Supporting Teacher Noticing for Equity with Progress Monitoring Tools

2,460 Words

Dr. Megan E. Welsh,, University of California, Davis School of Education, One Shields Ave., Davis, CA 95616, 530-752-9890, megwelsh@ucdavis.edu

Dr. Alexis Patterson Williams, adpatterson@ucdavis.edu

Dr. Jennifer Higgs, jmhiggs@ucdavis.edu

Students are discussing what seeds need to sprout in a life science class. Lisa, a white student, says, "I often propagate plants from pre-existing stems. All they need is some water and sunlight to grow." Sam, an Asian student, responds, "I agree. I am considering the process of photosynthesis, which involves sunlight and water." Xochitl, a Latinx student, adds, "I'm not sure about that. If my mom wants beans to sprout before cooking, she'll soak them in a jar of water, sometimes sealed, and sometimes open, and they'll sprout after a couple days. But if she puts them in water in the freezer and they aren't warm, they'll just become a bean paleta and won't. I'm not sure if they need sunlight, because I think my mom has put a jar in the cabinet before and it still worked." What might a science teacher notice in these students' responses? And what might their response be?

A teacher might evaluate an answer based on several criteria, including conceptual accuracy, the use of academic language, and the source of evidence to support claims. If the teacher values the use of discipline-specific language (e.g., "photosynthesis," "propagate plants from pre-existing stems"), then Lisa and Sam's responses might seem impressive and receive praise despite their conceptual misunderstandings (i.e.,they apply ideas about plants not seeds). A teacher with racial and linguistic biases may find Xochitl's response less credible due to lack

of academic language, use of some Spanish in her explanation, and reliance on home-based knowledge for evidence despite the fact that Xochitl has the most correct answer; most seeds need water, warmth, and air to sprout.

This is but one example of how what stands out as important to a teacher can lead to bias in day-to-day classroom interactions. Other examples include: who gets called on during classroom discussions, which ideas get centered and who is left out of the curriculum, and other forms of systematic attention to some students more than others. These daily sources of inequity have long term, pervasive effects on student learning and wellbeing. However, teachers can develop the skills to do better through intentional attempts to practice noticing for equity.

What is noticing for equity?

Teaching across all disciplines is a complex business that requires a myriad of professional choices. What teachers pay attention to and how they make sense of what they see shapes their responses to students. Such *teacher noticing* (Hand, 2012), as this form of professional vision is called, is central to classroom dynamics and culture. Building on the work of cognitive science and learning theory, we define noticing as the process teachers use to make sense of complex interactions. More specifically, noticing is concerned with what teachers attend to in the barrage of information that they encounter in the classroom. Teacher noticing has three main features: attending to classroom interactions, making sense about, and responding to what is observed (Jacobs et al., 2010). What teachers notice or pay attention to is based on various factors, including: professional vision (Goodwin, 1994), pedagogical commitments (Erickson, 2011), disposition (van Es et al., 2017), positionality (Wager, 2014), and amount of teaching experience (Haverly et al., 2020). Teacher noticing is pivotal to students' learning experience, as

what teachers see in the classroom helps them make in-the-moment decisions about what to do (Wells, 2017).

What teachers decide to recognize and attend to, or overlook and dismiss, is shaped by each teacher's cultural experiences, course work in teacher education, and the factors identified above. What is noticed varies from teacher to teacher as each has developed pedagogical commitments and a repertoire of knowledge based on their unique experiences. It also follows that what teachers notice in the environment constantly shapes and reshapes the learning context, with implications for equitable opportunities. Accordingly, we argue that teachers must be intentional about *noticing for equity*. We define noticing for equity as the ability to see, interpret, and respond to behaviors both within and outside of the classroom that facilitate equitable interactions, participation, and learning (Patterson Williams et al., 2020a).

What is the inner witness and why is it important?

Central to noticing for equity is the notion of the inner witness, or the intentional self-observation necessary to sustain disciplined attempts to notice. The inner witness can be likened to a magnifying glass that highlights information and interactions according to a teachers' lens or perspective. This lens is developed and refined over time as teachers gain expertise (Mason, 2002). As Mason explains, "The mark of an expert is that they are sensitized to notice things which novices overlook" (2002, p.1). However, experience does not guarantee the development of an inner witness focused on equity; it must be intentionally cultivated.

Cultivating the inner witness is crucial to teacher noticing for equity which, in turn, facilitates equity-focused teaching. Because this lens is not inherent, teachers need support in developing it. This work can be quite challenging and requires ongoing and consistent effort

(Patterson Williams & Gray, 2021). As such, teachers need practical tools for identifying when inequities arise in the classroom and for reflection and responding to students and the curriculum in ways that uplift equity. This paper shares tools that we developed and implemented in our current work with in-service English language arts (ELA) teachers to support them in cultivating an inner witness for equity.

Progress monitoring to supporting teacher noticing

We helped teachers develop their own tools to reflect on issues of equity that surfaced in online classroom discussions when schools closed due to the pandemic. Because building an inner witness requires ongoing reflection on the ways in which race, language, history and justice impact classroom interactions (Patterson Williams et al., 2020b), we helped the teachers as they developed progress monitoring tools (PMTs) to track the engagement of a group of focal students over time.

Progress monitoring involves repeated observation of a specific behavior for a group of focal students, quantifying those observations, and graphing what is observed. PMTs are used in multi-tiered systems of support contexts to evaluate the effectiveness of educational interventions (MTSS; McIntosh & Goodman, 2016). They are designed to efficiently and repeatedly collect data on student performance, usually to help educators reflect on what instructional approaches work best with students for whom previous educational efforts have not been fruitful (Stecker et al., 2008).

Because PMTs support teachers in systematically observing and reflecting on interactions with students, they can be helpful in building an inner witness in that they prompt ongoing reflection on issues of equity and justice when teachers observe behaviors relate to these issues.

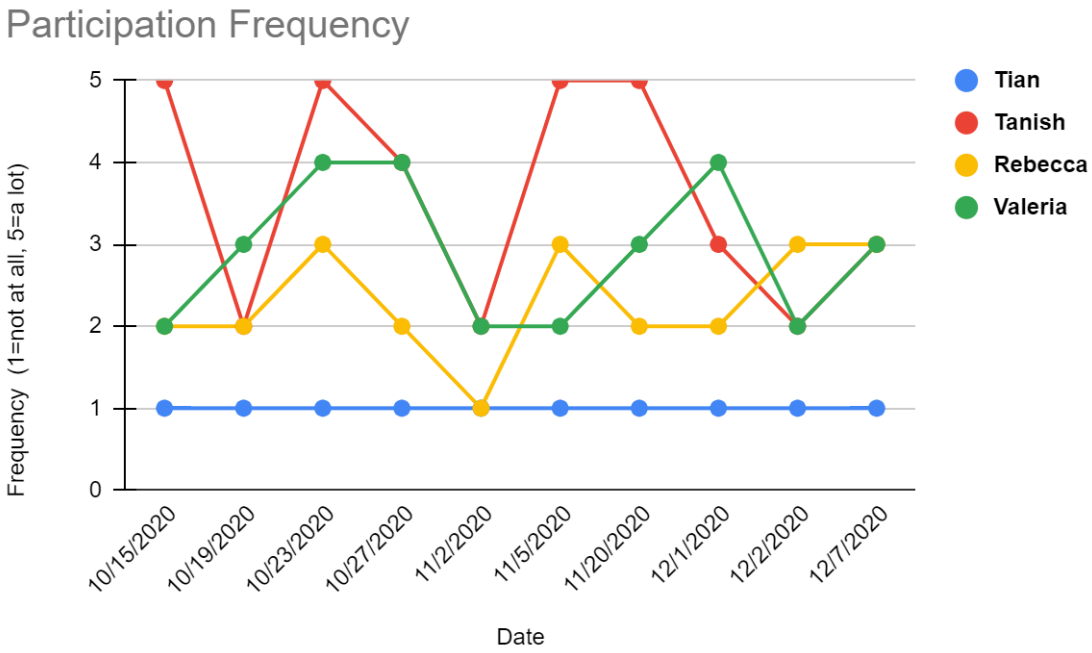
They can also help to disrupt teacher thinking about particular students by collecting data to determine the extent to which impressions reflect long-term student behavior as opposed to one notable event that overly impacts a teacher's thinking. These kinds of intentional noticing are at the heart of building an inner witness and doing the consistent work required to foster more equitable classrooms.

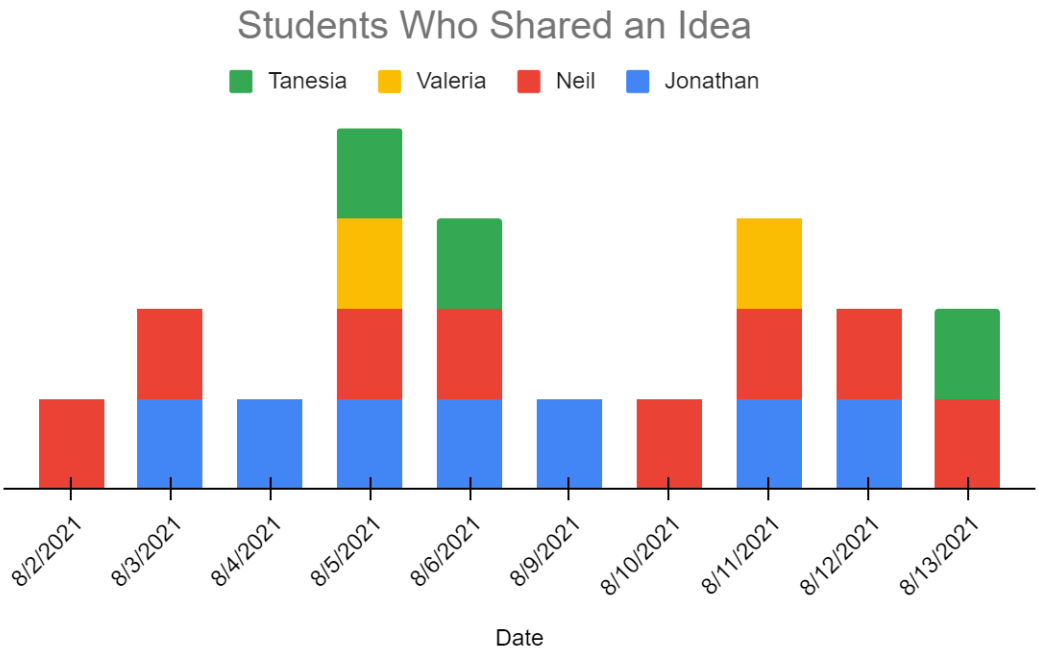
An example of how this might play out is presented in the progress monitoring graphs in Figure 1. In the top graph, it is clear that students vary in terms of their participation in class from day-to-day, except for Tian who consistently does not participate. Upon noticing this, a teacher might adjust their instruction. They might invite Tian into classroom discussion by increasing activities that involve collaboration among students or they might reflect on classroom dynamics that might make Tian hesitant to participate (e.g., are there any microaggressions between students?, does the way academic content is presented or discussed make any students uncomfortable?, is the teacher validating Tian's contributions?).

In the bottom graph, based on checklists in which behaviors are observed or not, it appears that the boys (Neil and Jonathan) share ideas much more frequently than the girls (Valeria and Tanesia). Having gathered data to confirm that this dynamic, a teacher might investigate strategies to bolster the contributions of girls to make sure that everyone's ideas are considered during class discussions.

Figure 1

Example PMT Charts





Note: The top graph presents a graph appropriate for instances in which teachers rate students along a multipoint scale (e.g., 1 = Not at All, 5 = A Lot). The bottom graph presents is appropriate when teachers check that something did or did not happen (observed behaviors are graphed).

It is important to note that what teachers attend to and how they interpret events are affected by their positionality. As such, initial attempts to develop and use PMTs may fall short of capturing the most salient equity issues facing a classroom. Teachers may need support in using PMTs to notice issues of equity that they might not naturally observe. Teachers might share their PMTs with each other, or be invited to revise PMTs until they arrive at a tool that works for them. This highlights that PMTs that support noticing for equity are best used in the context of ongoing efforts to support antiracist teaching. This is consistent with Leonard and Woodland's (2022) findings that antiracist teaching requires sustained efforts to support teachers.

Working with teachers to develop PMTs

We worked with secondary ELA teachers whom we meet with on an ongoing basis to explore teacher noticing. This work included supported the teachers as they each developed their own PMTs. The teachers identified a group of 3-5 focal students to observe, a behavior that they were concerned about, and a scale they would use to rate student behavior, key decisions in PMT development. We provided them with information on PMT design considerations and also technical guidance in developing and applying the PMT.

Because this work was conducted in Fall 2020, teachers opted to focus on issues of engagement and participation in online instruction. They found moving to an online teaching environment to be challenging, particularly because they could not access the cues available in typical face-to-face interaction. For example, one teacher expressed frustration related to perceived limitations of digital noticing: "I wanted to focus on participation but am struggling to understand what participation really is."

After using the PMT for a few weeks, many teachers revised their tool. They realized that their conception of what counts as participation was limited; it framed students as passive when they did not speak even though students were making substantial contributions in alternate ways. This attention to who is and not participating, and openness to consider alternate forms of participation as engagement in classroom activities provides preliminary evidence that teachers were indeed developing their inner witness while applying a PMT. As one teacher explained, "I [incorrectly] assumed I could monitor the same things as [I would in] face to face instruction." When the teacher decided to track contributions using the Zoom chat function, they were able to reexamine their assumption that some students were not engaged in class. This shift was especially important given the preponderance of underserved students who were hesitant or unable to participate via video or audio due to limited internet connectivity or reticence to broadcast home learning environments to their teachers and classmates.

Another teacher noticed that they were unclear about what should count as participation and that participation patterns varied widely between class meetings. "I am not sure what I am measuring sometimes; what counts as data and how do I measure that and adjust that? I need to take a step back and really think about how I am determining participation. The data is everywhere, some days they want to participate and some days they don't." Some teachers revised their tools to add a place for notes on what happened during a lesson to dig deeper into causes of differing participation patterns, particularly for students most disadvantaged by online learning.

This teacher-driven data collection and analysis allowed teachers to expand their conceptions of participation and to rethink their perception of students: students originally perceived as unengaged were in fact diligently contributing to classroom discussion. It also

helped teachers to begin to investigate the conditions that did and did not foster the full participation of all students.

Tips for Developing PMTs to notice for equity

The technical side of PMT development involves creating data collection forms linked to graphs that can be updated with a click of a button. We used Google forms, sheets, and slides because they are freely accessible and familiar to most educators. Instructions on the technical processes involved in developing PMTs are described in this video. It may be helpful to note that a low tech option exists; teachers can simply record observation ratings on graph paper.

Beyond the technical considerations, developing PMTs in support of noticing for equity involves several important decision points that can be used to establish which indicators will be focused on, the format of data collection tools, and how results will be displayed, including:

1. ***Identifying which behavior will be recorded to help teachers notice differential power structures.*** PMTs have to be easy to use. Behaviors must therefore be things that can be quickly recorded on a clipboard, notebook, or phone during or immediately after instruction. Noticing for equity-focused PMTs should gather information that addresses differential power structures. This might include: recording which students do and do not contribute in class, the extent to which students bring up diverse perspectives or experiences, or instances in which academic English is prioritized over ideas by students.
2. ***Deciding which and how many minoritized students to focus on.*** PMTs are more easily implemented when they focus on a small number of students, around 4-6 students at a time. Focal students should be selected when a teacher suspects that their needs are not being fully met.

3. ***Selecting response scales to capture the behavior being noticed.*** Closed-ended response scales that can be applied consistently across students and over time are preferable. Options include scoring according to whether or not something was observed, the extent to which something happened (e.g., 1=rarely, 5=frequently), the frequency of behavior, or the percent of a class during which something happened (e.g., 0%, 10%, 20%, etc.). Scales in which a behavior is recorded as observed or not will need to be presented differently from scales that allow teachers to describe behavior along a continuum (see Figure 1).
4. ***Frequency of data collection.*** How often data are collected should be related to the timescale over which educators might expect change. If seeking to confirm or disconfirm an impression, multiple observations a week over a period of two to three weeks may be sufficient. Because developing an inner witness requires ongoing effort, educators might decide to collect data at least weekly over several months. Alternately, educators might collect data intensively for one week a month to investigate change in focal students. About ten data collection points per PMT graph are needed to determine whether observations vary day to day or are stable.
5. ***Collecting contextual information.*** Recording notes about classroom context can be helpful in making sense of PMT results. Contextual notes might include details about classroom activities (e.g., were students working in small groups?, what was the instructional topic?, were classroom norms revisited?) or organizational structures (e.g., did seating arrangements change? were students assigned specific roles or tasks?).

Putting things together

We return to the example from the introduction, developing a PMT that Xochitl's teacher might use to reflect on the extent to which language use affects interpretations of student understanding (Figure 2). The first step involves wondering about the extent to which student language affects interpretation of the quality of student thinking. This wondering could arise for many reasons—a student might complain that the teacher isn't acknowledging their ideas; a colleague has shared that students who use scientific terms seem to use them inappropriately; or the teacher might have participated in professional development or read a book that highlights this issue. The teacher decides to use a PMT to provide structure to their reflections. The PMT helps them develop their inner witness by prompting them to consider language use and content knowledge separately.

To address this wondering the teacher rates two aspects of student talk: (a) understanding of scientific concepts and (b) use of scientific terms. This helps the teacher remember to separate vocabulary use from their attention to the ideas presented and to observe the extent to which conceptual understanding corresponds with use of scientific terms. The teacher would then should select focal students who enable comparison across differing contribution patterns. In this case, selection criteria might include: (a) students who tend to incorporate slang and languages other than English in their speech (Xochitl), (b) students who tend to use advanced vocabulary (Lisa, Sam), or (c) students who seem hesitant to share ideas (Rebecca). By comparing differing participation patterns, the teacher can reflect on how they interpret different communication styles.

Now it is time to build the PMT. We present a paper and pencil approach here for those who find creating graphs from Google Forms overly complicated. The graph's y axis should represent scores on rated characteristics. The teacher might rate understanding of scientific

concepts using a scale already in use in the classroom (e.g., a rubric score from 1 “early understanding” – 4 “advanced understanding” or perhaps applying a 10 point scale often used to grade assignments). To record use of scientific vocabulary, the teacher might count the number of terms used without attending to correct use of terms. Alternately, they might record whether students used any scientific terms if scientific vocabulary is rarely used.

The x-axis represents the observation date. The teacher must decide how frequently to record ratings. To focus on the language used during a particular unit, the teacher might rate students daily for two weeks. If changes over time over interest, they might instead rate students once a week. The lines or bars represent each student. Teachers might generate separate graphs for each student if the data collected are complex or if they want to pay deep attention to a specific student. Otherwise, including multiple students on the same graph is a convenient way to succinctly record a lot of information. Teachers might also take notes on context to allow them to relate results to the lesson topic, the activity, or specific terms used.

Figure 2 presents PMTs that Xochitl’s teacher might use. Two different aspects of student talk are examined—conceptual understanding and use of scientific vocabulary. The teacher decides to simplify things by creating separate line graphs that represent each student’s level of conceptual understanding and days in which students used scientific vocabulary, highlighting when vocabulary is used either correctly or incorrectly. The teacher recorded information on student talk during or immediately after the lesson using the sheet presented in Figure 3, which she kept on a clipboard for easy access. The recording sheet data were graphed weekly.

The charts tell us a few things. First, Rebecca rarely speaks (only three dotted days), but when she does her talk exhibits advanced levels of understanding but does not incorporate scientific vocabulary. In contrast, Sam regularly uses scientific vocabulary, but his conceptual

understanding is still developing. Xochitl and Lisa seem to have similar levels of conceptual understanding, but with differing units in which their conceptual understanding is strongest. Lisa seems to use scientific terms regularly, even when her conceptual understanding is relatively low. Xochitl incorporates scientific vocabulary into her speech less regularly, but seems to do so more frequently as the school year progresses, especially when she has mastered the key scientific ideas.

Figure 2

PMTs Representing Scientific Understanding and Scientific Vocabulary in Classroom Talk

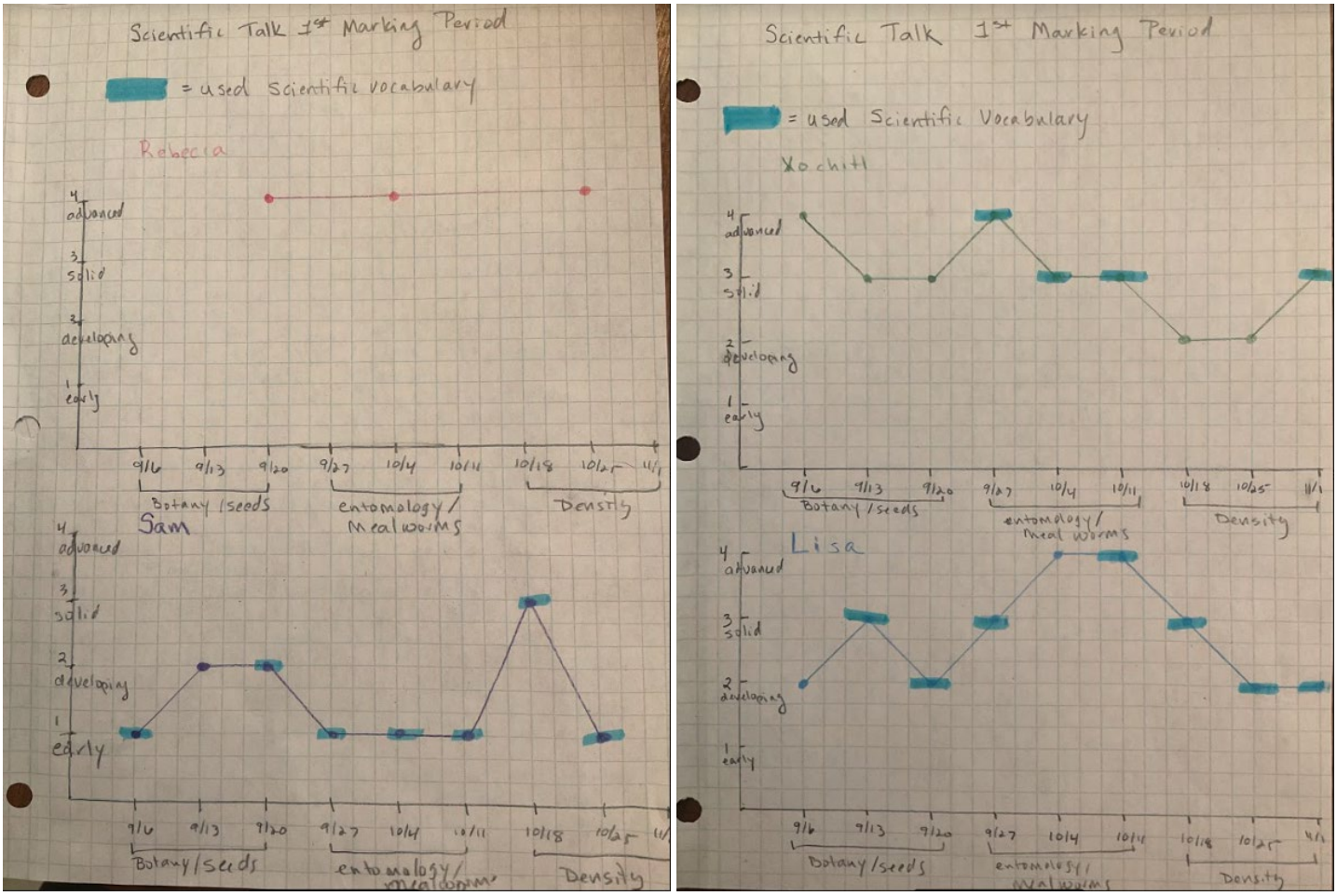
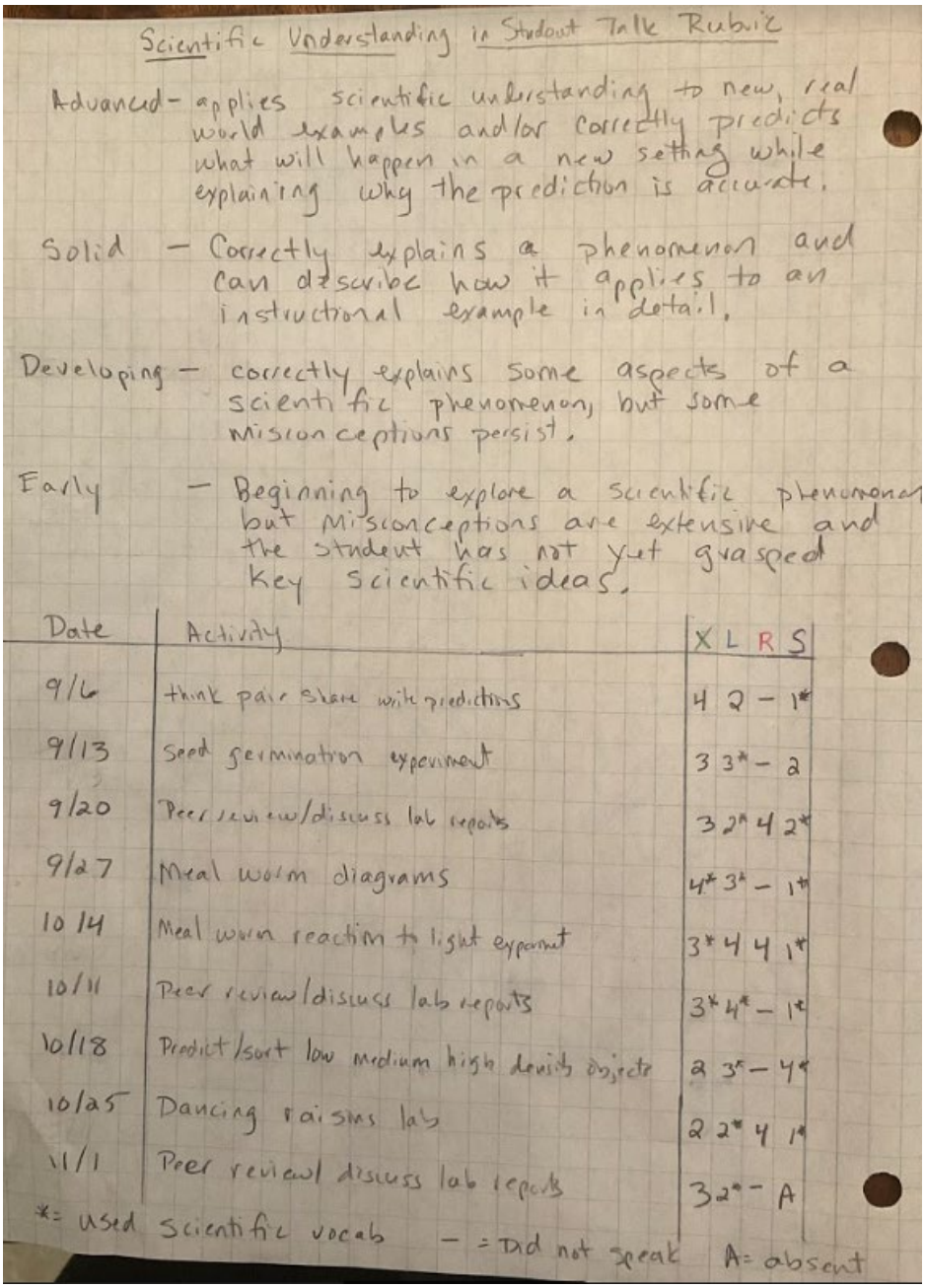


Figure 3

PMTs Data Recording Sheet



Scientific Understanding in Student Talk Rubric

Advanced – applies scientific understanding to new, real world examples and/or correctly predicts what will happen in a new setting while explaining why the prediction is accurate.

Solid – Correctly explains a phenomenon and can describe how it applies to an instructional example in detail.

Developing – correctly explains some aspects of a scientific phenomenon, but some misconceptions persist.

Early – Beginning to explore a scientific phenomenon but misconceptions are extensive and the student has not yet grasped key scientific ideas.

Date	Activity	X	L	R	S
9/6	think pair share with predictions	4	2	–	1*
9/13	seed germination experiment	3	3*	–	2
9/20	Peer review/discuss lab reports	3	2*	4	2*
9/27	Meal worm diagrams	4*	3*	–	1*
10/4	Meal worm reaction to light experiment	3*	4	4	1*
10/11	Peer review/discuss lab reports	3*	4*	–	1*
10/18	Predict/sort low medium high density objects	2	3*	–	4*
10/25	Dancing raisins lab	2	2*	4	1*
11/1	Peer review/ discuss lab reports	3	2*	–	A

*= used Scientific vocab – = Did not speak A= absent

Note: The rubric at the top of the sheet reminds the teacher of scoring criteria during rating.

The PMTs confirm that use of scientific terms does not always signal scientific understanding and that it is helpful for the teacher to consider them separately. Now that the

teacher is aware of this issue, they might continue practice listening and responding to student discussions in a way that disentangles scientific understanding from use of science vocabulary. If vocabulary use is a desired outcome, the teacher might also separately score lab reports with a grade for conceptual understanding and a grade for use of key terms.

The PMTS also provide some additional information that the teacher might follow up on. First, Rebecca rarely speaks in class and the teacher might consider revision to structures for classroom talk to foster greater participation. Similarly, the teacher might be concerned that Sam is using scientific vocabulary while not yet fully grasping scientific concepts and may explore options for deepening Sam's conceptual understanding. This may result in a new set of PMTs focused on these topics, or the teacher may select new students to observe to address a new equity issue.

Tools to support meaningful change

While many teachers embrace the importance of developing more equitable learning environments, it can be difficult to know where to start and to commit to the kind of sustained practice of noticing needed to bring about change. The tool presented here offers one approach to structuring efforts to notice, which should supporting teachers in building an inner witness that notices in new ways. Like all tools, PMTs also have some limitations. It can take a few tries to develop a PMT that crystallizes the equity issues that teachers want to focus on and recording information does add effort to already packed workdays, even when does as simply as possible. Finally, it is important to triangulate PMT data with other noticings about students (e.g., the quality of written assignments, performance in other subjects, etc.) to make sure that findings hold in other settings before making big instructional changes. We encourage educators to try to

use PMTs to reflect on classroom interactions with an equity lens and to see what they learn. Efforts to systematically reflect on instruction are never wasted, they help even the most seasoned educator grow in new ways.

References

Erickson, F. (2011). On noticing teacher noticing. In *Mathematics teacher noticing* (pp. 47-64). Routledge.

Goodwin, C. (1994). Professional vision. American Anthropologist, 96 (3), 606–633.

Hand, V. (2012). Seeing culture and power in mathematical learning: Toward a model of equitable instruction. *Educational Studies in Mathematics*, *80*(1), 233-247.

Haverly, C., Calabrese Barton, A., Schwarz, C. V., & Braaten, M. (2020). "Making space": How novice teachers create opportunities for equitable sense-making in elementary science. *Journal of Teacher Education*, *71*(1), 63-79.

Jacobs, V. R., Lamb, L. L., & Philipp, R. A. (2010). Professional noticing of children's mathematical thinking. *Journal for research in mathematics education*, *41*(2), 169-202.

Leonard, A. M., & Woodland, R. H. (2022). Anti-racism is not an initiative: How professional learning communities may advance equity and social-emotional learning in schools. *Theory Into Practice*, *61*(2), 212-223.

Mason, J. (2002). *Researching your own practice: The discipline of noticing*. Psychology Press.

McIntosh, K., & Goodman, S. (2016). *Integrated multi-tiered systems of support: Blending RTI and PBIS*. Guilford Publications.

Patterson Williams, A. & Gray, S. (2021). Promoting equity and justice in science classrooms via the (W)holistic Science Pedagogy. M. Winn & L.T. Winn (Eds). *Transforming Teaching and Learning through Restorative Justice* for Harvard Education Press: Cambridge, MA.

Patterson Williams, A. D., Athanases, S. Z., Higgs, J., & Martinez, D. C. (2020). Developing an inner witness to notice for equity in the fleeting moments of talk for content learning. *Equity & Excellence in Education*, *53*(4), 504-517.

Patterson Williams, A. D., Higgs, J. M., & Athanases, S. Z. (2020). Noticing for equity to sustain multilingual literacies. *Journal of Adolescent and Adult Literacy*, *63*(4), 457-461.

Stecker, P. M., Fuchs, D., & Fuchs, L. S. (2008). Progress monitoring as essential practice within response to intervention. *Rural Special Education Quarterly*, *27*(4), 10-17.

van Es, E. A., Hand, V., & Mercado, J. (2017). Making visible the relationship between teachers' noticing for equity and equitable teaching practice. In *Teacher noticing: Bridging and broadening perspectives, contexts, and frameworks* (pp. 251-270). Springer, Cham.

Wager, A. A. (2014). Noticing children's participation: Insights into teacher positionality toward equitable mathematics pedagogy. *Journal for Research in Mathematics Education*, *45*(3), 312-350.

Wells, K. J. (2017). Noticing students' conversations and gestures during group problem-solving in mathematics. In *Teacher noticing: Bridging and broadening perspectives, contexts, and frameworks* (pp. 183-204). Springer, Cham.

Author Bios

Dr. Megan Welsh is an associate professor and Chancellor's Fellow in the School of Education at the University of California, Davis. She studies assessment development, test validity, grading and assessment use.

Dr. Alexis Patterson Williams is an associate professor in the School of Education at the University of California, Davis. Her research explores 1) equity issues that arise from social hierarchies when students work together on group projects in science and 2) teacher development of practices that support equitable and robust interactions between students that can deconstruct implicit and explicit language and literacy hierarchies.

Dr. Jennifer Higgs is an assistant professor in the School of Education at the University of California, Davis. She studies young people's and teachers' sense-making of digital tools and environments in ways that support consequential, equitable learning and teaching in and across school and non-school contexts.