

Virtual Collaboration in the Age of COVID-19: Supporting Youth as Co-Researchers

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ABSTRACT: The COVID-19 pandemic profoundly impacted teaching and learning in K-12 settings, as many public schools lacked the technological tools and techniques needed to support effective virtual meetings and online learning. In this article, we explore the impact of the pandemic on *Youth Built Change* (YBC), a STEM-pipeline partnership between two high schools and a university. In YBC university researchers work with high school juniors to conduct research on substance abuse and addiction in their local school communities. As a school-university partnership which emphasizes multiple types of collaboration (e.g., among students within research teams, between research teams and teachers, between research teams and university research mentors, and between teachers and university research mentors), YBC challenged traditional approaches to teaching and learning before the pandemic. In light of the ways in which the pandemic exacerbated those challenges, and brought forth new ones, this article addresses tools and strategies that were used in YBC to engage students as researchers, insights gained about collaborative work in a virtual environment, and the impact of this year on the YBC program going forward.

INTRODUCTION

When schools and businesses went virtual as a result of the COVID-19 pandemic in Spring of 2020, all aspects of life were disrupted. Teaching and learning in K-12 settings was particularly impacted, as many public schools lacked the technological tools and techniques to support virtual meetings and online learning. As a partnership between two high schools and a university, the *Youth Built Change* program (Jacquez et al., 2020), faced significant and unique challenges. Funded by the National Institutes of Health through a Science Education Partnership Award, *Youth Built Change* (YBC) is a program focused on increasing diversity in STEM professions by introducing scientific research opportunities to high school students from underrepresented populations. Research indicates that students from underrepresented populations may have few opportunities to engage in science and research in meaningful ways during their formative years. Further, youth of color and youth in low income communities may be underrepresented because they cannot envision themselves successfully serving the fields of STEM, or conversely, STEM fields serving their community interests (Aschbacher et al., 2010; National Science Founda-

tion, Science and Engineering Indicators, 2019). YBC aims to help students see the viability of a STEM career path.

Currently in its third year, YBC partners university-based researchers with high school juniors to conduct research on substance abuse and addiction in their local communities. As a school-university partnership which emphasizes multiple types of collaboration (e.g., among students within research teams, between research teams and teachers, between research teams and university faculty, and between teachers and university research mentors), YBC challenged traditional practices of schooling before the pandemic. In light of the ways in which the pandemic exacerbated those challenges, and brought forth new ones, this article addresses tools and strategies that were used in YBC to engage students as researchers, insights gained about collaborative work in a virtual environment, and the impact of this year on the YBC program going forward.

The Youth Built Change Project *Youth Built Change* is a STEM pipeline program designed to increase diversity in STEM professions by introducing scientific research op-

portunities to high school students from underrepresented populations. YBC employs principles of community-based participatory research to engage high school students as co-researchers on projects aimed to solve a problem in their local communities. Unlike STEM education programs that focus primarily on students' acquisition of discipline-specific knowledge (Kennedy and Odell, 2014; McDonald, 2016), YBC integrates knowledge acquisition with direct research experience related to real-world problems. Students and teachers are positioned as collaborators and co-researchers, student expertise is valued, and the shared goal is to make a positive contribution to local communities. Specifically, high school juniors partner with researchers at a nearby university to conduct research on drug abuse and addiction, a growing problem in each of their communities as it is nation-wide. By engaging students as shared decision-makers in the research process, YBC aims to increase students' understanding of scientific research methods, enhance their perception of the relevance of STEM skills to their lives, and increase their intrinsic motivation to pursue STEM research.

Since its start in Fall 2018, YBC has engaged a new cohort of 11th grade students each year at each school site. Over the course of an academic year, these high school juniors develop their own research questions, collect and analyze data, and present results to academic audiences and to stakeholders and policymakers in their own communities. At the beginning of each year, the program is launched with a Research Kickoff event (Jacquez et al., 2020). Soon after this event, students divide into project groups of 4-5 to pursue a specific research topic of interest related to substance abuse in the community. YBC students share a class period each day devoted to this work. In each school, the YBC class is facilitated by a science teacher working together with university doctoral students who serve as Research Mentors. University professors with expertise in community-engaged and substance abuse research interact directly with the high schools as well, during three pivotal events each year: Research Kickoff, Research Proposal Feedback Conference, and Research Dissemination Day.

Over the years, YBC research teams have conducted a range of scientific investigations. For example, research teams have explored differences in perceived risk and knowledge of specific illicit drugs among students living in different neighborhoods within their school district; differences in messaging about drugs and alcohol on social media platforms used by youth versus those used by adults; and students' perceptions of the effectiveness of current drug prevention programs in their schools.

Guiding Principles of Youth Built Change. In contrast to programs that emphasize discipline-specific content knowledge and STEM literacy (Kennedy and Odell, 2014; McDonald, 2016), YBC prioritizes both content knowledge ac-

quisition and hands-on engagement in the research process. Drawing on principles of community-based participatory research (CBPR), the goal is to create a culture of youth as co-researchers and change agents. Community-based participatory research is an approach to scientific inquiry that promotes shared decision-making and equitable collaboration between community members and academic researchers (Minkler and Wallerstein, 2008). The goal is to establish a partnership in which the purposes, methods, and implications of research reflect the unique expertise of all members, working together toward the goal of positive community change.

A hallmark of CBPR is that research findings are used to fuel local action. In health-related research, CBPR harnesses community knowledge in service of action and social change. Engaging youth in CBPR has shown powerful results with respect to health issues impacting their own communities, in large part because the vested interests of youth are recognized and valued (Vaughn, 2015). Many of the students who join YBC, for example, are motivated to do so because of personal experiences with substance abuse in their family and peer networks. Youth-engaged CBPR also leverages youth knowledge and community connections to support research that might otherwise be difficult to pursue. Returning to YBC as an example, students have been able to gather data from other students on the topic of illegal substance use, based on their "insider status" within the student community. We suspect those data would not have been accessible to adults. That said, a systematic review of over 400 articles which used the terms "CBPR" and "youth" revealed that only 15% actually involved youth as partners in some phase of the research process. (Jacquez et al., 2013). By engaging youth in all aspects of the research process, YBC is a unique approach to creating a STEM pathway.

Conceptual Framework for Youth Built Change. The conceptual framework undergirding YBC includes six components. According to Jacquez and colleagues (2020):

*This framework equally prioritizes both **content knowledge** and **exposure to the research process**. It creates explicit spaces for diversity of **voice** and **shared expertise**. Additionally, it calls out the importance of both a **peer network** and **engagement with academic and local communities**. The framework components when taken together are designed to build a **culture** of youth as co-researchers; supporting not the "next generation", but the "now generation" of community change agents. (p. 3)*

Figure 1 shows each of the six components and corresponding goals and objectives. Collectively, these components contribute to the creation of an active work space in which youth collaborate to design, implement, analyze re-

sults, and disseminate findings of a research study. As members of a research team, students collaborate with one another, communicate with a variety of audiences, and engage with multiple communities. We believe participation in YBC holds promise for enhancing youth social and emotional development, self-efficacy, autonomy, and research identity.

Bringing the guiding principles of YBC to life requires a non-traditional approach to teaching and learning within the high school setting. Instead of leading and lecturing, teachers and university researchers are co-learners who guide students and facilitate learning. Content components of the YBC curriculum establish a shared knowledge base and serve as guideposts for inquiry, however most of the learning unfolds interactively as students work through the steps of the research process from study design to dissemination of findings. Adult facilitators listen more than they talk and are genuinely curious about students' ideas. Following the lead of students' interests and concerns, they ask responsive questions, prompt idea generation, and develop appropriate materials to help students move from one step to the next in the research process.

Participants, Facilitators, and Key Stakeholders. YBC partners with two geographically and socio-demographically distinct high schools: Plainfield and Morrow. (Names of schools, locations, and people are pseudonyms.) With approximately 1,500 students, Plainfield High School is a large public high school within the same metropolitan area as the university. It has an ethnically diverse population that is 45% African American/Black, 5% Asian/Pacific Islander, 23% Latinx, 6% Multiracial, and 21% White (ODEb, 2020). By contrast, Morrow High School is located in rural Appalachia

Figure 1. Conceptual Framework Guiding the *Youth Built Change* Program. *Note.* Figure adapted from Figure 1 in Jacques et al., 2020. Adapted with permission.

| Framework Components | Goals | Objectives |
|----------------------|---|--|
| Content | Increase understanding of STEM content | Provide information about drug abuse and addiction Youth share expertise of DAA in context of own community |
| Process | Increase understanding of STEM research processes | Expand understanding of what constitutes research & Experience applying participatory research processes |
| Culture | Create inclusive space for youth in STEM research process | Invite students to join the participatory research community & Expand youth buy-in to identity as a community change agent |
| Voice | Centering youth perspective in research process | Value youth as experts in how drug abuse and addiction affects their communities & Create formal structures that facilitate leadership in research process |
| Network | Deepen and expand social and cultural capital through youth connections with each other | Connect youth within and across schools Create collaborative team science opportunities |
| Engagement | Expanding relationships between youth, schools, researcher community, and local communities | Connect youth to university community Introducing youth as researchers to the university community Shifting traditional student/teacher dynamic |

with a student body that is 97% White (ODEa, 2020). One hundred percent of Morrow students and 60% of Plainfield students meet the state's criteria for economic disadvantage (ODEa, 2020; ODEb, 2020).

Students learn about YBC in the middle of their sophomore year when a description of the program is circulated and current YBC students visit sophomore classes to speak about their experiences in the program. Interested students submit an application which consists of an explanation of their reason for applying, the name of a teacher reference, and their current GPA. While GPA provides helpful information, admission decisions are not based on academic achievement, but instead on interest and teacher recommendation. School counselors are notified of student admissions so they can schedule students into the YBC class period.

In the first two years, there was an average of 40 student participants across schools (45 in Year 1 and 35 in Year 2). In Year 3 of the project (2020-21) there were 22 student participants. COVID-19 impeded both recruitment and scheduling for the Year 3 cohort. For example, there was no communication between current students and prospective students during the recruitment period, and sophomores were less responsive to e-mail applications reminders than in the past. Additionally, scheduling conflicts were more prevalent due to the hybrid models enacted in each school; as an elective, the YBC class can be taken only when it does not conflict with a required course.

In the Morrow cohort, one student is Asian/Pacific Islander and seven students are White. In the Plainfield cohort, five students are African American/Black, three students are Asian/Pacific Islander, and six students are White. In addition to the YBC students, each school has three Peer Leaders. All Peer Leaders at Morrow are White; at Plainfield, two are African American/Black and one is White.

There are seven adult facilitators in YBC: one science teacher at Morrow High School, a science teacher and an English teacher at Plainfield High School, and four university doctoral students who serve as Research Mentors. Prior to the pandemic, the high school teachers met with YBC students during one class period for one day each week, and University Mentors facilitated the class during this same class period. One additional doctoral student served as a Research Methodology Consultant, visiting with students three to four times per year to address specific questions pertaining to research methodology, especially as project groups grapple to determine the methods that best fit their research goals. YBC students also benefit from near-peer mentoring in the form of Peer Leaders. Peer Leaders, high school seniors who were in the YBC program as juniors, encourage new project groups by sharing their own experiences with the research process. In some cases, Peer Leaders work in their own research teams on projects that extend the work they conducted during the previous year, from research to action.

YBC brings together a range of stakeholders including school administrators, the broader community in which schools reside, and the university's academic community. For example, in previous years Morrow students have worked with members of the local health department, and Plainfield students have worked with district administrators during various phases of the research process such as: gathering preliminary information to help inform research question generation; building relationships with liaisons to gain access to specific populations of interest; and sharing research results with those who are empowered to take actionable next steps based on the research results.

The nature of co-learning and doing research for social change blurs the traditional lines between participants, facilitators, and stakeholders. For example, since our participating students are members of the adolescent community in which substance abuse is a growing concern, and many of them report first-hand experience with family members who have become addicted, they are also key stakeholders. And stakeholders such as building principals and school district superintendents become participants when they're engaged with students in problem-solving, especially at the point of turning research implications into action. Since YBC hinges on collaboration and the involvement of multiple stakeholders, COVID-19 posed particular challenges.

Pivotal Program Events. As noted previously, students in the program meet daily across the school year. In addition, there are three key events that serve as program anchors and milestones. These events are critical to establishing and maintaining the research culture of YBC, and they also serve to connect the multiple communities of participants and stakeholders. Additionally, these events (displayed in Table 1) serve as important progress benchmarks along the research process.

Research Kickoff. Each year, the Research Kickoff (RKO) event serves to introduce the new cohort of students to the YBC experience. RKO is designed to generate enthusiasm, build content knowledge, and engage students. Students are introduced to key scientific content about the broad topic of study (nature of substance abuse) and to the specific steps of the scientific research process. This event also provides experiences that set the tone and build the foundation for the coming year through relationship-building, invitations to collaborate, and engagement in participatory approaches to research.

Proposal Presentations. Another major milestone is the Proposal Presentation event which rejoins students with their peers across school sites and also with university faculty, whom they haven't seen since RKO. At this event, student research teams do a formal presentation of their proposed

Table 1. Pivotal Program Events of *Youth Built Change*.

| Event | Time of Year | Purpose |
|-----------------------|----------------------------------|---|
| Research Kickoff | August | <ul style="list-style-type: none"> Introduce students to key scientific content about the broad topic of study (nature of substance abuse) and a scientific approach (the research process) Build community across schools and the university |
| Presentation Proposal | Late November/ Early December | <ul style="list-style-type: none"> Engage with students' project development through project presentations, and giving and receiving constructive feedback |
| Dissemination Day | May | <ul style="list-style-type: none"> Disseminate students' research to the university and community stakeholders Celebrate students' accomplishments in conducting research |

research in order to get feedback from university faculty as well as their peers. Typically, this half-day event is held at a satellite campus of the university, located mid-way between the two schools.

Research Dissemination Day. The culminating event of the year is Research Dissemination Day. Returning to the main university campus for a full day, students do formal poster presentations of their research for an audience that includes University faculty and administrators, and current undergraduate and graduate students. In the manner of a research conference, posters line the hallways and presenters share their work with those who gather around posters. Students also engage in relational, participatory, and collaborative activities designed to further enhance their peer networks and celebrate their successful program completion.

Program Development. YBC uses a collaborative approach to iterative program development. An outside evaluator collects survey and interview data from participating students and high school teachers at the beginning and the end of each year. These data, along with collaborative conversations about the data, provide direction and lead to concrete ideas for program improvement. Although end-of-year data in Year 2 were limited due to COVID-19 disruptions, the data we did have, along with Year 1 data, were important to our decision-making for Year 3. In particular, communication and collaboration were areas in which we sought to continue to refine our work. More broadly, we strove to maintain our stance of continuous improvement even as we needed to move quickly at times to adapt to the challenges of the pandemic.

RESULTS

The Current Investigation. In this article, we examine the implementation of YBC during the global pandemic, from Spring 2020 (end of Year 2) through Spring 2021 (end of Year 3). We approach our analysis from two vantage points. First, we examine the three anchor events of the program (Research Kickoff, Proposal Presentations, and Research Dissemination Day) with an eye toward adaptations for COVID-19, and specific challenges and successes. Next, we examine the impact of the pandemic on broader efforts to establish shared content knowledge, build robust communication and collaboration, and support youth voice and engagement throughout the year, as these are key elements of YBC's conceptual framework. We conclude by reflecting on the value of "taking a pause," and discussing some of the new understandings that emerged during the past year.

This article is organized in a way that reflects major themes informed by multiple sources of data including: periodic recordings of student research team meetings, written reflections and digital records of student work, anecdotal notes taken during monthly YBC planning meetings, and transcripts of interviews conducted with key program participants and stakeholders. Specifically, teachers were interviewed in December and April and the two Peer Leader groups (who had experienced YBC pre-COVID-19 and during COVID-19) were interviewed in April. Research Mentors, classroom teachers, and university faculty also completed written reflections on the year, based on a set of common prompts. In order to understand our experiences, as reflected in these data, it's important to first understand the larger context for YBC program implementation from Spring 2020 through Spring 2021, including the delivery models for teaching and learning at each of the two schools.

Shifting Sands: Varied Contexts for Youth Built Change During COVID-19. The context for teaching and learning during the year of COVID-19 was not only dramatically different than anything we had previously experienced, it was unstable. In March of 2020, both high schools moved from 100% face-to-face to 100% online/remote teaching and learning. For most of the following summer, both districts were in a "wait and see" mode regarding the next school year. With fluctuations in COVID-19 cases in each of their counties, both districts had plans in place for a variety of scenarios. The lack of certainty impacted YBC planning, as we initially needed to consider various "If/Then" scenarios for the upcoming year. In the end, both schools used a hybrid format for the first three quarters of the 2020-21 school year.

At Morrow, two-thirds of the students attended in person on Monday and Tuesday, and one-third attended on Thursday and Friday, split unevenly due to scheduling. On the days they were not in-person, students worked on their projects virtually when they could. Since all students were

remote on Wednesdays, this is the day when project groups met with the Research Mentors. The hybrid schedule at Plainfield alternated weeks of in-person learning with weeks of virtual learning. Half of the students attended one week, and the other half attended the next week. In addition, there were some students who attended school remotely each day. All teachers taught from their classrooms each day, but the students who were in the space with them varied---depending on the day for Morrow and depending on the week for Plainfield. At Plainfield, instructional time always included those who attended in person and those who attended remotely. At Morrow, all students attended in person except on Wednesdays, when all students attended remotely. Since non-school personnel were not allowed into either school, university Research Mentors met virtually with their groups during this time.

In March 2021, both Morrow and Plainfield resumed in-person instruction and Research Mentors were able to meet with students in-person for the first time all year. Overall, we think of the year as "shifting sands," because we needed to adapt our program to accommodate variability in school delivery models across the year as well as variability in student schedules. We also needed to adapt to various online meeting platforms, since schools differed in the platforms they allowed. We ended up using a combination of Zoom and WebEx for most meetings.

An Examination of Pivotal Program Events. Our planning for Research Kickoff, Proposal Presentations, and Research Dissemination Day was constrained first and foremost in the areas of time, scheduling, and location. We knew we would have less time for each of them because we could not expect students to engage with a virtual event for the number of hours we might expect them to engage face-to-face. We also needed to fit each event into a schedule that would work across schools, even though the schools were using different organizational structures for hybrid instruction. Finally, we would miss a central element of each event, which is the university location. In YBC, the university location matters not just for the purposes of gathering students outside of their high school settings, but for establishing the students, and their work, in the academic space of higher education. Our planning was heavily influenced by our desire to make meaningful connections between the high schools and the university, however possible.

As we determined which activities to retain and adapt, and which to let go of, the planning team returned frequently to these questions: (1) What are the primary purposes of the event with respect to the goals of YBC? (2) What do our data from previous years tell us about the most impactful aspects of the event, as well as potential areas of improvement? (3) For elements that are important to retain, can we do so during this event, or do we need to adapt another as-

pect of YBC to meet this purpose? (4) Which elements will we need to let go of?

Research Kickoff: “It Happened!” As noted previously, Research Kickoff is the first touch students have with YBC and it lays the foundation for the year by introducing CBPR and establishing a culture of students as co-researchers (Jacquez et al., 2020). The RKO event is typically located on the main University campus and takes place over two days. Students arrive together on a bus and spend the night on campus, allowing for team-building events to occur throughout the day and in the evenings. Students across the school sites get to know each other both through structured activities and more informal gatherings such as sharing meals together. Events are held in a variety of University spaces including a large presentation room and smaller meeting rooms, and also involve a campus tour. Students are welcomed by University Deans and they have a chance to meet and interact with current University students who serve as ambassadors during their time on campus.

Adaptations. Formerly, RKO events had occurred from 10 a.m. until 10 p.m. on Day 1 and from 8 a.m. to Noon on Day 2. In Year 3, the event was held virtually from 12:30 – 3:00 on Day 1 and from 12:45 - 3:00 on Day 2. After several discussions, RKO took shape to include a Group Level Assessment, a research simulation, an expert presentation on drug abuse and addiction, and team building experiences. These were deemed impactful and important to the goals of RKO.

Group Level Assessment. Group Level Assessment (GLA) is a structured qualitative, participatory research method in which participants share ideas and perspectives related to specific prompts, then treat the collective responses as data which they analyze together to inform action steps. During RKO, the GLA is meant to elicit student ideas about research, science, collaboration, and community context in order to inform the small-group work they will do on specific research projects during the upcoming year (Vaughn, et al., 2020). Since GLA is a participatory research tool, it functions both to introduce students to participatory methods and to establish shared norms for YBC. In previous years, the GLA was conducted using chart paper, each page with a different prompt, and groups of students moving around the room to add their ideas to the pages in real time. This year, we used Padlet, an online tool that mimics a bulletin board, to collect student ideas, but instead of collecting them in real time, we collected them in advance so that students could focus their virtual time on analyzing results together. This way, time spent teaching students how to use Padlet and making sure the tool was working was not taken away from RKO.

Research Simulation. We also engaged students in several steps of a research simulation. Previously, students walked through all steps of the research process and conducted a mini-research project on-site. The simulation took them through (1) Developing a research question, (2) Using a research tool, (3) Collecting data, (4) Analyzing data, (5) Synthesizing data to produce findings, and (6) Planning for action. During virtual RKO, we talked through the steps of the process, using a hypothetical study for reference, in guided 45-minute break-out sessions with the Research Mentors and Research Methodology Consultant.

Presentation on Local Drug Abuse and Addiction Context. A local university-based researcher made a presentation on the nature and impact of substance abuse, including local and national trends. Her presentation drew from the scientific literature, her own research, and from her personal family story. In previous years, students have been drawn into this presentation in ways that are difficult to capture. The presenter’s personal experiences mirror those of many YBC students. And as a person of color, she is a face of the scientific community that students rarely see.

Facilitating Team Building Experiences. We asked the Peer Leaders to help with team building and they developed a Kahoot activity to help incoming YBC students get to know each other and build teamwork.

Challenges and Successes. Two major challenges we faced were time and consistency of student participation. Under normal circumstances, much of what we hope will happen at RKO requires an extended period of time for participants to interact in ways that are both structured and unstructured, as well as in ways that are both planned and unplanned. Constricting RKO to fit realistic virtual time parameters was a limitation.

An additional challenge was that virtual learning was still new to students. At the end of the previous year, they had experienced an abrupt move to new online platforms, along with inconsistencies in Internet access, tool accessibility, and technology support, leading several students to simply stop attending school after mid-March. Although the new school year began with different expectations, there were still glitches to be worked out. A few students were unable to access RKO and some students dropped in and out due to Internet connectivity problems. Some of those students who did attend were inconsistent in using their cameras, and participating. We had been so concerned about getting each part of RKO to work, we had not set clear expectations with students about having cameras on and staying engaged during the virtual sessions. Some students later reported that they lost focus during portions of the experience; they struggled to stay actively engaged, especially during larger group por-

tions, due to the need to “sit and watch a screen” for so long.

Still, the vast majority of students were in attendance and participated, which we consider success. More specific successes include utilizing online tools such as Kahoot and Padlet to engage students and facilitate idea-sharing. Further, by keeping the Padlets we now have an easily accessible digital record of those ideas. The Kahoot activity was highly interactive and engaging. It was also an unexpected success in that it engaged our Peer Leaders in a way that we will likely carry forward. The research simulation also revealed a direction we might take in the future. When we replaced participation in a full research simulation (based on research questions generated by students on site) with a description of the steps of the research process using an existing hypothetical study, we found students’ thinking to be somewhat more malleable when they returned to their classrooms, than in previous years. We now wonder whether the more in-depth approach of the past led students to become entrenched in a single research direction based on this early experience.

For almost anyone who had experienced RKO face-to-face and could not have imagined it as a virtual event, the fact that we did it at all (e.g., “It happened!”) was noted by teachers and Research Mentors alike as a major success. Student feedback on RKO was also generally positive. Figure 2 shows a word cloud depiction of results of a live poll conducted with students at the end of Day 1, using Mentimeter, an online tool for polling and surveys.

Proposal Presentation Day. As noted previously, Proposal Presentation Day serves several important purposes in the program. As the second official event, it gives students an opportunity to present their work, engage with their peers’ work, receive feedback from university faculty, and continue to build community across schools. In past years, students and teachers traveled from their schools to a university satellite campus for an all-day event which included the students’ presentations, a catered lunch, and engaging group activities. Once again, our planning took into account the major

loss of this university space as a place to situate this event.

Adaptations. By the time we started planning for Proposal Presentation Day, we had a template for how to coordinate a cross-school virtual event based on our experiences with RKO. Using our guiding questions regarding event purpose, most impactful elements, and potential areas of improvement, our adaptations were primarily focused on the format of Proposal Presentation Day. In previous years, students presented their projects to their peers (across schools) and university faculty. Afterward, both students’ peers and university faculty provided feedback on each project during a large group discussion. A benefit of this approach was student exposure to the full array of projects across school sites, as well as a wide range of feedback on individual projects. However, we had also discovered that research teams struggled to receive feedback on their projects without feeling discouraged, even though they routinely received positive feedback along with any suggestions for improvement. Also, we had observed that it was stressful for many of the students to present in front of such a large group. This year we wanted to improve students’ confidence, both with presenting and engaging with feedback.

Small Group Feedback Sessions. This year, students presented to only two other groups and university faculty. From RKO, we had learned that students were more engaged in smaller breakout groups than in larger groups, and we felt it was more important to facilitate conversation about their projects than to expose them to all of the projects. By keeping the groups small, we hoped to facilitate deeper discussions about project plans and continue to build connections with the university faculty. Students presented their project and then posed questions to the audience. In addition to live discussion, students provided feedback to their peers on a Padlet page (see Supplementary Material). We leveraged the digital bulletin board to capture ideas, as well as Padlet’s feature that allows users to create questions or notes that other users can then respond to. Using this tool, students provided feedback by responding to questions about their peers’ projects directly after the presentation. University faculty provided verbal feedback to students and Research Mentors took notes for students to reference later. Students were then able to access and use feedback from their peers and university faculty when working on their project.

Mock Proposal Presentation. Prior to COVID-19, we were aware that presenting a tentative research proposal to university faculty created anxiety for some students. Further, we thought that perhaps their concern with the “performative” aspect of presenting might interfere with their capacity to fully consider the faculty feedback and interact with faculty in the moment. Since gaining and interacting

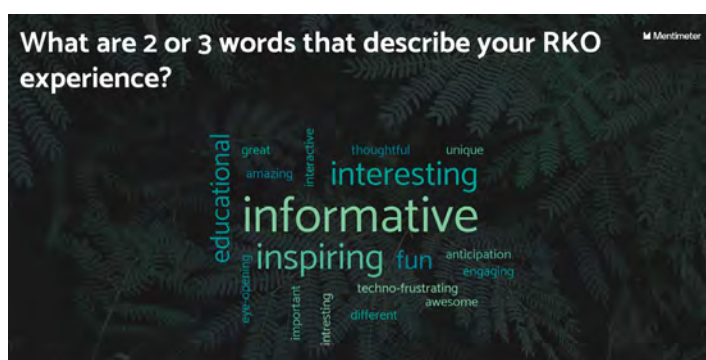


Figure 2. Word Cloud Group Reflection on Research Kickoff, Day 1. *Note:* Created using Mentimeter. The size of text reflects frequency of response (i.e. larger text indicates higher frequency).

with feedback is the higher priority goal for Proposal Day, we aimed to help students feel prepared for their proposal presentation without adding stress. This reflected our commitment to iterative program development, but the virtual format of Proposal Day also illuminated the opportunity to make a change since students were also concerned about the logistics of making their presentations virtually. To help support student preparation for their presentations, we recorded a mock proposal presentation. Using the same format the students would use, the Research Mentors made a proposal presentation to the university faculty who then provided them with feedback. The recording was shown to students as they worked on their own presentations and helped make students feel more comfortable as they prepared for Proposal Presentation Day.

Challenges and Successes. As with RKO, a major challenge was the inability to recreate the excitement for students of traveling and meeting up with peers across both schools. In previous years, students got to spend the school day with the YBC cohort and enjoy lunch together. In contrast, this year students at Plainfield had already had a full day of school before logging on for their presentation, and some Morrow students were unable to log on at all due to technological difficulties and scheduling conflicts. The lack of novelty around Proposal Presentation Day (i.e., it was yet another virtual meeting) and the inability to recreate the social connections highlighted just how crucial these aspects of YBC are, in that they provide a forum for community building which is then reflected in the way students work in research teams. Also, seeing the proposals of only two other groups limited students' exposure and thinking regarding different ways of conducting research, and also limited their engagement with a broader community of scientific discourse.

On a positive note, there was a feeling of success that students had projects to present and were able to give feedback to their peers and receive feedback from peers and university faculty. University faculty felt they were "able to give more specific and targeted feedback to each proposal" (Faculty Participant, written reflection, April 2020). The success of Proposal Presentation Day reflected everyone's growing comfort with virtual meetings and screen sharing, which had been utilized in their weekly meetings over the last three months. Padlet was also useful, as it had been during RKO, especially since the virtual meeting format is less conducive to back and forth conversation than in-person meetings. Finally, the mock presentation provided a shared understanding of expectations for Proposal Presentation Day and will be used again next year. Not only did students exhibit less stress than in the past, they exhibited greater preparation. After viewing the mock presentation and faculty feedback, they were able to anticipate certain questions or concerns

from faculty, and strengthened their proposals accordingly.

Dissemination Day. As the third and final official event of the year, Dissemination Day provides a formal platform for students to present and share their research with their peers, university faculty, and community members. This event promotes youth voice in research, validates its legitimacy, and allows for celebration of a year's work. The timeline of COVID-19 led to two virtual Dissemination Days: Spring of 2020 (Year 2) and Spring of 2021 (Year 3). Adjustments for 2020 reflect a quick pivot, whereas adjustments for 2021 reflect a year of "virtual YBC" and the accompanying programmatic transitions and learning opportunities.

Adjustments.

Dissemination Day – Year 2. Up until March 2020, we were planning an event to mirror Year 1 when both schools came to the University's main campus to present their projects using a poster session model. Students were celebrated in a closing ceremony where they received a certificate and a T-shirt. When we found ourselves suddenly shifting to a virtual event, we were concerned about everything from figuring out the logistics of a large online gathering that would enable students to work together (and meet each institution's requirements for online security) to recognizing the widespread fear and uncertainty of the early stages of the pandemic. During this quick pivot transition, we had little time to reflect on the most important aspects of Dissemination Day and were most concerned with coordinating something that would give students an opportunity to present their work and experience a sense of accomplishment. The event occurred over two days on a virtual platform that was new to both the adult facilitators and the students. Students presented PowerPoint slides instead of posters and were encouraged to talk about how COVID-19 had impacted their project, especially in cases where students were unable to complete data collection. We celebrated students with goodie bags that were appropriately sanitized and delivered to their schools for distribution. The virtual platform allowed for recording the event, so for the first time we had a record of students' presentations.

Dissemination Day – Year 3. As we plan our upcoming 2021 Dissemination Day, we know it will be virtual, however it will look quite different from 2020. Now, students and adult facilitators are familiar with navigating virtual meetings and presentations, and our planning has occurred over time, with consideration of the primary goals and most impactful features of the event, as well as feedback from Years 1 and 2. Additionally, the successes and challenges from RKO and Proposal Day have informed our plan for this year.

For Dissemination Day itself, students will present their final projects to their class peers, community members, and

university faculty. These presentations will occur in three meetings over two days. To prepare, students presented their projects to their peers in early April and had a chance to ask their peers for specific feedback. This will allow us to use the actual Dissemination Day to focus on presenting for community members and university faculty, and will afford research teams the opportunity to refine their presentations beforehand based on peer feedback. An added benefit of this structure is that it does not add to students' out of school commitments, since all meetings can be held during regularly scheduled class time. Also, stretching the event out over multiple days will shorten individual meeting times and should support student engagement as a result. We remain committed to celebrating the students' accomplishments, especially during this stressful and difficult year. With the majority of students back at school in-person, there will be outdoor celebratory lunches at each school following Dissemination Day. We aim to achieve the goals of Dissemination Day through multiple events, instead of a single all-day event.

Challenges and Successes. Certainly, there were more challenges with Dissemination Day in 2020 than in 2021. In 2020, 50% of the research groups were unable to fully complete their data collection. For example, one group's plan for in-person survey data collection, incentivized by pizza at the survey site, was replaced by sending surveys to participants via e-mail, which impacted the response rate. Another group had trouble getting participants to follow through with interviews when they needed to be conducted by phone or video, rather than in-person. In addition, several groups had difficulty connecting with their YBC research teams, due to Internet or technology issues, prior to Dissemination Day. Research teams did the best they could with what they had and all teams made a presentation which included explaining how their projects had been impacted by COVID-19, and what they had learned as a result of persevering. Teachers, Research Mentors, and university faculty felt that having this platform for students to talk about their projects was a success given the very quick adaptation. As one teacher remarked: "I was very impressed with what students were able to present, and how seriously they took Dissemination Day despite the incomplete research and the virtual nature of the event" (Ms. Landon, personal communication, April 2020).

Our plans for Dissemination Day in 2021, are constrained by the challenge of parsing out the most important aspects of the event over several days, and dividing the schools for these experiences rather than bringing school sites together. However, we believe that parsing Dissemination Day into three parts will help maintain the focus of each element of the experience and will keep virtual meetings short enough to maximize student engagement. We also consider it a major success that all research teams were able to successfully

complete their projects this year and are now at the point where they have findings to present, despite the limitations of electronic and virtual data collection. This represents an overall success in our programmatic response to the varying forces that shaped this past year. Table 2 provides an overview of students' research projects. Each student project received expedited review and approval through a special process arranged with the Chair of our university's IRB. This allowed student research to move forward in a timely manner.

Reflections on Pivotal Program Events. YBC is guided by a conceptual framework highlighting the elements of scientific content knowledge; research process participation; youth voice and shared expertise; peer networks; and engagement with academic and local communities. All three anchor events of the program were designed to reflect these elements in varying degrees. Taken together, these events feed the overarching goal of creating and sustaining a culture of youth as co-researchers. To guide our discernment regarding adaptations for COVID-19, we found it helpful to use a set of questions starting with *What are the primary purposes of*

Table 2. Student Research Projects in Year of COVID-19.

| School | Group Name | Research Question |
|------------------------|--------------------------|---|
| Morrow High School | Economy | What is the relationship between financial income and access to drug rehabilitation for adults in Apple County? |
| | Social Media/Home Life | How do peers and family influence MHS students' perspectives on drugs? |
| | Peer Leaders | What do Morrow Junior High and High school students learn from a student selected drug education program? What is the impact of learning directly from someone recovering from substance abuse? ^a |
| Plainfield High School | D.A.R.E. | How has the police officer-led D.A.R.E. program impacted our school community? How can we shape drug education to be better for us? |
| | Perception | What do students believe motivates substance use in the Plainfield Community? |
| | Sports and Mental Health | How is the mental health of PHS student athletes influenced by participating in sports? ^b |
| | Isolation | How has the COVID-19 pandemic affected the social lives of PHS students and their overall sense of isolation? ^b |
| | Peer Leaders | What do PHS students learn from a student selected drug education program? ^a |

^a The purpose of this question is to evaluate action steps based on research findings from Year 2.

^b Students connected their findings to substance abuse in their analysis.

the event with respect to the goals of YBC? Reflecting on the year, we believe we successfully honored the primary purpose of each event, even when this meant letting go of another important purpose.

For Research Kickoff, it was important to establish shared content knowledge regarding participatory research methods. Teachers commented that RKO provided “a good introduction to action research and what to expect for the YBC program,” (Ms. Howard, personal communication, April 2020) and “it was nice to be able to refer back to different things that were presented as the students started to select their research themes and formulate their research questions” (Ms. Jackson, personal communication, April 2020). For Proposal Presentation Day, it was important that students make cohesive presentations to an outside audience of university faculty and peers, and also engage with this audience around questions and suggestions for strengthening the research design. Creating a mock presentation added a new element to this process that will be a strength we can leverage in future years. Interestingly, we may not have considered it if we had thought solely of doing it in-person (as we probably would have, pre-COVID-19), since that would have required finding a mutually convenient time to gather faculty, Research Mentors, and students. However, we were able to coordinate this fairly easily when we did so virtually, and by recording it we have now added new content to our curriculum.

Our upcoming Research Dissemination Day holds great promise. We learned from RKO that engaging Peer Leaders in tactical planning, especially around student engagement, strengthened the youth experience. Peer Leaders’ input is very impactful since they have seen the program from two perspectives—what it was intended to be (their junior year experience, pre-COVID-19) and what it has become (their senior year experience, during COVID-19). For example, Peer Leaders who participated in RKO in Year 2 and Year 3 commented that in Year 2, “Research Kick Off and going to the campus and different things like that, made the research feel more important” (personal communication, April 2020). Comments such as this have helped us plan for balancing the content, the experiences, and “the feel” or “the tone” of our upcoming Dissemination Day, in each of its three parts.

Across all three events, the loss of location was huge. There was no way to replace the experience of traveling to the university campus, spending time in various places on campus, and interacting with college students and faculty as an integral component of developing a youth researcher identity, and seeing the importance of the upcoming research through the eyes of academic researchers, in traditional academic spaces. Also, as much as we wanted to find a path to building cross-school peer networks, it became increasingly clear with each big event that we simply would not be able to do this during COVID-19. This was a loss because of the

role of peer networks in establishing youth identity as part of a broader research community. Also, students had limited exposure to the research conducted by other groups, and in learning about other socio-demographic locations. Observing the way these losses have impacted student experiences with the program across the year has heightened our understanding of why they matter. We greatly anticipate returning to these experiences with greater clarity regarding their importance.

An Examination of the Day-to-Day Culture of Youth as Co-Researchers. In the first part of our analysis of the impact of COVID-19 on YBC, we foregrounded our three annual anchor events. We now turn to an examination of YBC life between these events. Using the major themes in our conceptual framework to organize this discussion, we highlight the specific approaches we used to establish *shared content knowledge, build robust communication and collaboration, and support youth voice and engagement as co-learners.*

Establishing Shared Content Knowledge. Students’ first exposure to the scientific content knowledge of YBC occurred during the Research Kickoff event where we were able to provide experiences with an expert presentation, a Group Level Assessment, and a research simulation. This foundational knowledge was important, yet building on it after RKO was more difficult than in previous years, especially at Morrow where students were “in class” only three times each week (two times in person and once virtually), as opposed to Plainfield where they were in class (either in-person or virtually) every day. As the Morrow teacher noted, “It was challenging in the beginning when they are learning the foundations of action research to try and get through what I can in the two days they are in person and then figure out ways for them to continue that concept remotely until the next week. I felt like a lot of the concepts were broken up by their remote learning days and I would have to re-teach or re-discuss materials from previous weeks to make sure they understood everything” (Ms. Jackson, personal communication, April, 2020).

At the same time, scheduling constraints led to unexpected benefits. For example, teachers and Research Mentors created electronic material to support content knowledge acquisition that they plan to continue using even when normal scheduling resumes. Regardless of their role, classroom teachers, Research Mentors, and the Research Methodology Consultant agreed that schedule limitations helped them to focus on what was most important to address during their time with students, and to consider how students could continue to develop their understandings of key ideas remotely. This discernment stimulated further conversations about the role each adult facilitator played, and how to increase overall cohesion across the team of adult facilitators without unne-

essarily duplicating efforts.

As an example, let's consider the development of research questions early in the year. In the first two years of the project, we continued to grapple with how best to support students through this critical and very difficult stage of the research process which involves focusing on a topic, conceptualizing a problem related to that topic, and translating that problem into a viable research question. Continuing on our trajectory of refining this process, and cognizant of the constraints of virtual learning, we tailored a series of guide sheets for students and systematically considered how and when to provide adult support as project groups worked through the sheets. Research Mentors worked collaboratively with research teams to complete the guide sheets and then the Research Methodology Consultant provided written feedback and met individually with each research team to discuss her feedback and answer emergent questions.

Building Robust Communication and Collaboration.

YBC success requires multiple levels of collaboration, including student collaboration within research groups, teacher collaboration with student groups, and teacher collaboration with Research Mentors and university faculty. Prior to COVID-19, we understood that collaborative processes drove both the youth research and the program planning. When COVID-19 disrupted our usual methods of collaboration, however, we learned more about the specific ways that collaboration functions within the program. Of course, collaboration and communication are intertwined. Communication among stakeholders and participants is an ongoing challenge for any project that touches people across organizations. Here we consider three functions of collaboration in YBC which became evident through the year of COVID-19: team science, program planning, and social action.

Collaboration as Team Science. Peer networking was one of the most negatively impacted elements of YBC, especially at the beginning of the year. It took much longer, than in years past, for project groups to establish a shared goal, then keep up the momentum and organization needed to move forward in a cohesive manner. In our examination of the year, we identified two important ways of connecting during research collaboration that were particularly impacted by COVID-19: logistical and relational.

Logistical Connections. COVID-19 brought an array of new logistics to manage, and this impacted both students and adult facilitators. Virtual meetings required everyone to learn new skills which ranged from the logistics of logging into a meeting to the logistics of speaking conversationally with others who appeared only as small boxes on the computer screen. Virtual meetings also required different ways of managing time. Scheduling meetings, keeping track of meeting

links, and managing time between meetings required special attention. As one of the Plainfield teachers said, "Seeing the kids every other week was so difficult. I was planning for three different scenarios for four different classes that I teach. What am I doing with the kids who will be in class? What will the kids at home be doing for their week 'off'? What am I doing with the remote kids? It was a lot... so it was very difficult to keep track of everything" (Ms. Howard, personal communication, April 2020). For students, YBC was one of several commitments for which they needed to manage their time and attention. Certainly, they had other classes, as well as family and work commitments. Logistics were also at play when it came to organizing shared materials so that research teams could easily access them and move their work forward. Over time, students began to use shared Google documents and each project group utilized its own internal website, with help from the Research Mentors. This helped them keep shared files together, delegate tasks, and keep track of their progress.

Relational Connections. True collaboration requires the willingness to share personal ideas with a group and to listen carefully to the ideas shared by others. In Year 2, many students reported that it took time for them to build, and gain confidence in sharing their ideas with peers. They also reported that learning to listen deeply and consider the viewpoints of others was one of their largest areas of growth across the year (Watts-Taffe, et al., 2020). Considering broader data on the impact of COVID-19 on peer relationships and social interaction (Wray-Lake, et al., 2020), it is no surprise that our students took time to gain traction here. Additionally, one of the goals of YBC is to connect youth not only within their own schools but across school sites. These cross-school connections are challenging under any circumstance, yet an aspect of the program that youth have reported as highly desirable. Reflecting on her experiences with YBC during the previous year, a Peer Leader shared, "Last year, we would follow each other [students from the other high school] on social media, so we felt like we got to know them. And we got to know more about their lives" (personal communication, April 2020). During the COVID-19 year, these relational connections simply did not happen.

Relational connections are also an important part of data collection. Students need to communicate with those who can help them locate and gain access to potential research participants. They also need to communicate directly to their participants as they explain the purpose of their studies and engage them with their research methods such as surveys and interviews. Virtual data collection has been problematic for academic researchers during COVID-19, so we were impressed by students' successes in this area. As the Morrow teacher noted, "Students were able to increase their

confidence with virtual communications....Now, towards the end of the school year, they don't think twice about getting on a virtual meeting or sending an e-mail to an adult or a group chat with their group members to keep everyone up to speed" (Ms. Jackson, personal communication, April 2020).

Collaboration as Program Planning. Using an iterative approach to program development, annual YBC planning meetings occur each summer and involve a range of key stakeholders. Time in these meetings is spent reviewing evaluation data, sharing anecdotal notes, and reflecting on successes and limitations of the previous year. This collective approach is used to guide macro-level plans for the upcoming year and identify any specific issues that require further examination or problem-solving. Once the new school year begins, micro-level planning occurs in an ongoing manner through conversations involving smaller groups (e.g., individual Research Mentors and teachers, Research Mentors and university faculty). The challenges of COVID-19 seemed to require more and better communication than in years past. At the same time, previously taken-for-granted communication routes were disrupted. Reflecting on the year, what stands out was the need to schedule and intentionally monitor collaboration.

Scheduling Collaboration. During COVID-19, we quickly realized how much communication was lost when Research Mentors were no longer visiting the schools each week to work with their research teams in person. A great deal was shared between the classroom teacher and the Research Mentors in the few minutes just before or just after research team meetings. This information might include a quick update on group progress over the last week or a deeper insight that surfaced when Research Mentors and teachers watched groups working together at the same time. Even small details could have big consequences, such as learning about a school schedule change that would impact a planned meeting between Research Mentors and students. With this communication channel closed, it was important to schedule times to meet virtually.

A benefit of the hybrid schedule adopted by Morrow was the "all virtual Wednesday." With no students in the classroom on this day, Ms. Jackson was able to meet virtually with the Research Mentors each week for a 30-minute conversation. In her words, "These meetings were very useful because we would take a look at our monthly goals and then make a plan for the week of what each group needed to accomplish. This was a huge improvement from communication in years past." Unfortunately, the hybrid schedule adopted by Plainfield made weekly meetings more difficult. Since Ms. Howard and Ms. Landon met with Research Mentors less frequently, meeting time usually focused on pre-determined agenda items (many of which were logistical), with

less time to discuss unplanned topics related to general observations or reflections.

Monitoring Collaboration. Loss of the weekly school visit impacted collaboration in other ways. For example, when Research Mentors regularly visited schools, they got a sense of the classroom culture and, over time, became part of it. The university-school partnership was tangible in these weekly meetings. On the other hand, the brief, informal check-ins with teachers didn't always lend themselves to substantive reflection and responsive planning. Seeing each other weekly sometimes gave Research Mentors and teachers the feeling that they were on the same page when in fact there were disconnects in their understandings. Usually, this became apparent when Research Mentors or teachers thought they were continuing where the other had left off in building student knowledge, only to find a gap. All in all, we have reflected on what collaboration as planning really means, and how best to enact it moving forward. Virtual meetings made it possible for more larger group meetings than usual, allowing Research Mentors, and classroom teachers from both sites to reflect and plan together—a benefit when considering that the university sits between the two schools, 11 miles from one and 75 miles from the other. We plan to continue these meetings and we've learned it's important to keep open space on the agenda for recalling and reflecting on experiences in the program, as well as brainstorming ideas for the next few weeks and months, rather than keeping them focused solely on logistics.

Collaboration as Social Action. Even though several project groups were unable to complete their data collection in Year 2, all groups made the best of it and did what they could with the data they had. This past year, it was remarkable to observe the two Peer Leader groups take up where projects from the year before had left off (see Table 2). Each of these groups embodied the social action component of YBC, collaborating not only with their group members but with members of the community at large. They also worked together across school sites, leveraging the peer networks they had established in Year 2.

Based on data gathered the previous year, which pointed to gaps in the effectiveness of existing drug prevention strategies in their respective schools, each group sought to improve local drug education services. Following up on research conducted with recovering substance abusers (focused on what they wished they had been taught in school about drugs) and current middle school students (focused on what they thought would be most effective in teaching them about drugs), the Morrow Peer Leaders hoped to bring a new drug education curriculum to their school, including interactions with recovering addicts. Following up on research conducted on Plainfield students' knowledge and attitudes

about legal and illegal drugs, coupled with learning about inconsistencies in Health education within the district, Plainfield Peer Leaders sought to establish a class focused on drug education that would be offered as part of the district's summer school offerings. Peer Leaders worked together to locate and review potential curricula then tested a lesson from their selected curriculum by teaching it themselves to a group of students---middle-schoolers in Morrow and high-schoolers in Plainfield. Lessons included pre- and post-tests of content taught, which the Peer Leaders used to gather data on lesson effectiveness. Each Peer Leader group also developed its own tool to collect data on students' self-reports of personal engagement with the lessons.

Curriculum selection and their field testing was coupled with further information gathering unique to each site. For example, Morrow students consulted with one of the high school Health teachers regarding his willingness to pilot the curriculum next year. Their approach for enacting change in their school was to begin with one willing teacher in hopes that he would become invested and share his experiences with other Health teachers in the building. Since Plainfield students hoped to enact change at the district level, they investigated several delivery options before pursuing summer school. Their planning included ways to fund the new curriculum and those who would teach it. In Spring of Year 3, both groups had met their goal to impact change. At Morrow, a recovering addict visited virtually with 9th graders and talked with them about his experiences. Further, the Morrow Peer Leaders shared their work with local and regional community agencies focused on substance abuse, addiction, and prevention including the Northern Kentucky Institute for Strategic Prevention. At Plainfield, Peer Leaders made a formal presentation to district administrators seeking (and receiving) a commitment to put their project into action. The superintendent pledged not only his support, but guaranteed funding, noting that this was one of the most thoroughly researched ideas and one of most effective presentations he had heard during his administrative career.

Supporting Youth Voice and Engagement as Co-Learners. YBC is dedicated to centering and elevating youth perspectives in the research process, from initial idea generation through the dissemination of research results. Since it took longer than usual to gain traction with consistent youth participation in virtual meetings, it took longer for students to see themselves and their voices as central to their work. Tremendous persistence was needed on the part of Research Mentors who agreed that "never seeing students and knowing them in person has been a disruption to facilitating authentic interactions" (Research Mentor, personal communication, January 2020). Early on, Research Mentors balanced efforts to build community and center student voice with the understanding that COVID-19 was impacting students and

their families in a variety of ways that were not necessarily known to them. In high school, it is counter-cultural to center youth voices and for adolescents, centering their own voice may make them feel vulnerable. It was tricky to encourage this vulnerability during such an uncertain time, and without the benefit of the unique relational connections that come from face-to-face meetings.

Digital tools that supported us in opening space for all voices to be "heard" during virtual meetings, included Padlet, Mindmeister (used for brainstorming and concept mapping), and Mentimeter. These tools supported major program events (e.g., Research Kickoff) as well as the day to day work of YBC. Each of these tools allowed students to share their ideas in real time and provided a visual display so that all voices could be seen, if not heard. These visual displays helped launch conversation and supported collaboration. It's possible they even encouraged participation by students who might have felt self-conscious about speaking in the group. Additionally, saving digital documents helped students to see their thinking processes unfold and coalesce over time. Shared Google documents were also an important way for students to share ideas. By mid-year, students were using these shared spaces proactively, especially as a way to connect with each other and continue their thinking between class meetings. Figure 3 illustrates one way we used Mentimeter in Spring 2021.

Shifting the traditional student/teacher dynamic required consistent attention. Virtual learning environments are perhaps most easily utilized for the one-way transmission of information. Adult facilitators were regularly discerning how much, and what types, of direction to provide in order to establish norms for practice in virtual spaces. For example, without wanting to be too directive, it was important for teachers to take leadership roles in the beginning around the logistics of making sure students could access meetings and felt comfortable with the learning platforms.

One aspect of the program that started slowly, but then blossomed powerfully was the Peer Leader component which was described previously. At the beginning of the year, Research Mentors had difficulty getting Peer Leaders to attend meetings consistently, much less engage with leadership. By December, we were unsure of whether we would have a Peer Leader component of any kind for this year. But after a slow start, the Peer Leaders took off. They essentially organized themselves and each Peer Leader group developed an action project. The youth took complete leadership and the results were powerful.

Reflecting on The Power of the Pause. In some ways, the year of COVID-19 has felt like one very long pause in "business as usual." But with respect to YBC, we did not flip a switch in Spring of 2020, transition to life with COVID-19, and then prepare to flip the switch back in Spring of 2021. In



Figure 3. Word Cloud Group Reflection on Youth Built Change, Spring 2021. *Note:* Created using Mentimeter. The size of text reflects frequency of response (i.e. larger text indicate higher frequency).

fact, there have been a series of transitions. As one Research Mentor put it, “We haven’t just adjusted to the pandemic one time; it’s been multiple transitions for different stages of adjustment” (personal communication, April 2020). In many ways, the year was a series of stops and starts; transitioning YBC to distance/remote learning platforms involved ongoing struggles with barriers, both anticipated and unanticipated. It was a year of quick pivot adaptations, interspersed with longer periods for more thoughtful adaptations. The “pandemic pause” spurred us to reconsider what we do, why we do it, and how best to do it. It has been a year of decision-making, problem-solving, and programmatic changes. And while these changes were in no way a panacea, program implementation to date has exceeded our expectations for success.

As we begin plans to move from virtual back to in-person experiences, we are challenged to consider carefully the COVID-19 adaptations to hold on to. We’ve created new digital content, utilized online tools to support student engagement, and begun the practice of recording our anchor events. We’ve also leveraged virtual meetings to engage broader bands of stakeholders at various points throughout the year. At this point, we’re discerning how to use what we’ve learned over the past year to increase alignment between YBC practices and its guiding conceptual framework.

For the Year 2 Research Dissemination Day, project teams were asked to share something they had learned about research, especially as their projects were impacted by the pandemic. One group included this on the final slide of their virtual presentation: “You can make something out of what you have, even if it’s not an ideal situation.” We found this to be true as we worked to sustain virtual collaboration and support youth as co-researchers in the age of COVID-19.

ASSOCIATED CONTENT

Supplemental material mentioned in this manuscript can be found uploaded to the same webpage as this the manuscript.

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ABBREVIATIONS

CBPR: Community-Based Participatory Research; GLA: Group Level Assessment; RKO: Research Kickoff; YBC: *Youth Built Change*

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