EQUIP

Using the EQUIP Observation Tool to Advance Equity in Math Classrooms

by Jahneille Cunningham, Sola Takahashi, and Kate Hirschboeck

> "[EQUIP] really made me cognizant of who I am calling on. It was neat to look at the data and then have [my co-teacher] and I do a co-teaching lesson to improve our participation."
>
> *—Sophia, 1st grade teacher*[1]

Exploring patterns in classroom participation can be central to creating math classrooms that are more equitable. Whether the context is an elementary school, a college math classroom, or somewhere in between, understanding who is participating and in what ways and how often they are participating can help educators improve the learning experiences of students. Research suggests that students benefit from opportunities to explain their own reasoning and engage with each other's ideas (Ing et al., 2015). However, not all students have the same opportunities to participate in class (Shah et al., 2014). For example, in a study of more than 100 math classrooms in an urban school district, boys were more likely to participate verbally than girls, with Latina girls being the least likely to participate verbally in class (Reinholz & Wilhelm, 2022). Aware of the equity issues that surface in mathematics classroom interactions, Niral Shah and Daniel Reinholz[2] created an

[1] This report uses pseudonyms for some individuals to protect the identities of teachers and instructors who participated in the research studies.

[2] The authors of this report appreciate Dr. Shah and Dr. Reinholz for sharing their work for this report and connecting the authors with EQUIP users. Their support of the report has been invaluable. However, the views and opinions expressed in this report are those of the authors and interviewees and do not necessarily reflect the views or positions of Dr. Shah and Dr. Reinholz, aside from the direct quotes from Dr. Shah.

observation tool—**E**quity **Qu**antified **I**n **P**articipation, or EQUIP—to support teachers in identifying and addressing inequities in classroom participation.

This report shares the experiences of educators who used EQUIP in two contexts—an elementary school and a community college—and shares how a partnership with researchers afforded them a rare opportunity to look at data and reflect on their teaching practices to address equity in classroom participation. The report outlines the key learnings that EQUIP users described in interviews, including the opportunities and challenges they faced. Finally, it synthesizes recommendations from these educators to guide those who are interested in using EQUIP themselves, pointing to optimal support structures.

WHAT IS EQUIP AND HOW DOES IT WORK?

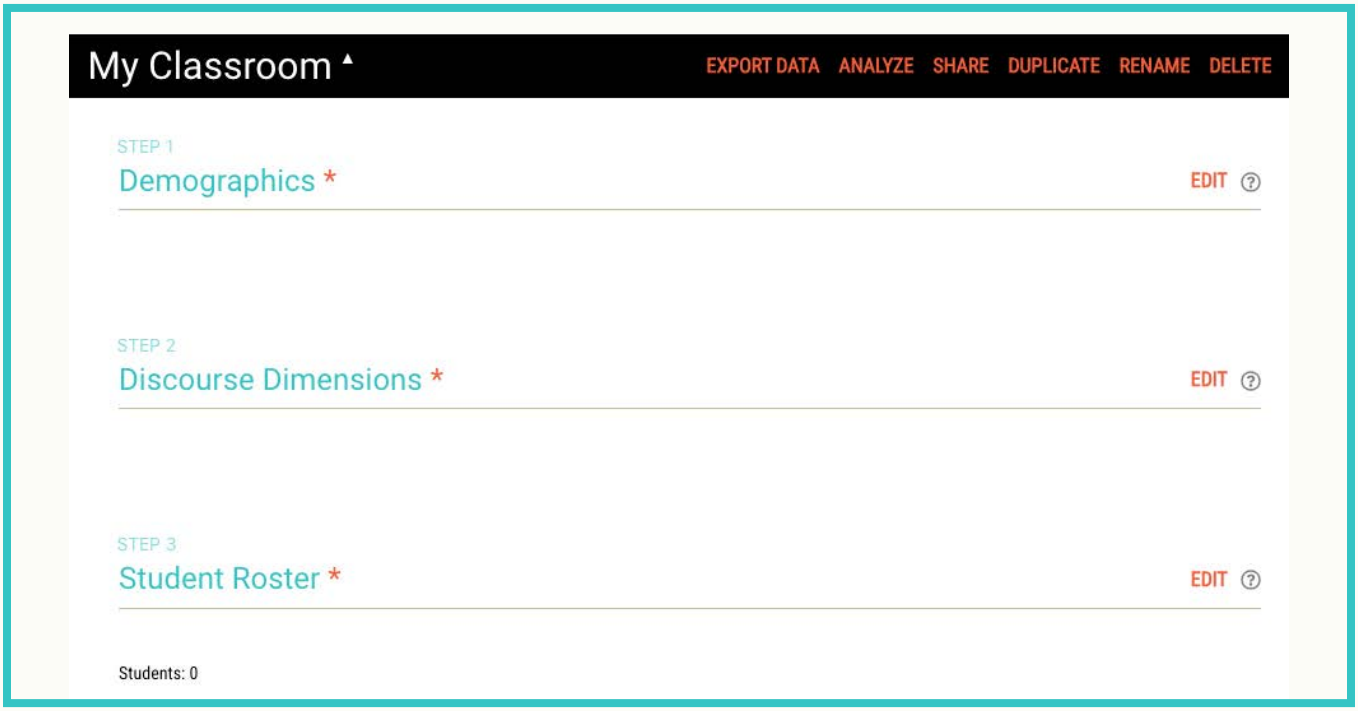
EQUIP is an observation tool to help educators[3] track patterns in student participation.[4] The tool is customizable in numerous ways and allows educators to track classroom participation in real time or via video. Once the observation is complete, EQUIP automatically generates analytics to help teachers improve their practice.

To begin using the tool, educators set up the EQUIP app with information about their classroom by uploading a student roster and the associated demographic information (e.g., race, gender) that they are interested in tracking (see Figure 1). Educators then have the option to select which discourse dimensions—aspects of classroom talk such as the types of questions asked or the length of time a student talked—they will cross-reference with demographic information. In an interview for this report, EQUIP cocreator Niral Shah described discourse dimensions as "things that are happening in a classroom that you think—as a teacher or a coach—matter for learning." While the app has default settings for demographic information and discourse dimensions, educators can also customize these categories if they prefer. Discourse dimensions are not required; if they prefer, a user can simply record how many times a student participated.

[3] This report uses the term *educators* to encompass teachers and people in other school roles (e.g., coaches, administrators) who might use the tool to support teacher learning.

[4] See the EQUIP website for more details.

FIGURE 1. SETTING UP YOUR CLASSROOM IN THE EQUIP APP

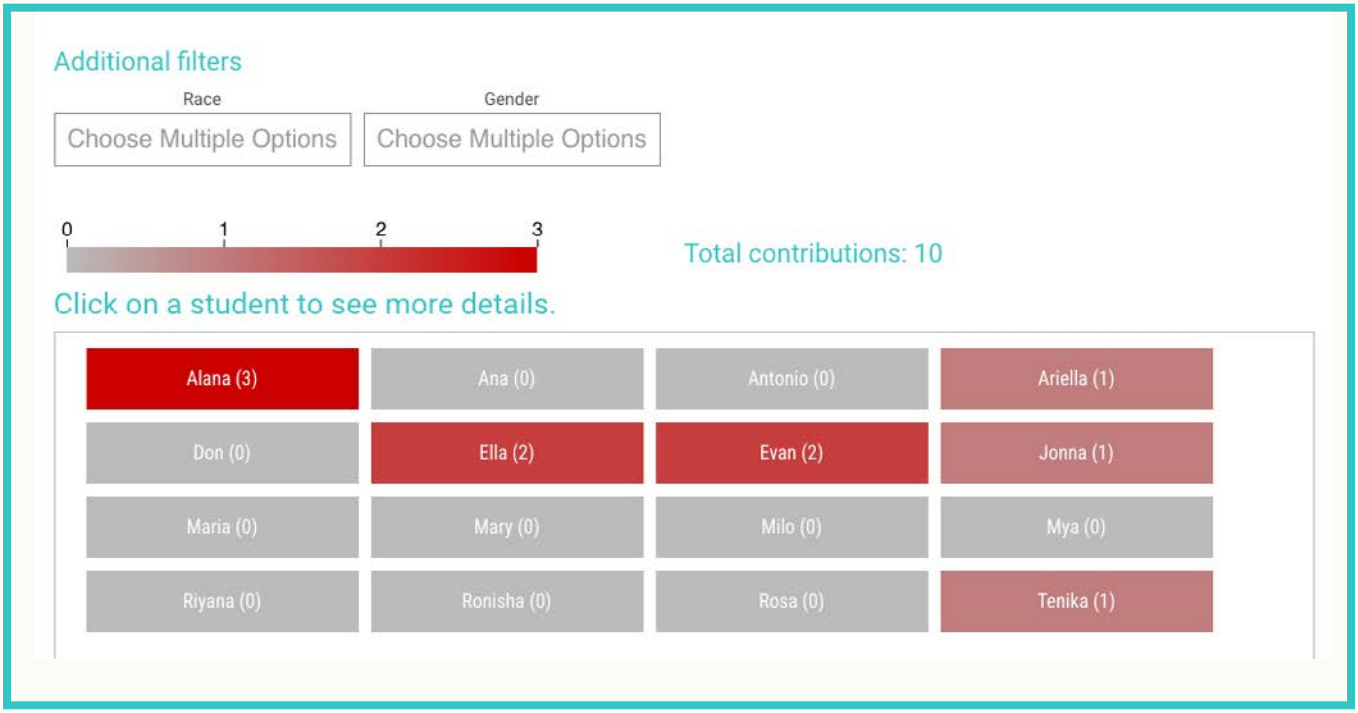


For deciding on what social markers to pay attention to, Shah suggests that teachers ask themselves, "What are the local hierarchies present within my community or within my school or within my classroom along which I am seeing inequity play out?" Common lines of inequity include race, gender, socioeconomic status, and special education status. The customizability of the tool allows users to pay attention to what matters most to them. "There isn't just one version of the EQUIP app: EQUIP is an approach and a platform for looking at how one aspect of inequity—who does and who doesn't get to participate in classrooms—is playing out," Shah explained.

Once the app is set up with classroom information, the observer can code classroom observations either via video or in real time. Whenever a new student contributes to a discussion, the observer clicks on the student's name and selects the appropriate codes. For example, if interested in the length of talk time, the observer may choose from the following options: "a few words," "a sentence," or "2+ sentences." Throughout the classroom interaction, the observer continues to click on student names and code their participation.

When the observation is complete, EQUIP will automatically generate analytics, including heatmaps, histograms, and various other data visualizations (see Figure 2). The data report can then be used to surface inequities in participation and facilitate conversations about potential improvements to teaching practices. For more information about setting up your classroom, conducting an observation, and analyzing data, you can view tutorial videos on the EQUIP website.

FIGURE 2. MOCK CLASSROOM DATA DISPLAYED IN A HEATMAP



EQUIP IN ACTION

The authors of this report conducted interviews with four individuals[5] across two school–researcher partnerships who used EQUIP in either a research or teaching capacity between 2017 and 2022. The two sites for this use of EQUIP were an elementary school in California and a community college in the Pacific Northwest, as described further in the following sections.

EQUIP in a 1st Grade Classroom

Sophia, a 1st grade teacher, used EQUIP during the 2021/22 school year as a participant in the Anti-Bias Developing and Researching STEM Education (ARISE) project. The ARISE project uses professional development on culturally sustaining pedagogies and Universal Design for Learning (UDL) to support inclusion and equity in elementary mathematics classrooms. Cathery Yeh (Lead Principal Investigator) and colleagues Meghan Cosier,[6] Audri Sandoval Gomez,[7] and Daniel Reinholz (EQUIP cocreator) designed the ARISE project to address the unconscious

[5] The authors of this report are grateful to the four interviewees for sharing their experiences and artifacts to make this report possible.

[6] Meghan Cosier is the Executive Director of the Thompson Policy Institute on Disability and Associate Professor at Chapman University.

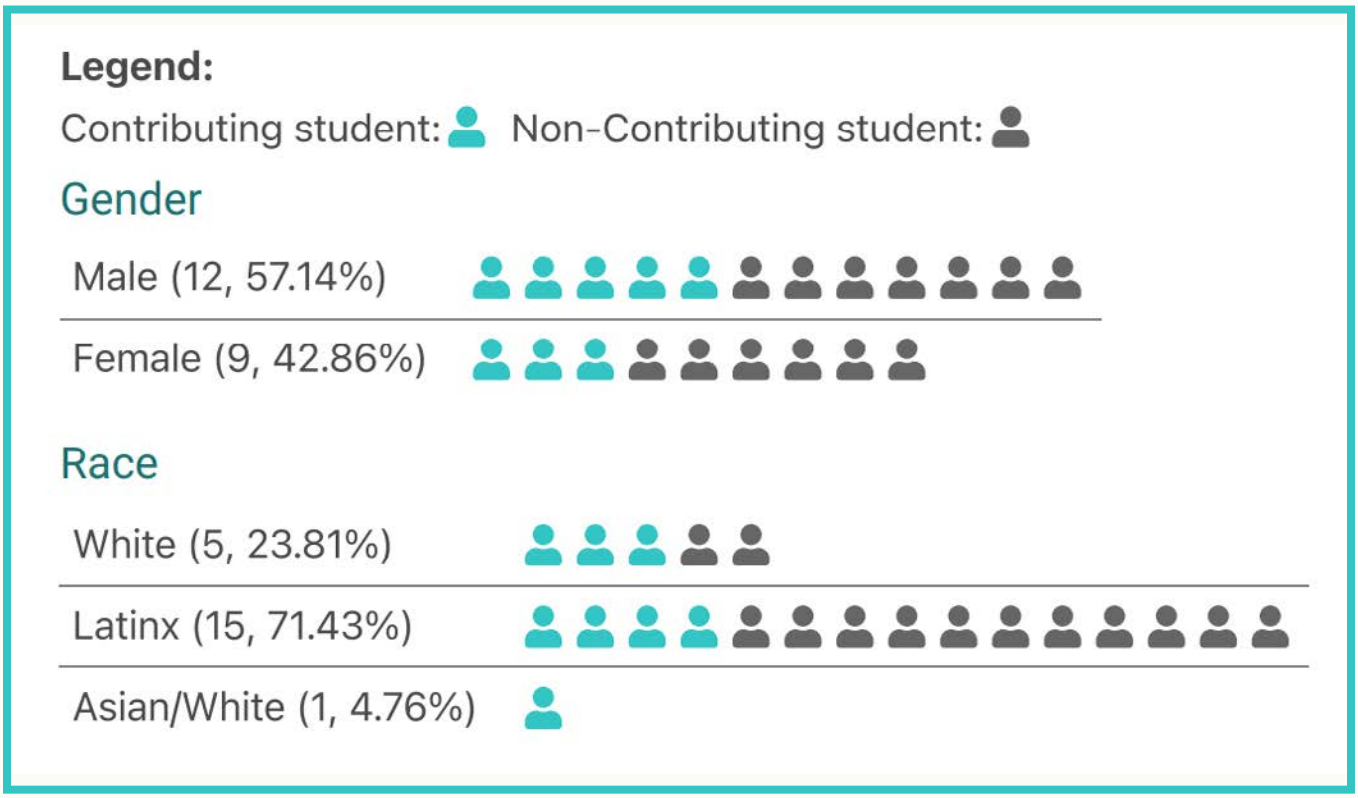
[7] Audri Sandoval Gomez is the Director of the Thompson Policy Institute on Disability at Chapman University.

biases that show up in mathematics classrooms, including the various practices and policies used to classify, sort, and track students into and out of mainstream classrooms. The researchers partnered with a California school district to provide teachers with professional development on culturally sustaining pedagogies and UDL to support inclusion and equity in mathematics classrooms. Their intention in using EQUIP was to surface the often invisible and unintentional teacher biases that impact classroom interactions. In Yeh's interview, she remarked, "We see UDL as a pedagogical framework, but EQUIP allows us to look at the interplay between the pedagogy and what's actually happening to the kids."

Through the ARISE research partnership, Sophia and her co-teacher, a special educator in 1st and 2nd grades, attended six professional development sessions to learn strategies to improve classroom participation in math using the UDL approach. Included in this training was an opportunity to use the EQUIP tool to measure classroom participation. Sophia and her co-teacher submitted a class roster to the research team that included each student's name, photo, race/ethnicity, and gender. Then the pair video-recorded and submitted a math lesson to the researchers, who used the EQUIP tool to code classroom interactions, generate data reports, and share back the results with the teachers in individual debriefing conversations. About 8 weeks later, Sophia and her co-teacher recorded another pair of lessons and submitted them to the researchers for another round of coding, analyzing, and debriefing.

Sophia described the experience as a learning opportunity because she had "never received that kind of data before." After receiving the first data report, Sophia was surprised to learn that she had only been calling on fewer than half of her students during the math lesson. Although disappointed by this discovery, Sophia was motivated by it. In an interview, she recalled her reaction to the data as "how can I get all learners to share?" Sophia was particularly interested in increasing participation for girls because only 3 of the 9 girls (33%) present that day participated, compared to 5 of the 12 boys (42%) (see Figure 3). Sophia and her co-teacher began brainstorming ways to increase participation, including using manipulatives, drawings, and hand gestures to encourage students who did not typically participate and those who were not as confident in math. Sophia also tried to use small-group conversation strategies such as Think-Pair-Share and conversation clubs, and she was more intentional about student pairings.

FIGURE 3. SELECTED GRAPHICS FROM SOPHIA'S EQUIP DATA REPORT



EQUIP in a Community College Math Classroom

John, a community college math instructor, and Haley McNamara,[8] then a researcher with Carnegie Math Pathways, spoke with the authors of this report about their experiences using EQUIP. John was 1 of 10 community college instructors who used EQUIP while participating in the Pathways Instructional Rubric and Toolkit (PIRT) study in the 2017/18 school year. For this study, participants received wraparound support to help improve outcomes for students in developmental mathematics courses.

> "In dev[elopmental] math ed[ucation], you tend to get the students who are already the least served by the system who end up in these courses. How do we best support these students? ... They are coming to learn again. We want to make the most equitable, most supportive environment possible."
>
> *—Haley McNamara, Research Associate*

[8] Haley McNamara is currently a Research Associate at WestEd but is not staffed on the Math Practical Measurement project. Haley was not a WestEd employee when using EQUIP.

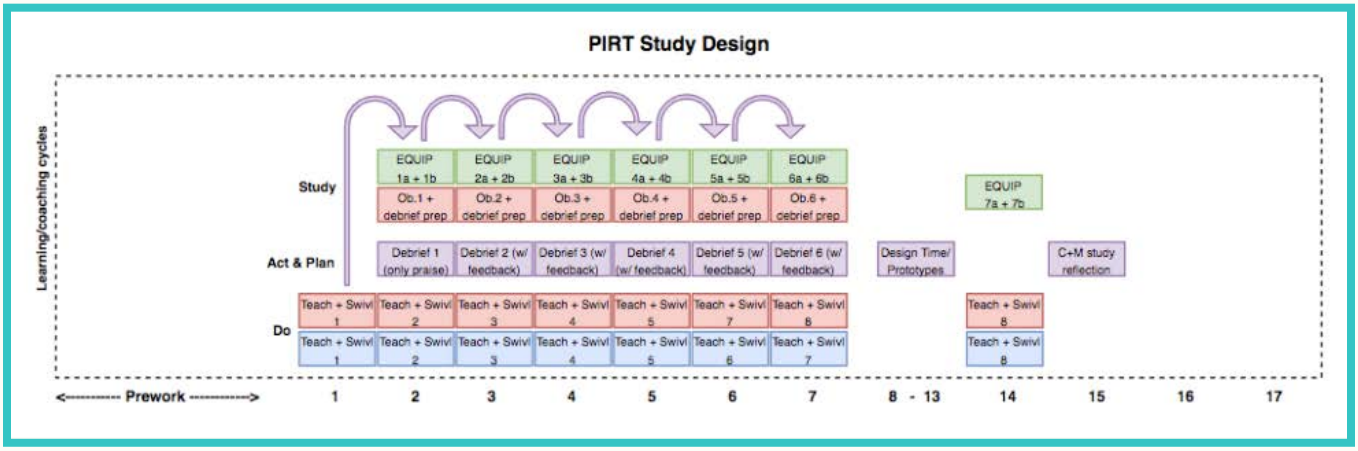
To support instructors as they were learning various classroom interventions, PIRT researchers provided instructors with EQUIP as a data tool to help measure equity in classroom participation. They were also paired with another instructor to observe each other's classes. The research team initiated the PIRT study with a formal kickoff during which they introduced the EQUIP tool, explained how researchers would code the data, and showed some examples of data visualizations that the tool would produce. Haley said the study was designed to have participants use EQUIP during the earlier weeks of the semester to help instructors "build positive behaviors early in the course" to maximize the impact on students.

John used EQUIP six times in the fall of 2017, weeks 2 through 7 of his developmental math course (see Figure 4). The researchers provided John with a swivel camera to capture classroom interactions that research assistants later coded in the EQUIP app. He also provided researchers with a seating chart for ease of coding. Each week, a few days after teaching and recording, he was sent an email with his data report to review in advance of a debriefing meeting. The first debriefing conversation focused only on positive feedback; subsequent debriefing conversations focused on both strengths and areas for improvement.

Recalling his experience using EQUIP, John described it as a learning experience. "The most powerful thing was watching another instructor's classroom and having some guidance and procedure around how we did feedback," John said. He also shared that he liked that it was "self-led" and that he had a "warmth" when he thought of how EQUIP presented a rare opportunity to learn with and from his colleagues: "I think there is a definite need for more intentional [professional development]. … I think there should be encouragement to get into each other's classes and get feedback."

John's positive memories of EQUIP speak to the intentional decisions the research team made to promote learning and relationship building among instructors. Haley emphasized the importance of setting norms to discourage judgment and encourage openness to learning. "We are all here to learn and grow. The focus of this [is] to help students, not tear each other down," Haley would remind participants. Also, by sending data reports to teachers via email before debriefing discussions, the researchers provided participants with space and time to process their feelings and initial reactions independently before discussing results with others. Despite being worried that instructors might get defensive and reject data results, Haley was pleasantly surprised that instructors received the data well, even the "patterns they didn't love," and used the data to motivate change. The rapid turnaround of data also promoted learning for teachers. Seeing sets of "data six times really seemed to change people's opinions [about their instruction]." This also gave teachers an opportunity to see change over time. By creating an environment that supported collective learning, the research team afforded participants the opportunity to maximize the benefits of the EQUIP tool.

FIGURE 4. LEARNING/COACHING CYCLES THAT HALEY (RESEARCHER) AND JOHN (MATH INSTRUCTOR) PARTICIPATED IN WHILE USING EQUIP IN THE FALL SEMESTER OF 2017



RECOMMENDATIONS FOR EQUIP USERS

> "I think [using EQUIP] elevated our conversation to have that intimate insight into each other's classrooms. … That really elevated us to be quite strong colleagues and be advocates for one another"
>
> *—John, community college math instructor*

Learning With EQUIP Is Better Together—Use With a Partner or as a Department Team

It was hard for the researchers and teachers who were interviewed for this report to envision a teacher using EQUIP independently. "There are real constraints on teachers' time that make it difficult to do that," Haley responded when asked if it was possible to use EQUIP without assistance. The teachers who participated were grateful to have had research assistants provide swivel cameras, collect data, and share protocols that set norms for reviewing data without judgment. However, a research team and swivel camera are not necessary to use EQUIP. Teachers who are interested in learning from EQUIP without a research–practice partnership can get similar support from an instructional coach, school leader, or classroom paraprofessional. Teachers also should use EQUIP in a grade-level or department

team to help collect and make sense of the data together. The shared learning experience can strengthen relationships among teachers; having a shared vision and commitment to equitable classroom participation can help teachers stay focused and motivated to achieve classroom participation that is more equitable. It can also help mitigate the difficult emotions that the data can surface; no one individual is to blame for inequitable participation—this is a problem to be solved as a team. For these reasons, it is highly recommended that teachers work together to make sense of the data, brainstorm and plan to test new pedagogical approaches, and hold each other accountable for making the classroom environment a more equitable space for students.

Be Careful Not to Reinforce Deficit Views of Students and Teachers

> "Good intended people can do things that are harmful without the right support."
>
> *—Haley McNamara, Research Associate*

The EQUIP tool is designed to surface classroom inequities, not perceived deficiencies in students. It is important that educators who use EQUIP do not shift the blame onto students when the data report shows disappointing results. Haley cautioned future participants against "want[ing] to fix students, rather than what kind of systems and structures are allowing students to participate or not." Also, to support teacher learning, it is just as important that teachers are not penalized based on the data. The EQUIP users interviewed for this report received continued support and guidance throughout their use of the tool. Professional development sessions helped teachers learn why they were using the tool and to develop positive relationships between the users. Protocols were used to facilitate productive data sense-making conversations that use undesirable results to motivate change rather than criticize teachers. These intentional steps should not be taken for granted when using EQUIP because they optimize learning and reduce harm, which is the purpose of this tool.

Use for Learning, Not for Evaluation

> "[The researchers] did a great job telling us ... the why. 'This is for you as a teacher, not as a judgment.' [That] helped our mindset before looking at the data."
>
> *—Sophia, 1st grade teacher*

When using EQUIP, it is important to remember that its intended purpose is to support teacher learning. In order to feel safe to learn from the data, teachers need to know they will not be evaluated or penalized based on what surfaces in the data reports. To optimize teacher learning, teachers should have agency to decide how to use the data. In other words, teachers should be able to choose a problem they are interested in learning more about and solving either before they see data for the first time or after a data report surfaces inequities in classroom participation. This also means that the tool should be used more than once. The ideal data collection frequency is one that allows users to see change over time as teachers try new pedagogical approaches to improve upon inequities in classroom participation.

Explore the Affordances and Drawbacks of Various Data Collection Methods

> "The tool doesn't tell you what you have to capture. You determine [that]. No one ever said it had to only be verbal [participation]."
>
> *—Dr. Cathery Yeh, Lead Principal Investigator*

Whether a teacher chooses to capture interactions in a live classroom, on a prerecorded video, or through a combination of both is up to the discretion of the user. Although default discourse dimensions focus on verbal participation, the tool can be customized to capture nonverbal participation instead or in addition. It can be helpful to record observations and code the data at a later time. Video recordings provide an opportunity to review interactions multiple times in case something was missed. Both Sophia and Cathery were interested in nonverbal participation (e.g., hand gestures, use of manipulatives), which can be difficult to track in real time. In their cases, video observations were essential for capturing classroom experiences more accurately. However, recording lessons might feel disruptive for some teachers and students and might not capture every interaction. As Haley said, "There were certain instances where a few students were cut off [from the video] and you couldn't tell who [it was]." In this case, having a student roster was helpful, and using multiple cameras (one facing the teacher, another facing the students) was necessary to get a complete picture of the classroom. An in-person observation could circumvent some of these issues and needs. Future users should consider the pros and cons of various data collection methods in the context of available resources, available time, and the interest and wills of participants in order to find a method that suits their needs.

Take Care in Sharing and Discussing the Data

> "We're all biased, and looking at your data is pretty painful."
>
> *—Dr. Cathery Yeh, Lead Principal Investigator*

Reviewing data about their own teaching practices can cause teachers to feel vulnerable, and those sharing and discussing data should take care in doing so. Cathery said that the researchers deliberately sent the data via email in advance of debriefing conversations to give teachers time to process the results. In addition, using a discussion protocol can help guide the conversation and serve as a reminder to highlight teacher successes and areas for improvement. Using a debriefing conversation to talk about the future and brainstorm changes in teaching practices can present another opportunity to bring hope and optimism into the conversation, encouraging next steps and instructional improvement rather than dwelling on shortcomings.

Use the Data to Take Action

> "It illuminated patterns [teachers] weren't aware of and changed who they called on."
>
> *—Haley McNamara, Research Associate*

If teachers are going to endure the vulnerability that comes with surfacing classroom inequities, the experience should be used to motivate change and improve the classroom experiences for students who cannot fully participate under the current conditions. For example, teachers can use the data to try a new strategy in the classroom and collect data again to see if there is any improvement. In addition, EQUIP data collected from an entire department team, grade level, or school could be used to design or identify professional development programming that aligns with the teachers' areas in need of growth. For example, Cathery and her research team noticed that multilingual learners were not participating in whole-group discussions, so they focused on strategies to address this need in professional development sessions, including conversations about how this group of students has been mistreated historically and how past experiences might be impacting present participation.

FINAL TAKEAWAY

The recommendations outlined in this report represent advice from the four EQUIP users who were interviewed for this report. Together, they point to the thoughtful implementation that is needed to deliver the goal of achieving classroom participation that is more equitable while using EQUIP. While the tool has the potential to shift the way teachers interact with their students and, consequently, student experiences in the classroom, the transformative power is not in the tool itself but in *how* it is used to enact change. What is consistent in these recommendations and the stories that they draw on is that educators who are considering using the tool should do so with adequate support to sustain learning throughout the various stages of collecting data, making sense of the data, and testing data-informed changes to classroom practice. The nature of this support may differ across contexts. Some users may work only in pairs while others may participate as entire departments or grade levels. Teachers may partner with researchers to use EQUIP or may simply work with other school staff to help them collect and make sense of their data. In any case, it is important to remember that EQUIP was designed to help illuminate teachers' practices that impede or support participation in mathematics classrooms, and this focus can help to ensure that every student has access to the quality mathematical learning experiences they deserve.

What is the Math Practical Measurement Project?

The Math Practical Measurement project at WestEd aims to support the use of practical measurement by educators applying continuous improvement methods to enhance math teaching and learning in 6th through 9th grades, with a particular focus on the learning of Black and Latine youths and youths experiencing poverty. "Practical measurement" is the deliberate and routine gathering, analysis, and interpretation of information with the distinct purpose of enhancing the learning of those who work in schools and districts as they test changes and improve processes at the heart of their work. The measures are "practical" in that they can be collected, analyzed, and used within the daily work lives of practitioners. They are also "practical" in that they reflect practice—they act as sensing mechanisms at the level at which work is carried out. This project is generously funded by the Bill & Melinda Gates Foundation.

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