply "co-research" (Lyndon & Edwards, 2021; Spriggs & Gillam, 2019). This trend in the literature mirrors the work of larger international organizations concerned with the rights and participation of youth in society, such as UNICEF, UNESCO, USAID, the Council of Europe, and various educational institutions. As Roggero (2014) noted, "the production of knowledge is immediately the production of autonomy" (p. 512). Without the possibility of autonomy and open participation from youth, the benefits realized by youth co-research would be nonexistent. One of our goals in adding these co-research components to our data was to make the scholarship legible to our colleagues in the learning sciences, but we acknowledge that this conversation is taking place in many fields and institutions.

The enrollment of youth as co-researchers, while becoming more common, is not without its own unique considerations. In our study, there were practical considerations such as the acquisition of research skills by young students and the development of research training processes. Broadly, we had to manage the logistics of teaching and engaging students in qualitative inquiry, and more specifically, we had to help students develop the ability to process and implement qualitative coding. There were also more nuanced issues that had the potential to develop related to consistency in co-researcher work products, as well as a whole spate of ethical considerations (Smith et al., 2002; Cullen & Walsh, 2020). In the sections that follow, we outline youth co-researcher considerations and some of the ethical dilemmas that surround them.

Youth Research Considerations

While there are pitfalls for including youth participation in research, there are also benefits that could potentially be enjoyed by all parties in the research process. Our perspectives on youth participation were guided by the expansive literature on the topic. We wanted to move beyond what Guishard and Tuck (2013) called the all too common "staged and superficial" participation in gathering youth perspectives. They point to studies that define youth participation as simply adding participants to an existing research process. To attempt to counter this narrative, the authors offer a definition of participation as "a set of beliefs about knowing and knowledge wherein youth bodies are not haphazardly inserted or attached to research" (Guishard & Tuck, 2013, p. 367). The methods that engage with these beliefs vary across discipline and focus. For example, Conrad (2004, 2006) used Popular Theater, which draws from youth participant experiences to produce theater that identifies, analyzes, and speculates on how change might be enabled in their specific communities. Other examples that enroll youth in the development and modification of more fundamental aspects of the research process employ an array of methods. Smith et al. (2002) called for youth co-researcher views to be "incorporated as far as possible, and that the subjective aspects of their needs should be properly identified" (p. 2). The youth co-researchers described in the study, after "significant training," made decisions related to conducting interviews, developing questionnaires, and other research design considerations. The meaning of "significant training" that the authors detailed included workshops to generate interest in the project, develop ideas around research tasks, and teach inquiry skills and methods. Unfortunately, the age of the participants was not clear from the piece. Of course, what constitutes appropriate training would vary greatly depending on the age and development of participants, along with factors like cultural background or language ability. One study exploring outcomes of specialized cancer services for young people utilized participants as "co-researchers, consultants and collaborators," eventually reporting research out through a theater show which highlighted the experiences in a meaningful and coherent way for the public (Taylor et al., 2020, p. 2).

Creating meaningful experiences can also extend from emancipatory methodologies. Wright et al. (2021) coupled Indigenous methodologies and participatory action research

aimed at decolonial, strengths-based engagement with mental health services. This was a "Steady Walking Talking co-design" which "acknowledges and privileges Aboriginal ways of being, knowing and doing and underpins the participatory action research and co-design study methods" (Wright et al., 2021, p. 2). This included elements such as respecting participant status in the community as well as maintaining commitment and connection throughout the process. From this scholarship, it is clear that the length of training, depth of content, participant characteristics, and resources available should all affect decisions about how and when to implement co-research. As such, our decisions related to the research training of youth co-researchers was a negotiated process among the research team on the UbiCos project, based on the work in previous co-design sessions and our collective experiences teaching and conducting research with youth. This decision-making process aligned with earlier scholarship that suggested a reflection on fit between co-research and study aims, in addition to regularly evaluating the impact of research on participants and on the study (Pavarini et al., 2019).

The youth co-research that we engaged in was an initial foray into enrolling youth in the research process. As was mentioned above, our youth co-researchers were trained to code qualitative data and produce discernible codes. We had intended to continue with our group of co-researchers to explore the development of additional research questions and modify our interview protocols. However, our project scope was limited by the early closure of schools and reduction of research activities due to COVID-19. The ethical considerations that we needed to keep in mind, however, were the same for any duration or size of co-research project.

Ethical Issues

We encountered a host of potential ethical issues when engaging in the analysis of interview transcripts with youth co-researchers. As many qualitative research methodologists have determined, working with youth researchers poses significant ethical quandaries not well contrasted from that of other vulnerable populations (Mishna et al., 2004). In a narrative review of the literature, Cullen and Walsh (2020) found that these ethical tensions in participatory research were beginning to be addressed and often surround issues related to the agency of participants, their control of the research process, and the development of benefits. In a reflection among social work researchers, Schelbe et al. (2015) focused on the protection of youth in the process of research, from access to consent to confidentiality.

The first and most obvious ethical issues began with re-examining the anonymity of the interviewed participants from the first phase of our study. In order to ensure the anonymity of our original participants, we sent a modified consent document to the school to inform them of our plans to conduct co-research with students using their interview data. We also reviewed the transcripts from previous iterations of our UbiCoS design interviews and modified them to obscure any personally identifying information, to prepare them for use by our new youth co-researcher collaborators. Additionally, the participants represented in the interview transcripts were from a different school, which further reduced the likelihood of our co-researchers being able to identify participants. This extended from our responsibility to our original research participants as well as for our new youth co-researcher participants. As Huber and Clandinin also found, "We began to sense a particular moral obligation when we engaged in relational narrative inquiry with children as co-researchers to care for the stories that are given to us" (2002, p. 797). That is to say, we were concerned with the data generated from each of our various groups of youth participants. As with the previous data generated in the study, we sought to ensure the same level of anonymity for the co-research process, with participant pseudonyms and data that was only available to the research team.

There were other ethical concerns that we faced related to beneficence. What benefit would these co-researching activities provide for our student participants? As Mishna et al. (2004) point out, the sharing of benefit is also an essential ethical consideration, more specifically that:

> guidelines suggest that all stakeholders should have equal access to the research process (fairness) and that through the research process, all participants should have an enhanced understanding of their own experience (ontological), an enhanced appreciation of the phenomenon under study (educative), and encouragement to act on this expanded understanding (catalytic). (Mishna et al., 2004, p. 460, p. 460)

In our case, it was essential for our participants to understand and access the research process, specifically through understanding the nature of, and skills involved in, qualitative coding. As Mishna (2004) suggested, this was developed through the ontological lens as each student group was coming to an enhanced understanding of their own experiences as they related to the research process.

Smith et al. (2002), and later McLaughlin (2005), suggested five ethical areas when working with young co-researchers: exploitation, valuing and using young researcher's work, child protection, confidentiality, and unanticipated risks. Spriggs and Gillam (2019) identified similar categories, including problematic access to private insider knowledge, coercion, exposure to distressing information, and placing too much burden on youth co-researchers. As mentioned above, ethical concerns related to child protection, confidentiality, and unanticipated risks were built into the design of the session protocols. Collectively, these were addressed through the use of secured university facilities for the research sessions, the consent and assent forms from students and guardians, reviewed by multiple researchers participating in the sessions, and monitoring by a designated school chaperone

present at each session. However, since this co-research element was a smaller addition to a larger study, the ethical issues of exploitation and valuing and using co-researchers' work were the most salient to our project.

In terms of avoiding exploitation, we made certain that the tasks assigned to the students were not menial. Rather, following the example set by McLaughlin (2005), "young co-researchers were provided with research training before being actively involved in the identification of the research tools and questions" that were asked in interviews (p. 216). We detail the research training and introduction to protocols and interview transcripts below. In terms of using co-researchers' work, many of the ethical dilemmas had already been addressed in our earlier work. As part of the larger co-design research protocol, students are given assent forms that detail how their participation will inform the larger project's technological interventions as well as the production of research materials (presentations, journal publications, etc.). With the addition of youth co-researching elements, we informed our co-design participants that the analysis work they would be doing would help us understand these situations better. This was something that we did throughout the project. We continually checked in for assent to use specific research elements and products created during the research process (e.g., student pictures, interesting drawings), even when we were within our "rights," per the signed consent forms, to simply use them. This was meant to show that we were valuing their contributions and that they had value outside of the current research setting.

Developing Research Competencies

There is a growing literature on the inclusion of young students in research processes and in the development of scientific knowledge across numerous fields. UNICEF. (2020) has long explored how youth might be best positioned in engage meaningfully in society, including through various types of participatory research. According to UNICEF. (2006), young students have acted as evaluators and researchers around the world. For example, the British government has included children in the planning, delivery, and evaluation of services and policies (Alderson, 2008). Alderson describes three factors that are important to address when students conduct research: the stages of the research process, their level of participation, and the types of methods they employ. To accompany this form of student-conducted research, the concept of an adult, co-researcher that is a co-producer of data and analysis, sharing equal involvement, has been commonly endorsed (Alderson, 2008; Bernt et al., 2005). Proponents have argued that this co-design research model, integrating adult researchers and youth researchers, produces a broader range of data and allows for a more comprehensive understanding of results (Alderson, 2008). As Lyndon & Edwards, 2021 noted, expanding competencies in designing and carrying out these adult-youth co-research projects "enabled… us to be open to different interpretations and multiple meanings, recognizing there is no single or 'correct' interpretation" (p. 4).

Educational researchers have asserted that authentic student research is a promising avenue for better understanding educational and social issues. For example, Bernt et al. (2005) conducted a study that provided evidence to support the use of a project-based curriculum. The integrated, project-based approach supported by the authors has been shown to produce meaningful and relevant learning experiences when carried out with middle school students. In the past, research related to children has focused on protecting their rights, and methods tend to involve measuring and assessing young people without regard for their individual views and perspectives (Alderson, 2008). This aligns with many of the ethical concerns expressed above. An important aspect of this form of co-research is mutual respect for individual abilities and viewpoints. However, the scholarly literature is lacking pertaining to research conducted by students in their schools. When students perform research, it is typically framed as an opportunity to practice and hone skills, rather than worthwhile and legitimate work in its own right (Alderson, 2008). As a result, when we implemented our training for qualitative research skills, we started with very simplistic ideas about the nature and purpose of research and expanded it to include substantive qualitative analysis.

Teaching Qualitative Research

Instruction and training in specific qualitative research methods in co-research situations, with youth co-researchers, is not well documented in the literature. However, best practices for enrolling youth co-researchers in more general terms are clear. As McLaughlin (2005) suggested:

> For young co-researchers to be involved as fully as possible, lead researchers need to articulate the underpinning philosophies of their approach, and not just assume that their co-researchers are not interested or unable to understand these. It is not enough to just ask young people to undertake certain research tasks. If the intention of the research includes an element of empowerment, it is necessary to provide the co-researchers with the opportunity to understand the strengths and weaknesses of different approaches. (p. 220)

This is largely mirrored by Smith et al. (2002) who advocated for the most extensive level of training possible, to avoid a situation where unpaid participants are focused on a narrow set of tasks, rather than involved with the broader operations of the research study. As such, we used the McLaughlin statement, quoted above, as a guide for the development of the qualitative analysis component of the co-design research. Since our participants had already engaged in the co-design process, they were already familiar with why we were conducting the broader research initiative, so the task became enrolling them in the process of why we might conduct and qualitatively code interviews. A focus on coding, with an understanding of the broader research process, allowed our participants to engage in the reasonable manner

considering the limited timeframe that was available (Luchtenberg et al., 2020)

The processes we used in the co-research sessions were guided by Docan-Morgan's (2010) instructional strategies for teaching grounded theory coding to undergraduate students. In this approach, the first author of this paper explained the theoretical perspectives of grounded theory and instructed students to read physical paper copies of the data. The students then used scissors to cut out specific codes "individually by organizing their data into piles based on content similarity and creating tentative labels" (p. 204). In our work, the complexity of theoretical explanations for coding activities had to be scaled to a level that we felt 8th grade students would be able to understand—jargon-free statements with real-life examples. The coding activities were spread out over two sessions, as outlined in the table below (see Table 1).

The first session started with an explanation of research. In our presentation, we described research as the process of solving a problem or issue by carefully studying it. This also included a short description of the differences between quantitative and qualitative research. In order to describe qualitative research, we used a modified definition of qualitative approaches as ones that "[capture] people's thoughts and feelings about things" (Given, 2008, p. xxix). Students were given examples of how research like this is used outside of academic settings, such as making decisions in small groups, or solving problems using inductive reasoning.

In order to acclimatize students to these ideas, we used contrived research questions about pizza toppings to cement understanding and provide a concrete example of how codes were developed. (See Appendix A for the example research questions, interview questions, and groups of developed codes). For example, we gave students the research question "How do students feel about pizza toppings?" This was followed by a verbal prompt asking students how we might be able to collect information about this question. Drawing again from the plain explanations provided in Given (2008), specifically of a constant comparison approach, students were instructed that each segment of the interviews should be "coded and compared with every other episode for similarities and differences to answer the question, 'What is going on here?'" (p. 114). The students were given three example interview transcripts detailing the answers to interview questions about pizza toppings. Interviewees were colleagues of the research team who answered questions like, "What are the important characteristics of toppings on pizza?" Students were divided into groups of three and instructed to cut out specific codes and stack them together, keeping the research questions in mind. Collectively, students developed coding groups such as: health, taste/flavors, visual characteristics, uncommon toppings, and conflict about the importance of meat. This example activity was relatively successful based on the cohesive code groups we developed. For example, the code "visual characteristics" from one group was based on two different interview transcripts and three different sections of the interview. Not all students developed coherent codes, but as an initial activity it was successful in introducing the nature of research and the development of codes from interview data. As can be seen in the figure below, the student developed code for "the importance of meat" was taken from all three provided interview samples. (Figure 1)

In the second session, we reviewed the previous week's co-research work with the students and began analyzing UbiCoS project data. We implemented a few process changes to improve the productivity of the session. First, we grouped each transcribed interview response by question. This helped to ensure that the students considered each interview response individually. However, we did not offer instructions that would limit each interview response to a single code—rather, students were free to develop as many (or as few) codes as they saw fit. Each of the three interview transcripts were grouped by the interviewer's question, which was presented in bold typeface with a contrived interviewee name. There was space under each interviewee response for student participants to write a code (See Figure 2). This helped to avoid the necessity of group reading, cutting, and taping in the previous session, which consumed a lot of working time that would have otherwise been used for analysis. Second, we chose to have students work in pairs rather than groups of three. This was done to allow for more direct negotiation between participants, and a greater number of final codes. Third, in this session, we worked through the first potential code as a group. In total, the coding sheets included 19 identical interviewee prompts for the co-researchers to analyze. The six pairs of youth co-researchers generated responses for 107 out of the 114 code segments, as one group did not complete the material by the end of the second session.

The research question from the UbiCoS project that we chose to analyze with the students was "What types of students are likely to participate in a Khan Academy Exchange?" We chose this question because we assumed that the youth co-researchers would be more in touch with student behaviors, along with two other rationales: First, the research question was chosen because the youth co-researchers were already familiar with the Khan Academy Exchange platform. This allowed for the research team to avoid spending time acclimating the students to a new, complex digital learning platform. Second, the authors that were responsible for coding the larger UbiCoS dataset determined that the interview transcripts for the Khan Academy research question had the greatest code density and diversity. This would give the research team more coded material to compare and contrast with youth co-research work.

We began by coding responses to the interview prompt, "I enjoy giving help in math to others on Khan Academy."

The interviewee response was:

Interviewee: I disagree [with the statement] because it's hard to figure out what to say, to answer to the question if you don't know what they're talking about.

Table 1. Co-research Session Activities.

Session 1	Session 2
Training in qualitative research and coding. Sample coding activity	Reminder of coding protocols. Began coding project data

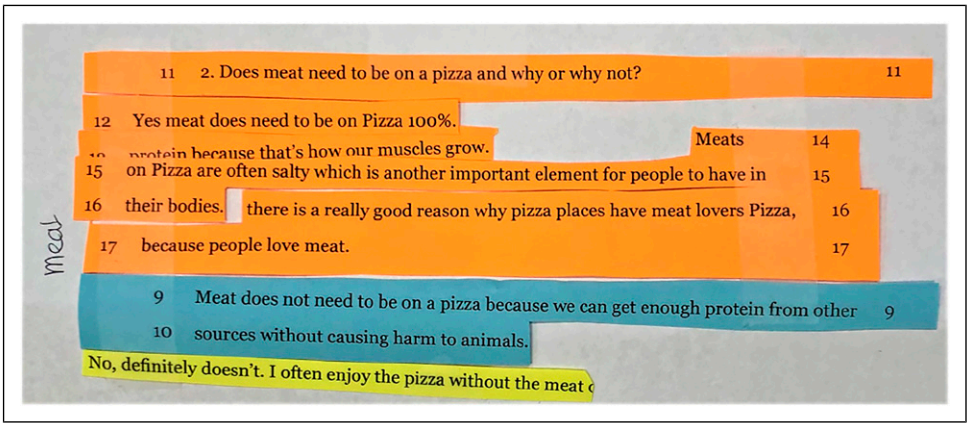

Figure 1. Example of first session group coding category.

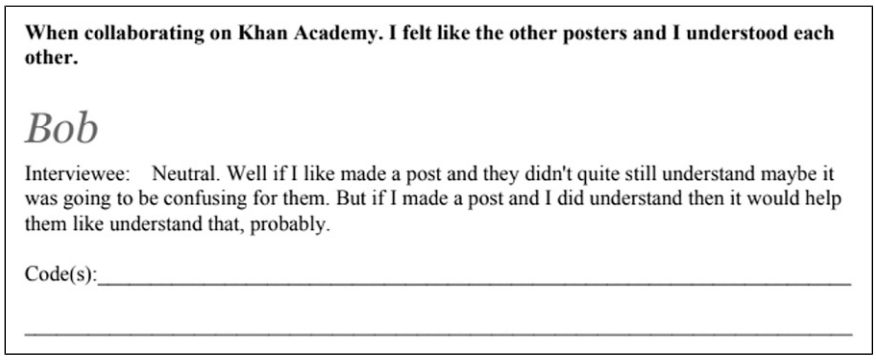

Figure 2. Example of student worksheet.

To this response we asked the youth co-researchers, "Does he not understand the content, or does he not understand what they're saying (sometimes we need to read multiple times) … how might we give that a code?" Some of the youth co-researchers speculated that maybe the interviewee had no math knowledge. They also supposed that people who enjoy giving help on Khan Academy are probably most likely to participate. Other students suggested that it was likely social difficulties that led to their hesitancy to provide help. In the section that follows, we expand on the results from student co-researchers and detail the utility of the student codes for the larger coded transcripts.

Process of Analysis for This Paper

The analysis of the collected codes was straightforward; our goal was to compare and contrast the existing research codes created by the adult researcher with those generated by the youth co-researchers. Once the codes were collected from the youth co-researchers, they were digitized by interview prompt. Once the materials were digitized, the first two authors of this paper met over several Zoom meetings to analyze and discuss the youth co-researchers' codes. The second author was part of the original coding of the interview transcripts, and the first author guided the analysis process. We started with a spreadsheet with the youth co-researchers' responses on it. We added a row for the second author to apply the research team's original code to the prompt. The original codes generated by the research team were relatively high-level, guided from a structured analysis of the help-giving literature. As we can see in the table below, the coding was focused on identifying help-giving characteristics and related factors (see Table 2). However, in reviewing each of the prompts line by line, the second author also conducted a re-analysis. We will provide further detail on this re-analysis in the sections that follow. We worked through each student code

Table 2. Original Codes and Co-researcher Phrases.

Original Code	Original Codebook Definition	Example from the Interview	Example Phrases Given by Students
Help-giving value	Interviewees state that they find help-giving important	"This is on Kahn Academy like posters? I put agree. When collaborating on Kahn Academy, I did feel like the other people posting, we kind of just understood each other. Because we're all in the situation where we're just trying to help out other people online and trying to figure out an equation at a time. We were just all in the same boat and we're just trying to help out each other. So I just felt like collaborating with others was good."	She's motivated; collaborative; helping
Math self-concept	Interviewees evaluate their own math ability	"*I'm very good at math* and I feel like it didn't really take a lot of time for me to explain to other people..."	Confident about math skills, good at math
Help-giving self-concept	Interviewees evaluate their own help-giving ability	"*I can definitely help people understand difficult ideas*."	Confident, intelligent in math
Empathy/ Noticing emotions	Student notices how specific actions make others feel (speculation or actual actions) or feels empathy	"All they're just asking is for help and you need to be the person just to give them help and to simplify the question that they are trying to ask."	Helpful, caring, and, social
Extracting contextual info	Any contextual factor in a platform that influences the way students give help	"*...if the question's hard* and you also try to explain it to them the easiest way possible."	Understands but doesn't understand when it comes to the question

and compared the codes, deciphered the meaning of the student codes, and flagged codes that were remarkable for their addition of potentially new information. Much of the time working through the codes involved discussion and clarification of the original codes, which was useful in its own regard for the progression of the study.

The Benefits of Student Codes and Co-Research

As mentioned above, two of the authors analyzed the youth co-researchers' codes by comparing them with the analysis the research team conducted for the same coded interview transcripts earlier in the year. In this case, we were looking for new codes introduced by the youth co-researchers and expanded interpretations of existing codes. Of course, the underlying purpose in the development of student codes was to contribute to the accuracy and further development of the previously collected interview data. As such, regardless of the outcome, the analysis will ideally confirm our own coding frames or help us reflect on missed perspectives that the youth co-researchers were able to pick up on.

For the purposes of this paper, the codes generated by our youth co-researchers can be categorized into three situations: (1) the co-researchers' codes matched one of the originally generated codes; (2) co-researchers' codes deviated, extended, or otherwise modified an originally generated code; and (3) co-researchers came up with new codes that were not present in the original codebook. The most commonly produced codes from students were those that we interpreted as matches for our originally generated codes. The extended, deviated, or modified versions of existing codes were less frequent, and the novel student codes were relatively rare. There were also codes generated by student pairs that were off topic or illegible. In the section that follows, we outline examples from each of these categories, followed by a discussion of we plan on expanding and using this information.

First, there were many cases wherein our co-researchers' codes matched one of the original codes generated by the research team. The following table displays a list of original codes that matched student-produced codes:

This table includes the interviewee utterances and corresponding labels assigned by research team coders from the original codebook, as well as codes generated by youth co-researchers. For example, the co-researchers were able to identify if the interviewee demonstrated a positive attitude towards help-giving, confidence in solving a math problem and giving help, and empathy to the other students. The co-researchers were also able to extract contextual reasons that influence students' help-giving behavior: for example, a group of co-researchers mentioned "*Understands but doesn't understand when it comes to the question*," indicating that even if a student knows the domain, if the question is hard, it will be difficult to help others. This shows that some of the codes produced by the youth co-researchers are congruent with that of the study researchers. This finding indicates that the research team was able to extract the key factors related to help-giving, and thus validates the original codebook in one way.

Second, there were some cases where youth co-researchers' codes not only matched the general idea of the codes produced by the study researchers, but recontextualized

or added to them in unique ways. For instance, one of the codes we identified in our data was *empathy*, which was assigned to a part of the student interview statement when an interviewee noticed how specific actions make others feel. An example from the interview transcript where this code was assigned is, "*maybe they don't have people who can help them at home or maybe at their school*." But during our co-design sessions, the youth co-researchers interpreted some other parts of the interviews as "understanding, caring," thereby extending the definition of the "empathy" code. For example, when an interviewee mentioned that they would still like to provide help in Khan Academy even if the original poster doesn't see it, "*because someone could see the post and it would help them a lot, or not at all,*" a group of co-researchers labeled it as "understanding and reasonable." Upon reflection with previous data, we found that this indicates that students value empathy during help-giving, which is in line with our previous research (Ahmed et al., 2019).

Finally, in a few cases, the co-designers came up with new codes that were not present in the original codebook. First, when a student interviewee said, "*I'll give an example maybe of … for them to understand and then I'll explain the problem*," our original coding team did not assign any codes to this section, but the youth co-researchers noticed the **help-giving styles** and labeled the passage, in one youth co-researcher team's words, "restates, explains in a different way." Second, a group of co-researchers assessed the interviewees based on their response related to help-giving; for example, "reliable, teamwork, hard worker." This could be seen as possible necessary **qualities within a help-giver/team member**. In the original codebook, no such codes were present, as the primary purpose was to identify individual or contextual characteristics that influence students' participation. However, it is interesting to see the youth co-researchers interpret positive qualities of a help-giver from the interview statements. This could mean that how students perceive their team members may affect their collaboration effort as well. For example, if they identify their groupmate as not being a team player, they may not be interested in helping them or collaborating with them. Third, the youth co-researchers identified **affect** as a reason for not giving help to others; for example, a group of youth co-researchers mentioned, "...disagrees on helping others because he doesn't *want to make a fool of himself*" for the interview statement, "I disagree because it's hard to figure out what to say, to answer the question if you don't know what they're talking about." According to the original codebook, study researchers would have identified this statement as indicating a domain knowledge requirement to give help to others. However, the youth co-researchers could identify the affective state of the student, which could be a contributing factor in a student's lack of help-giving. Fourth, the co-researchers indicated that "students would feel more comfortable having a student in their age group to understand the work." We have evidence that students usually prefer helping their friends, but here we observe some students have a preference for help from similarly aged cohorts. Students with the same age can "speak each other's language," so students are able to understand their own way. These new codes added different perspectives on how populations in the same age cohort interpret their peers' comments, and indicated additional factors to consider when investigating help-giving.

These insights from students were spread across the various youth co-research pairs. In truth, there was little overlap among the novel co-research code productions from each student pair. This resonates with our rationale for including groups of students to inform our earlier design-based decisions. In both cases, it wasn't that we necessarily required elements of triangulation from our student participants; rather, we valued a variety of unique observations that could inform our designs and analyses. Additionally, in our analysis of the student coding documentation, there were some cases where the youth co-research coding productions were not very useful. In these cases, we observed some students simply paraphrasing the original interview statement. We did not consider them to be valid codes. Other nonproductive coding examples were simply off topic or an attempt at humor. For example, in some of the coding blanks, one pair simply put "LOL" or "makes sense." While these were not helpful for the project, these instances did not typify the responses of most student co-research pairs. Rather, this sort of nonproductive code represented less than 2% of the youth co-researcher coding production.

In terms of the benefits gained from engaging with youth co-researchers, the research team's codes related to the interviews were validated, which in turn indicates that the themes extracted by the researchers have influence on students' help-giving behavior. This youth co-research enabled us to see a different aspect (i.e., the new codes) of the middle school students' collaborative behavior, which may help us to develop more personalized support for collaboration. Additionally, these benefits were innovative in the sense that while much youth co-research is conducted with older youth, our younger co-researchers proved broadly capable of contributing to the coding experiences. Finally, in addition to benefits for the project, the youth co-researchers also received hands-on experience in the research process and qualitative coding, which will hopefully add to their experiences with and understanding of social science in the future.

The less immediate and straightforward benefits of the youth co-research relate to how we have come to value the epistemological contributions of our youth collaborators. The UbiCoS project was able to realize the benefit of triangulated codes and, anecdotally, begin to recognize the valuable contributions of other-than-professional research communities. Unfortunately, expanding on and reflecting on these contributions was cut short by the global pandemic, as detailed below. However, we can intuit from other fields that this stepping outside of normative research roles is not unique to youth co-research. As we stated above, there have been many efforts across fields to embrace

other, often marginalized, ways of knowing the world. In qualitative research, there is an active movement to reflect on the Western philosophical cooptation and erasure of Indigenous epistemologies. This work pushes to include more recognition for these ignored parallel Indigenous knowledge systems and support anti-colonial and collaborative scholarship (Bird-Naytowhow et al., 2017; Rosiek et al., 2019). Other work in critical qualitative inquiry has expanded the category of public intellectuals outside of academia to include local activists (Bowers & Clark, 2020) and emphasized the role of community review boards for research approval at institutions (Cross et al., 2015). Collectively, the literature is clear that inquiry at large is expanding the categories of who and what counts in research production. In the section that follows, we outline some of the limitations of this study and possible directions for the future.

Limitations

There were some limitations to this study that preclude us from making firm declarations about the benefit of youth co-research in our larger project. These are largely due to the scheduling changes made necessary by the global pandemic in 2020. This, in turn, affected how we were able to expand on youth co-researchers' involvement in the study. Unfortunately, the project was only able to implement two sessions of the co-research analysis (one of which was a developmental training phase) before our in-person collaborations were canceled due to local school closings from COVID-19. As such, any elements of more advanced youth co-research, such as collaborative writing and negotiating, or adding more co-research perspectives into the project, were not able to be planned or implemented. Additionally, a debriefing on the research process with our youth co-researchers was also not possible. In future iterations, it would be valuable to reflect on the co-researchers' conceptions of research and the understanding of the research process that they developed through the co-research sessions. This aligns with notions in youth co-research literature which encourage whole participation in the research process (Guishard & Tuck, 2013). Just as scholars reflect on their evolving understanding and movement through research inquiry, projects involving youth co-researchers should also build this reflection into the overall structure of the research.

However, as can be seen in the preceding sections, our project has benefited from the coding work of our youth co-researchers. Our hope is that the brief experiences that we were able to implement also revealed the value of research and coding to our participants. Our goal is to continue adding youth co-research to our project, to further expand this benefit to students when it is safe and appropriate to do so. In future implementations, we hope to also collect data from the youth co-researcher participants in the form of research production. What types of questions, thoughts on methods, and other areas of research design might they produce?

Conclusion

In this paper, we moved from the co-design of computer-supported collaborative learning environments to a reflective co-research process focused on the project team's earlier data analysis. The co-researcher participants proved to be up to the task of understanding and implementing guided qualitative research. As a result, the coding and analysis that the original research team had already conducted for the project was triangulated, modified, and expanded. However, even with these successes, we continue to believe that elements of youth co-research should not be added lightly. Taking into account Guishard and Tuck's (2013) insistence on avoiding "staged and superficial" additions of youth participants into projects, we discussed our engagement with youth co-researchers as a team. Was our planned implementation of youth co-researcher methodologies staged and superficial? We concluded that it was not. During two sessions, we were able to give our 8th grade co-research colleagues introductory training in general qualitative inquiry, with respect to methods and coding. We consider this to be a benefit to the students. Their responses in the training sessions and their work with project data showed that the co-researchers were able to grasp how social research, and more specifically the how and why of qualitative research, already fit into the inquiry paradigms of their own lives.

As Roggero (2014) argues, "the production of knowledge is immediately the production of autonomy" (p. 512). We have come to recognize co-research as a way to encourage that autonomy within our youth colleagues. We believe that what sets our research apart from other efforts is that a smaller implementation of co-research in only part of a study's design, similar to Luchtenberg et al. (2020), can allow more research done to, for, and with youth to include elements promoting autonomy.

Another element that helped us determine that this was an appropriate use of youth co-research methods was that our co-research sessions were an extension of our existing co-design sessions. Our earlier co-design sessions had students sharing their thoughts and feelings about various topics in many similar ways. These prior sessions helped students get to know one another, as well as the research team, thus engendering greater trust. These sessions were not product-oriented, but rather focused on learning together. In other co-research implementations, it might be beneficial to lead into the co-research sessions with activities focused on academic inquiry, rather than those explicitly focused on developing research. This may allow for the type of rapport that we built with the students through our co-design sessions to develop, before specific research performance is expected.

Our larger hope with this paper is to allow for principled methodological extensions to studies with youth, that the option to include that in the research process becomes a matter

of course. While our youth co-researchers' role in this project turned out to be smaller than intended, the process we used to include them was robust and beneficial to all involved parties. In the future, these co-research elements will continue to add depth and perspective as they are integrated into other research stages.

Appendix A: Qualitative Teaching Materials

RQ: How do students feel about pizza toppings?

Sub Q1: Why do students dislike chicken on Papa John's Pizza?

1. What are the important characteristics of toppings on a pizza?
2. Does meat need to be on a pizza and why or why not?
3. How do you feel about chicken on a pizza?

INTERVIEW 1

1. What are the important characteristics of toppings on a pizza?

I think there are several characteristics of pizza that are important. I think there is a certain element of color variety of pizza toppings provide. Like when you have pepperoni and green peppers the red and green make for a better visual experience and there are a lot of colors of meat to like bacon is red and sausage is brown and pepperoni is also red. Another thing about pizza toppings that is important are the mixture of flavors. I think that sometimes it's nice to have something hot Italian sausage or banana peppers and something cool like sun-dried tomatoes and avocado and last I think pizza toppings are important because cheese pizza by itself is really ugly, nobody wants to eat just a white and brown Pizza.

2. Does meat need to be on a pizza and why or why not?

Yes meat does need to be on Pizza 100%. This is because it is important to get protein because that's how our muscles grow. Also, just vegetables on a pizza are gross they're too crunchy and they don't have flavor by themselves. Meats on Pizza are often salty which is another important element for people to have in their bodies. There is a really good reason why pizza places have meat lovers Pizza because people love meat.

3. How do you feel about chicken on a pizza?

I don't think chicken counts as a meat on pizza because it is bland and does not taste good by itself. The pizza that we get from Papa John's very six rectangular pieces of chicken that fall off when you left the pizza. They look like if you cut up a chicken nugget but didn't have any of the good pieces of breading left. My question is where do they buy their chicken?

INTERVIEW #2

1. What are the important characteristics of toppings on a pizza?

I like our pepperoni, jalapeno, and mushrooms. Also sausage. So like I tend to like some kind of meat I can pepperoni or sausage. I also think a little spices are like a little heat in terms of jalapenos, really make it good. Those are the two major things. Things I don't think they enjoy are the efforts peppers on there. Why is that? Um I don't think they have a good flavor the texture is somehow it doesn't fit well for me

2. Does meat need to be on a pizza and why or why not?

No, definitely doesn't. I often enjoy the pizza without the meat or with me but some really good pizza is definitely—does not have doesn't have meat on it. So yeah, basically it's still taste good.

3. How do you feel about chicken on a pizza?

I am not a fan of chicken on pizza. All the meats; generally think most of the meats are good on the pizza. Chicken though. It has a weird kind of contrast between the marinara sauce with pizza, cheese chicken. It just doesn't feel like it combines very well. Any other thoughts? No. Thank you

INTERVIEW #3

1. What are the important characteristics of toppings on a pizza?

For me usually is, I don't know something a little give the pizza, something a little more kick to it, sometimes more protein. Those are the two big things for me. I'm not a super big toppings person. But if I see something I like, I'll get it or it's often whoever I'm with. Sometimes wine is tough. And that's a consideration. What kind of topics? I really like Bazell. I like extra cheese, vegan cheese Of course cashew cheese. No diet cheese if you can avoid it. Red roasted red peppers.

2. Does meat need to be on a pizza and why or why not?

Meat does not need to be on a pizza because we can get enough protein from other sources without causing harm to animals. Like, what are some other sources of protein? Well, one thing I personally like to put on pizza is quinoa; tastes

really good. Yeah. And there's all kinds of alternative meat products beyond meat, vegan sausage, basically any meat traditional meat that you would put on a pizza, you can find a plant based alternative.

3. How do you feel about chicken on a pizza?

I guess before I became vegan, I never I didn't eat chicken. I don't recall ever having it on pizza. So I guess if I saw it, it would be I guess a little surprising. I just I don't know, I guess it's just one of those things where, you know, we're programmed to associate certain foods in pairs. And I don't think chicken and pizza is a common one. So I mean, it could be in the future. If someone's coming up with a new concept. Maybe they're setting a trend.

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Note

1. A mad lib is a text-based activity where a player inserts words or phrases into the blanks of an existing story.

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