International Society of the Learning Sciences

Yalla KIBO: A Research-Practice Partnership for Binational, Youth-Led Kindergarten Robotics in Jerusalem

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Abstract: Educational programs working for a shared society are one peacemaking approach for intractable conflicts, such as that between Jewish Israelis and Palestinian Arabs, including Palestinian citizens and residents of Israel. This paper discusses a pilot program where Israeli and Palestinian teenagers, alumni of a binational computer science (CS) and entrepreneurship program, designed, taught, and researched a robotics program at an integrated Arab-Jewish kindergarten, using an iterative design process to construct the program based on their experiences. We found features in both the learning environment and student outcomes relating to the shared society model. Our findings suggest that by incorporating features of education for a shared society into the design of the educational environment, a CS educational leadership program can become not only a coding playground but a coding bridge, leading to outcomes of a shared society as well.

Background

The relationship between Jewish Israelis and Palestinian Arabs, including Palestinian citizens and residents of Israel, is considered by some to be one of the worlds' most extreme examples of an intractable conflict (Bar-Tal & Rosen, 2009; Nasie et al., 2021). The seemingly intractable conflict resulted out of at least two dominant ideological discourses (one Jewish, one Palestinian) on the control of the land and recognition of group sovereignty. Individuals within the region view the conflict as inevitable and irreconcilable, one of the qualifying features of an intractable conflict (Bar-Tal, 1998).

The region

The status quo for the region involves periods of tension interspersed with periods of war, with the region returning to the status quo of heightened tension following each war (Bekerman, 2018). The 1948 war, called the War of Independence by Israelis and the Naqbe (Catastrophe) by Palestinians, was the first open military clash between the Zionist and Palestinian nationalist movements. Four major wars have erupted in the region since then in 1956, 1967, 1973, and 1982. The Intifada outbreaks in 1997 and 2000, organized in the conquered territories under the flag of the Palestinian Liberation Organization (PLO), brought about even bloodier events which shattered hopes for a peaceful solution that had come from the Oslo agreements between the Israeli Government and the PLO in 1993. Although disengagement from the Gaza strip was potentially promising; the 2006 second Lebanese war and the overtake by Hamas of the Gaza area of the Palestinian Authority, with its following outbreaks of hostility, left place for optimism. At the time of writing, an ongoing war between Israel and Hamas in Gaza, in response to the Hamas terrorist attacks on October 7, 2024, have further discouraged optimism for a peaceful solution.

Although some who are unfamiliar with the region may imagine the two communities to live in entirely separate territories, approximately 20% of Israeli citizens are Palestinians Arabs, and approximately 40% of Jerusalem residents are Palestinian, the majority of whom do not hold Israeli citizenship (Hasson, 2018). As such, the two communities can live in the same land, but typically do so either in legally or socially segregated communities, with separate schools or neighborhoods for the Arab and Jewish communities, who primarily speak Arabic and Hebrew respectively. The Jewish-Palestinian conflict remains the most potentially explosive of conflicts within Israel, placing the Jewish majority and the Palestinian minority at perpetual odds. Though structurally there is a sharp asymmetry between both communities, they both hold to beliefs on having a monopoly on objective truth regarding the conflict and the identity of the villain in it, undermining possibilities for conflict resolution (Bar-Tal, 1998).

Israel, since its inception and as is clearly stated in its Declaration of Independence, has been committed to full political and social equality for all its citizens irrespective of their religion or ethnic affiliation. Yet, even the Israeli government agrees that it has not been fully successful in implementing this ideal, and instead implementing segregationist policies which are only recently being challenged in the courts (Jamal, 2008, 2009). These separatist policies are reflected in the Israeli educational system which is divided into separate streams

(Non-religious Jewish, Religious National Jewish, Orthodox Jewish, Druze, and Arab), making it very rare for Palestinian Arab and Jewish students to attend the same school (Sprinzak et al., 2004). An advantage to the separated educational programs is that each student receives education in their language – Jewish students in Hebrew and Palestinian students in Arabic – but there are discrepancies between the systems in physical facilities, teacher qualifications, retention rates, and levels of special services. In terms of achievements, rates at which students take the matriculation exams are equal for the Arab and Hebrew education streams, but there are still gaps. For example, 58% of students in the Hebrew education stream pass the most advanced English exams compared to 14% of students in the Arab education stream (Blass, 2017). In many ways, Israel's education system reflects and reinforces ethnic and religious divisions in Israeli society (Amara & Mar'i, 2005).

Shared society in intractable conflict

One approach to peacebuilding in intractable conflicts taken by educators and NGOs is the creation of a shared society (Sagee, 2021). Educational initiatives and NGOs working toward shared society expand on the Contact Hypothesis, first proposed in 1954 by Allport, which posits that that intergroup contact under appropriate conditions can effectively reduce prejudice between majority and minority group members (Allport et al., 1954; Bekerman & Horenczyk, 2004). However, research suggests that the Contact Hypothesis may not be enough to bring about peace in intractable conflict (Bekerman, 2018). Effects of short interventions may not be sustained if children are return to sustained adverse social and political influences, and contact interventions may themselves replicate existing power dynamics. The shared society model expands on the contact hypothesis to better serve the unique needs of communities in intractable conflict. According to the model of shared society, integration between the two groups requires regular, frequent, and equitable contact towards the creation of a shared goal and the development of genuine friendships across the two communities (Bekerman, 2016).

Multiple organizations in the region focus on sustained, equitable contact and shared society as their approach towards peacebuilding education, including but not limited to bilingual schools which promote education of Jewish Israeli and Palestinian Arab children alongside each other in both Hebrew and Arabic, the PeacePlayers program for integrated youth sports, and Middle East Entrepreneurs of Tomorrow which offers binational computer science and entrepreneurship education for high school youth (Bekerman, 2016; Bekerman & Horenczyk, 2004; Ditlmann et al., 2021). Although a potential critique of these programs is that they serve students who are already interested in peace education and conflict resolution, research on the region's bilingual schools and binational programs suggests parents and students often participate for personal goals, such as school-quality, the opportunity for their children to learn the other language, or opportunities for athletic participation (Ditlmann et al., 2021; Yahya et al., 2012). Students who participate in binational shared-society model programming have increased willingness to engage with the "other side," are more likely to report having out-group friends, and have higher opinions of the other community. These patterns have been seen for both Israeli and Palestinian students, and the effects are stronger with more frequent and longer contact (Ditlmann et al., 2021).

One aspect of the region that must be considered in Israeli-Palestinian shared programming is how the organization will approach language. The official language of Israel is Hebrew, and this is the language spoken by the Jewish Israeli community. Arabic is the primary language of the Palestinian Arab community and was considered an official second language until 2018, when it was relegated to an auxiliary language. As Hebrew is the official language of Israel, Palestinians who live in Israel typically learn Hebrew as a second language in school. Both Palestinian Arab and Jewish Israeli students may also learn English as an additional language. Most shared-society programs approach the issue of language by creating bilingual programs, often with the assistance of translators or educators who facilitate students' participation in their native language. However, due to the power imbalance in the region, with Palestinian Arabs more likely to learn and know Hebrew than Jewish Israelis to know Arabic, there is still potential for language-related power imbalances in bilingual programs, which limits the ability of the program to create equitable experiences for the children across cultures working towards a shared goal (Rajuan & Bekerman, 2011). Another approach is to have programs in English, as English is a shared second language for the two communities. An example of such a program is MEET, Middle East Entrepreneurs of Tomorrow, which offers a three-year program for Israeli and Palestinian teenagers in English, therefore bypassing the potential language related inequities and placing the students in a more equitable space (Azenkot et al., 2011).

Coding as a playground

Around the world, including in Israeli and Palestinian communities, there is a desire to increase participation in computer science and technology for students. This is for a variety of reasons, including economic reasons, adapting to a digital culture, and improving student higher order thinking (Jara et al., 2018). In Israel specifically, there is a focus on the high-tech industry and the culture of the "startup nation", which can lead to an increased

focus on the value of STEM education and the tech and entrepreneurship labor market (Senor & Singer, 2011). Additionally, research suggests that because the STEM field is seen as global, for Palestinian teenagers in Israel, STEM education can be a global space outside of the power dynamics of the region and the conflict (Diamond & Kislev, 2022).

There has been a call for the development of pedagogies to teach computer science and making in developmentally appropriate ways. One such pedagogy is Bers' understanding of Coding as a Playground (Bers et al., 2019). The metaphor proposes that, like the physical playground, coding playgrounds can be environments for learners to engage in self-directed learning through individual choices and personally driven and meaningful projects. The pedagogy expands off of Papert's constructionism, which suggested that children's creation of personally-meaningful and affective projects can lead to cognitive development (Papert, 1980). Like physical playgrounds, coding playgrounds are designed with scaffolds for developmental appropriateness, and like on physical playgrounds, children can develop across multiple domains, including the moral, social, emotional, and communicative in addition to the cognitive.

Not all coding playgrounds are on the computer; examples of researched coding playgrounds include KIBO, a screen-free robotics platform, and makerspaces. (Bers, 2018; Kazakoff & Bers, 2014; Strawhacker & Bers, 2018; Sullivan et al., 2015). Previous work with KIBO has suggested that the coding playground can be used as a tool as an empowering tool for communication for children with disabilities, and as a means of reducing stereotypes (Levinson et al., 2021; Sullivan & Bers, 2016). Work with makerspaces has suggested that in makerspaces and such technological environments, making can be understood as a way for students to create and develop their imagined and ideal worlds (Wargo & Alvarado, 2020). Coding playgrounds have been primarily studied in young children, but can also exist for older children, adolescents, and educators.

This paper

Early childhood computer science and robotics are still a novel field, and early childhood teachers, many who do not have prior STEM training, are not inherently comfortable teaching the topic (Govind, 2022). Additionally, in the classroom, teachers are limited in the time they have to learn a new domain and become comfortable with the topic. Teaching early childhood robotics then offers a potential opportunity for a cross-generational partnership, whereby teenagers who are familiar and comfortable with robotics and computer science can learn educational skills and lead educational robotics programming in the early childhood classrooms. Previous research has suggested that teenagers in cross-age volunteer programs can gain empowerment and give back to their community by designing STEM curricula and teaching young children (Sawyer, 2001; Schwartz, 2005).

This paper describes a research-practice partnership in which Jewish Israeli and Palestinian Arabs youth developed, taught, and researched a six-day robotics program at a bilingual Arab-Jewish kindergarten in Jerusalem. Our primary research aim was to understand if and how an experience designing a bilingual early childhood robotics program could promote shared society for Arab Palestinian and Jewish Israeli teenagers. We had two research questions: 1) What were the unique factors of the learning experience compared to other learning experiences for these teenagers? 2) What were the unique outcomes for the teenagers engaged in during the Yalla KIBO program?

Methodology

This project was conducted in partnership with Middle East Entrepreneurs of Tomorrow (MEET), a three-year CS and social entrepreneurship program for Israeli and Palestinian high school students (Azenkot et al., 2011). MEET's approach to binational programming is unique in the region– the organization recruits students through a competitive application process, and all programming is conducted solely in English removing potential power imbalances described in bilingual education programs (Rajuan & Bekerman, 2011). 71% of MEET students stay actively involved through its alumni network, as teaching assistants, and instructors. MEET has made intentional decisions in its language choices to both respect student identity and promote equality and respect for all students, and we are using the language choices of the organization within our paper. Following the practices of MEET, we are referring to the region known as Israel/Palestine simply as the region. Additionally, we are using the term nationality to refer to the identities of the Israeli and Palestinian students, rather than to the students' citizenship or residency. The Palestinian teenage participants were all Palestinian citizens of Israel (from Nazareth), and the Palestinian children were all Palestinian residents of Jerusalem (Israeli citizenship status unknown).

Participants

The youth design and research team consisted of four teenage alumni of the MEET program (Table 1). The students were divided into binational pairs, with one team responsible for curriculum and teaching and the other responsible for research assessments and observational data collection. All four students were recent high school

graduates, and three worked as CS teaching assistants for MEET. None had experience teaching young children, although they had contact with young siblings and relatives.

Table 1
Demographic Information of the Youth Design, Education, and Research Team

	Age	Nationality	Gender	Project Role	Languages Spoken	Home City
Selma	19	Palestinian	Female	Educator	Arabic*, English, Hebrew	Nazareth
Shira	17	Israeli	Female	Educator	Hebrew*, English, Arabic	Jerusalem
Maroon	17	Palestinian	Male	Researcher	Arabic*, English, Hebrew	Nazareth
Ziggy	17	Israeli	Male	Researcher	Hebrew*, English	Tel Aviv

Protocol

For the Yalla KIBO program, the teens developed, taught, and researched a children's coding program at an integrated Arab-Jewish kindergarten in Jerusalem. The program was named "Yalla KIBO," after the direction "Yalla KIBO," which translates to "Let's go, KIBO" in both Arabic and Hebrew, that was used daily by the team with the young children. The children's coding program consisted of 14 children (mean age = 4.7, *SD* = 0.3). Two of the children were Jewish Israelis and 12 were Palestinian Arabs. Both Israeli children spoke or understood some Arabic, and seven of the Palestinian children spoke or understood some Hebrew. There was an equal gender representation of the students. The kindergarten had two teachers assisting with classroom management who were not involved with the robotics program.

The team was provided the Coding as Another Language (CAL) curriculum to serve as a model curriculum for early childhood computer science education and used an iterative design process in adapting and teaching the curriculum. The coding program with the children involved six days of instruction with three hours of daily programming. After each lesson, the team completed guided debrief sessions using MEET's template of successes and challenges relating to curriculum, class culture, and logistics. Finally, reflecting on the debrief document and existing CAL curriculum, the youth educator team wrote the next day's bilingual lesson plan. The youth researchers assessed students' learning on the first and final days of the program using one-on-one research assessments in Hebrew and Arabic. The youth researchers also led small-group KIBO sessions and collected qualitative data including field observations, video recordings, and photos.

Data sources

The data source for this paper was a semi-structured interview conducted after the completion of the Yalla KIBO program. For the teenagers who were also teaching assistants in the formal MEET summer program, the interviews were conducted after the completion of the MEET summer program. All data was collected in Summer 2023.

Analysis

We used a thematic analysis approach with a combination of deductive and inductive coding to answer our research question. Two authors, an American Jewish woman and Palestinian man from Israel, first selected key quotes from the interviews according to a deductively-created codebook developed from our research question. We then open-coded these quotes and sorted the microcodes according to themes and constructs.

Results

Features of the learning environment

Our first research question related to the unique features of the teen leaders' learning environment created by this experience. Two key themes of features emerged from across the interviews: features relating to new and challenging experiences, and features relating to the processes of making.

New and challenging experiences

The new and challenging experiences described related to the experiences of teaching young children and the experiences of teaching and working in a bilingual or trilingual setting. As mentioned above, most of the teenagers had previous experience as teaching assistants in a high school program, but none had experience teaching young children. The teenagers described this newness as a place of potential fear and challenge, with one going so far as to say that before the project "think I always ran away from teaching kids. I didn't want to teach the kids."

Specific mechanics of working with the children were new and potential challenges to the teenagers as

well. One described the novelty of reading a story to the class as nerve-wracking, explaining "I've never told a story to a kid. So, I didn't know if there's a specific way. The tones, the words, or I don't know… telling a story to a kid seemed a bit frightening to me in the beginning." Additionally, another teenager described the challenges of administering a research assessment to a young child: "What I felt was more difficult was in the CSA [task-based assessment to evaluate robotics knowledge]…I needed…to reorganize the KIBO kit. And that was difficult, because I need to do it as fast as possible, or I will lose the kid in front of me, their attention. And because they have very short attention span, I felt that they were either [getting] distracted by KIBO itself and start playing with it without talking to me, or they were just staring [at] the ceiling and just don't snap back."

Additionally, there were specific novelties and associated challenges related to teaching in a bilingual classroom and conducting the project in three languages. Previously, the teenagers had only worked with each other in English, and in a strict English environment. Of the two Israeli teenagers, one knew some Arabic but was not fluent, and the other knew no Arabic. The two Palestinian teenagers knew Hebrew but were more comfortable in English than Hebrew as far as comfort in a non-primary language. Finding a rhythm of teaching in multiple languages added a difficulty for the teachers and the researchers. Selma, the Palestinian teenage educator, described how this affected the actual teaching process, explaining "So I think in the beginning it was a challenge and it wasn't natural at all, because I used to speak in Arabic, then talk to Shira in English, then Shira would go and translate to only specific students in Hebrew." Maroon, the Palestinian researcher, specifically described a difficulty of having three language options in the classroom as "when I have the possibility of speaking the three languages, sometimes I get confused. When I know that I only have to speak this language, it's easier than having three possibilities." However, the language difficulties were not only described by the Palestinian students, one of the Israeli students described the challenging experience of having more students and the classroom teachers speak Arabic: "All of [the kids] understood Arabic, while not all of them understood Hebrew, so the natural thing was to speak Arabic, and for me as someone who's used to the English environment…for the first time I met the challenge of [having] a gap between my experience right now and Selma's experience."

Of note, both of these challenges, working with children and the multilingual nature of the project, were described by all four of the teenage project leaders in their interviews. The fact that struggling was a joint experience was also highlighted by teenagers when describing their experiences with the project overall.

Making Experiences

The descriptions of making that emerged from the interviews related to the planning and iteration stages of creating and adapting lesson plans and curriculum, developing educational practices, and developing the bilingual element of the educational program. As described above, the overall iterative design process for the Yalla KIBO project consisted of debrief sessions following each lesson, after which the education team would write the next day's lesson plan. Any necessary materials would be made at this time, and adjustments to the instructional method would be planned at this time as well.

When describing the creation of the curriculum and lesson plans, descriptions of both the planning and iteration stages of the process emerged from the interviews. For example, one student described how "before the start of the program, the team agreed that 'In this day we want to teach them this' and 'this day we want to teach them this.' We just agreed on the overall schedule. But since we were teaching kids so you can't really expect how they would be on each day, if they would be really feeling it and really focused each day. Each day, it was just different, because they're kids." Another student used the iterative process as an example of a display of Strive for Excellence, one of MEET's organizational values: "During sessions I always took note of stuff that I saw that that should be noted, and I always went to the specific person, or even sometimes in the debrief itself, where I said, 'this thing should be changed to make it as perfect as possible for the next time.'"

The students also described the development of educational practices. One sub-theme of educational practice that was described was behaviors that the teens developed to engage the students. As the teenagers taught more lessons, they began to reflect, iterate, and expand on the educational practices that were offered to them in the trainings. One explained her iterations on a classroom call and response: " When I saw that it started to be boring for them, I added some movements to it. As 'if you can hear me, let's clap calmly.' And they saw it as an interesting thing. 'Now let's clap sharply.' So, I think I was creative in the ways of how to get the kids."

Another educational practice that was described across all of the interviews was the creation of "Job Cards" to promote child collaboration. The provided CAL-KIBO curriculum had "Job Cards," which contained an image of a child and text assigning the child a role in a small group. When presented with the suggestion of introducing the cards, the team decided to create new Job Cards without text rather than translate the cards to two languages. This was to not prioritize one language over another and because the children were unable to read. Many descriptions of these cards and their creation emerged from the interviews. One teenager described the effect of the cards on the students, saying "In the beginning, it was difficult for them to kind of collaborate, but in

the end, with also the cards, it was much easier for them to work together as a team." Another described how the creation of the cards aligned with the MEET organizational value of Think Big through being creative.

The bilingual educational practices were developed, iterated upon, and solidified over the course of the six-day program, and descriptions of this iterative process emerged from the students' interviews. Both Shira and Selma described teaching bilingually in the early days of the program as challenges, with one describing the first days as "a whole mess." However, the two went on to further explain the iteration process, "So what we did first for the second day was super technical. We just divided the session into sections, and each of us took a section and started with her language, and then we are always translated. And then, after two to three days… it just started to be less technical and more natural for us to just have it equally divided or have everything translated. So yeah, sometimes… when you want to have things not technical, you have to start with them being technical, and you need to be stubborn."

Program outcomes

Two key themes that emerged from interviews relating to program outcomes were strong and sustained friendships and the inclusion of Hebrew and Arabic in the teenagers' binational relationships.

Descriptions of pre-KIBO friendships, even within the binational MEET program, described most strong friendships as being within nationality rather than across nationality. The teenagers attributed this to a variety of factors including location and prior friendships. This did not prevent the students from making friendships in MEET but meant that their prior close friend groups within MEET were within nationality, as well as primarily from within their home cities.

However, after participating in KIBO, a different description of the teenagers' friendships emerged from the interviews, and the teenagers were explicit about the difference between this friendship and previous friendships from MEET. During the three weeks after the Yalla KIBO program, Selma, Maroon, and Shira were working together at the MEET summer program, and jokingly described their friendship during this time as "like a gang," saying that their supervisor of MEET had joked, "nobody can tear you." Shira described her sustained friendship with Selma: "I visited Selma twice since MEET ended in Nazareth. I talk to her on a daily basis. She has already seen my kibbutz where I live at in video calls so many times. She's a friend of mine. When I hang pictures on my wall, on my room here in my dorm, I have at least 3 pictures with Selma." Shira's visits to Nazareth were mentioned by Maroon as well, and were described as atypical, even for MEET students.

The three continued to primarily communicate in English but began to include some of their primary languages into their communication as well – also atypical for both for MEET and for the inclusion of both Hebrew and Arabic. Shira described this increasing comfort with the inclusion of Arabic, and therefore of the multiple languages, "I felt comfortable with them speaking Arabic, and they felt comfortable with that, and I got to know more and more things, and they got used to translating everything. So, for sure we were way more comfortable, bringing our languages in." She also explained that this comfort was bidirectional with her close friendship to the other two and related to her comfort asking for clarification. "We also got us more and more close…Sometimes, when I didn't understand, I got more comfortable saying that 'Hey? I did not understand.'"

Discussion

This paper examined the learning environment and outcomes of a binational program for Israeli and Palestinian teenagers to develop, teach, and research a six-day robotics program at a bilingual Hebrew-Arabic kindergarten in Jerusalem. The purpose of this paper was to understand if features of the learning environment and outcomes related to elements of shared society, to ask if and how the experience could promote shared society for the teenagers.

Two factors emerged from interviews relating to the learning environment – shared making experiences and shared challenging and new experiences faced by the students. There were multiple things that the teenagers worked to make over the course of this learning project, each of which was based on their personal desires from the feedback of the day before. One of the key components of shared society is the inclusion of shared goals, and the iterative design themes of the project emerged from each students' interview, demonstrating these goals as clearly shared across all four teenagers.

Additionally, working with young children and teaching bilingually were both novel to the teenagers, who were all experts in computer science and mostly had experience as high school teaching assistants, but none of whom had experience working with young children. Importantly, both themes of challenges, working with children and the multilingual project, were experienced by all of the students, even if they were experienced by all of the students differently. In this way, the challenges created a potentially novel space for both the Israeli and Palestinian teenagers where there is no political power dynamic between the Israeli and Palestinian teenagers, because they are together struggling through the difficulties of learning to work with children, teaching in a new

age group and modality, and researching with young children. As mentioned above, coding playgrounds are scaffolded to the students' zone of proximal development. Although this is often focused on developmental appropriateness for cognitive, reading, or motor development, in this project, the shared challenges provided by novelty and lack of educational domain knowledge created a developmentally appropriate playground for the teenagers to meet and engage on equal ground. As such, this presented an opportunity for equality by removing the students from the conflict and power dynamics, rather than from trying to create equality or remove the power dynamic from an existing learning environment.

As described above, the coding as a playground pedagogy proposes that through engaging in self-directed projects, students can develop morally and socially. Additionally, the Positive Technological Development framework proposes that in coding playgrounds, learners can express and practice positive skills such as Community Building and Communication (Bers et al., 2012; Strawhacker & Bers, 2018). Unlike a traditional coding playground, this project did not include solo self-directed projects, but rather collaborative projects based shared goals. However, the projects were still personally meaningful to students, and the teenagers' descriptions of their processes in the interviews included descriptions of self-direction and self-motivation.

The coding playground behaviors of community building and communication described by the positive technological development framework were seen in the programmatic outcomes of strong and sustained friendships and the inclusion of Hebrew and Arabic in the teenagers' binational relationships. The genuine friendships are also another feature of the education for a shared society framework, suggesting that the learning environment not only created a space for students to experience elements of shared society, but also produced and created elements of the shared society philosophy. As mentioned above, the education for the shared society model proposes that integration between the two groups requires regular, frequent, and equitable contact towards the creation of a shared goal and the development of genuine friendships across the two communities. Each of these elements were seen in either the learning environment or outcomes of this project.

Two components of the education for a shared society philosophy are shared goals and an equitable relationship in the environment. These features were described by the themes above, suggesting that the teens experienced at least some of the shared society elements within the provided learning environment, or coding playground. Bers has proposed a pedagogical metaphor of Coding as a Bridge, expanding on coding playgrounds as a space for not only personal development but also relationship development (Bers, 2022). By incorporating the shared society model with the coding playground philosophy, this project created not only a coding playground, but a Coding Bridge. Rather than self-directed personally-meaningful projects, students worked towards shared goals for their personally meaningful projects, which led to not only the development of positive individual social behaviors but also to genuine and equitable friendships.

A limitation of the study was that we only worked with four teenagers, but moving forward, our goal is to expand on this work to both provide binational CS educational leadership opportunities to more alumni of the MEET organization as well as provide robotics programming to more children in the region. Our work suggests that youth-led CS educational programming can provide a space for youth to participate in and develop shared society, utilizing the power of coding as a bridge to create connections across their regions and with each other.

References

Allport, G. W., Clark, K., & Pettigrew, T. (1954). The nature of prejudice.

Amara, M., & Mar'i, A. A.-R. (2005). Language education policy: The Arab minority in Israel (Vol. 1). Springer Science & Business Media.

Azenkot, S., Golfinopoulos, T., Marcus, A., Springmann, A., & Varsanik, J. S. (2011). Overcoming barriers among Israeli and Palestinian students via computer science. Proceedings of the 42nd ACM Technical Symposium on Computer Science Education, 667–672.

Bar-Tal, D. (1998). Societal beliefs in times of intractable conflict: The Israeli case. International Journal of Conflict Management, 9(1), 22–50.

Bar-Tal, D., & Rosen, Y. (2009). Peace Education in Societies Involved in Intractable Conflicts: Direct and Indirect Models. Review of Educational Research, 79(2), 557–575.

Bekerman, Z. (2016). The promise of integrated multicultural and bilingual education: Inclusive Palestinian-Arab and Jewish schools in Israel: What happens to children when adults find solutions to problems they do not have. Oxford University Press.

Bekerman, Z. (2018). Working towards Peace through Education: The Case of Israeli Jews and Palestinians. Asian Journal of Peacebuilding, 6(1), 75–98.

Bekerman, Z., & Horenczyk, G. (2004). Arab-Jewish Bilingual Coeducation in Israel: A Long-Term Approach to Intergroup Conflict Resolution. Journal of Social Issues, 60(2), 389–404.

Bers, M. U. (2018). Coding, playgrounds and literacy in early childhood education: The development of KIBO

robotics and ScratchJr. 2018 IEEE Global Engineering Education Conference (EDUCON), 2094–2102.
Bers, M. U. (2022). Beyond coding: How children learn human values through programming. MIT Press.
Bers, M. U., Doyle-Lynch, A., & Chau, C. (2012). Positive technological development: The multifaceted nature of youth technology use towards improving self and society. Constructing the Self in a Digital World, 110–136.
Bers, M. U., González-González, C., & Armas–Torres, M. B. (2019). Coding as a playground: Promoting positive learning experiences in childhood classrooms. Computers & Education, 138, 130–145.
Blass, N. (2017). The academic achievements of Arab Israeli pupils (Policy Paper 04.2017). Taub Center. http://taubcenter.org.il/wp-content/files_mf/ academicachievementsofarabisraelipupils.pdf
Diamond, A. H., & Kislev, E. (2022). High school students' perceptions of science and attitudes towards intergroup cooperation. Compare: A Journal of Comparative and International Education, 52(2), 192–210.
Ditlmann, R., Asimovic, N., & Samii, C. (2021). Report of Research Highlights. https://peaceplayers.org/wp-content/uploads/2021/06/PP-Research-Highlights-29.01.20.pdf
Govind, M. (2022). A Qualitative Examination of Second Grade Teachers' Experiences and Attitudes Around Coding and Robotics Education.
Hasson, N. (2018, May 13). Palestinians Now Make Up Some 40 Percent of Jerusalem's Population. Haaretz. https://www.haaretz.com/israel-news/2018-05-13/ty-article/palestinians-now-make-up-some-40-percent-of-jerusalems-population/0000017f-f34e-d5bd-a17f-f77e2d450000
Jamal, A. (2008). The counter-hegemonic role of civil society: Palestinian–Arab NGOs in Israel. Citizenship Studies, 12(3), 283–306.
Jamal, A. (2009). The Contradictions of State-Minority Relations in Israel: The Search for Clarifications. Constellations, 16(3), 493–508.
Jara, I., Hepp, P., & Rodriguez, J. (2018). Policies and Practices for Teaching Computer Science in Latin America. Microsoft.
Kazakoff, E. R., & Bers, M. U. (2014). Put Your Robot In, Put Your Robot Out: Sequencing Through Programming Robots in Early Childhood. Journal of Educational Computing Research, 50(4), 553–573.
Levinson, T., Hunt, L., & Hassenfeld, Z. R. (2021). Including Students With Disabilities in the Coding Classroom: In M. U. Bers (Ed.), Teaching Computational Thinking and Coding to Young Children (pp. 236–248). IGI Global.
Nasie, M., Reifen Tagar, M., & Bar-Tal, D. (2021). Ethno-political socialization of young children in societies involved in intractable conflict: The case of Israel. Journal of Social Issues, 77(4), 1257–1281.
Papert, S. (1980). Constructionism vs. Instructionism. Proceedings from Japanese Educators Conference. http://www. papert. org/articles/const_inst.
Rajuan, M., & Bekerman, Z. (2011). Teachers''inside'reports on language instruction in the Palestinian–Jewish Schools in Israel. Journal of Multilingual and Multicultural Development, 32(5), 465–479.
Sagee, Y. (2021). Shared society in Israel: The Givat Haviva model (case study). Conflict Resolution Quarterly, 39(2), 179–188.
Sawyer, R. D. (2001). Mentoring but Not Being Mentored: Improving Student-to-Student Mentoring Programs to Attract Urban Youth to Teaching. Urban Education, 36(1), 39–59.
Schwartz, D. F. (2005). Dude, Where's My Museum? Inviting Teens to Transform Museums. Museum News.
Senor, D., & Singer, S. (2011). Start-up nation: The story of Israel's economic miracle. McClelland & Stewart.
Sprinzak, D., Bar, E., Segev, Y., & Levi-Mazloum, D. (2004). Ministry of education culture and sport: Facts and figures [dataset].
Strawhacker, A., & Bers, M. U. (2018). Promoting Positive Technological Development in a Kindergarten Makerspace: A Qualitative Case Study. European Journal of STEM Education, 3(3).
Sullivan, A., & Bers, M. U. (2016). Girls, Boys, and Bots: Gender Differences in Young Children's Performance on Robotics and Programming Tasks. Journal of Information Technology Education: Innovations in Practice, 15, 145–165.
Sullivan, A., Elkin, M., & Bers, M. U. (2015). KIBO robot demo: Engaging young children in programming and engineering. Proceedings of the 14th International Conference on Interaction Design and Children, 418–421.
Wargo, J. M., & Alvarado, J. (2020). Making as worlding: Young children composing change through speculative design. Literacy, 54(2), 13–21.
Yahya, S., Bekerman, Z., Sagy, S., & Boag, S. (2012). When education meets conflict: Palestinian and Jewish-Israeli parental attitudes towards peace promoting education. Journal of Peace Education, 9(3), 297–320.