Using the Student Hat to Push on Multiple Goals in Teacher Professional Learning

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Abstract: One commonly used but under-investigated practice in teacher professional learning is asking teachers to do work in the "student hat," which means asking teachers to engage in learning activities while acting like their students. The literature mostly describes using this tool to facilitate development of teachers' content understanding. In an investigation of a two-day professional development around a middle school storyline science curriculum, we found that the student hat not only supported teachers' understanding of science ideas, but also their understanding of storyline curricular approaches and empathy with their students. This ability of the student hat to push on multiple goals suggests that it might be a valuable pedagogical tool for teacher educators to support teachers' understanding of reform science curricular and expand their ideas about what counts as valuable reasoning in a science classroom.

Introduction

The learning sciences include a focus on understanding how people learn and how to design environments to support this learning. When those environments occur in classrooms, the teacher is one of the most important components of that environment (Fishman, Davis, & Chan, 2014). Historically, however, the field has spent less energy investigating how teachers learn. Recent reforms in science education place new emphasis on students figuring out natural phenomena rather than learning about science ideas through more traditional teacher-centered instruction (Schwarz, Passmore, & Reiser, 2017). Storyline curricula are an example of materials designed to address these reforms. A storyline curriculum is based around an anchoring phenomenon and written to emphasize eliciting and drawing on student questions and ideas and co-constructing next steps for investigation together between students and teachers (Zivic et al., 2018). This transition will require extensive professional learning for teachers, which can be supported through well-structured professional development (PD).

One common tool used during PD is the "student hat." Asking teachers to wear the student hat means asking them to engage in learning activities while embodying how they think their students would engage in the activity. The literature on the student hat mostly describes how it can be used to provide other teachers (or pre-service teachers) a space to rehearse instructional moves they are learning (Lampert et al., 2013) or how the student hat allows teachers to "engage in the discipline" (Gibbons & Cobb, 2017) in order to push on their understanding of disciplinary concepts at play in the PD. Despite its use in many PD settings, the pedagogical tool of the student hat has not been thoroughly investigated. Consequently, we investigated the following questions: 1) How did teachers use the "student hat" in investigations and sensemaking discussions during a curriculum-based middle school science PD? 2) How did the teachers describe their experience wearing the student hat and its impact on their learning?

Methods and analysis

This study took place in the context of a two-day curriculum-based PD for 6th- 7th- and 8th-grade science teachers implementing a new storyline curriculum from OpenSciEd. This PD was held in a major city in the northeastern United States and included 37 middle school teachers from the same state who were field testing the OpenSciEd materials. The teachers were split into groups based on grade level and each group focused on a different unit.

We video recorded all of the PD from all three groups. Major activities during the PD included reflecting on current practice, mapping out the storyline of the curriculum, engaging in key investigations and discussions in the student hat, planning for and rehearsing a sensemaking discussion, and planning for implementation. After the completion of the PD, we interviewed 12 teachers about their experience wearing the student hat. We did a thematic analysis of the interview transcripts (Braun & Clarke, 2006) looking for ways that the student hat influenced teachers' understanding of their practice. We then used the themes that we constructed as lenses to review the discussions that took place during the PD in all three groups. In this paper, we selected one sensemaking discussion for deeper analysis because of the way it highlighted each of the themes. This PD discussion, therefore, served as an instrumental case (Stake, 2005) of how the student hat can function to support teacher learning.

The discussion we analyzed took place in a PD session focused on a 6th-grade curriculum about the behavior of light. Just prior to the discussion, teachers participated in an investigation in the student hat. Pairs of

teachers were provided a flashlight and a particular medium—either a piece of glass, plexiglass, or a one-way mirror—and asked to describe how light went through the medium, reflected off of it, or both. The pairs then created a model of how the light behaved. In the discussion, the participants were asked to remain in student hat while they came together to share their models and make sense of what they now knew about how light moves.

Results

The teachers in our study found that the student hat did help them push on their understanding of science ideas. For example, Mr. Richter pointed out that the student hat "makes you think for yourself as a scientist. Like how does this actually work? It makes you explain that." Throughout our interviews, however, the two most common ideas that teachers mentioned were not about science content. Instead, almost all of the teachers brought up that the student hat was valuable for their understanding of the *curricular approach* and their own *students* and how their student might respond to the curriculum. Figure 1 below outlines these three outcomes that we found.

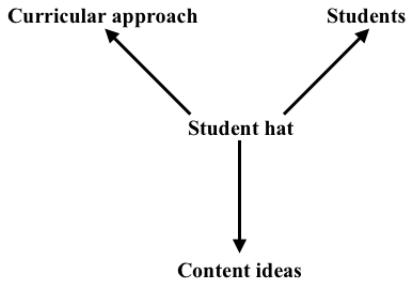

Figure 1. Teacher learning outcomes of using the student hat.

Pushing on teachers' understanding of the curricular approach

In their interviews, multiple teachers pointed out ways that working in the student hat allowed them to have a stronger understanding of key features of the storyline approach. For example, Mr. Bernard stated that "the scientist circle parts of the PD were really good to be attentive even if you weren't really a sixth grader, to what other people were saying and being part of that culture of using and building on other people's ideas was helpful." Here, Mr. Bernard reflected on how using the student hat during sensemaking discussions helped him engage in a key feature of storyline curricula: valuing others' ideas and building understanding in a community.

In her reflection, Ms. Mendell pointed out another way that the student hat allowed her to come to a stronger understanding of the storyline approach. She noted that traditional science instruction does not value student thinking as much as conventional scientific understanding and that thinking in student hat forced her to acknowledge and question this value. She said:

> I had to think like my students, and a lot of times I don't think like my students. I want my students to think like me. So, trying to wear the student hat and allowing the students to be a student opposed to allowing the students to think like Ms. [Mendell] was interesting because I never really thought about the student hat. I always thought about the teacher hat and what they needed to know.

By spending time in the student hat, Ms. Mendell re-oriented her understanding of the goal of science education, moving away from a model of education as emulation of experts' thinking.

Even in instances in which teachers found it difficult to remain in student hat, we also saw them using it to make sense of the storyline approach. For example, during the discussion on the behavior of light the group had come to agreement that light can be represented in straight lines but Mr. Donohue interjected to ask "at this point, has light been represented with a laser yet?" Although it was breaking out of student hat during the discussion, this comment demonstrated that Mr. Donahue was considering the way the curriculum ordered students' experiences and ideas to facilitate coherent understanding of light.

Pushing on teachers' understandings of their own students

Of the 12 teachers we interviewed, 11 of them brought up that the student hat allowed them to empathize with their students. These comments demonstrated three distinct ways that teachers empathized with students as a result of being asking to think like a student: empathizing with the way they might *speak* during a storyline unit, the way students might *think,* and the way they might *feel*.

Ms. Vernon emphasized how the student hat made her focus on using the language of her students. She noted that she found herself "trying to make sure I said something while I had the student hat, how would my student really say this?" and her focus was "trying to think of all the things a student might say and how you could really balance that out or just try to make it more even, a better playing ground." By thinking in the student hat, Ms. Vernon developed a better understanding of what her students might say and how she might design her classroom environment to allow more students to speak than have traditionally done so in the past.

During his interview, Mr. Morse emphasized that he valued the student hat for the way it made him consider what students were thinking as they participated in classroom discussion:

> I think [the PD] really focuses on what's important about being in student hat is what's the response? What's the thought process of the students going to be during this? […] So you could say, well my student would say, "I don't know." But really when they say, I don't know, they were processing something in order to come to the realization they didn't know.

Here, Mr. Morse emphasized that students could say something like "I don't know" in class, but thinking like a student during the PD forced him to consider *why* a student might claim not to know something. By considering the internal processes behind common student statements, Mr. Morse pointed out how he moved beyond copying what students might say to empathizing with what they might be thinking.

In his reflection, Mr. Emerson described how the student hat allowed him to feel emotions that he expected might be common in his students. That empathy helped him think about how to support his students in maintaining engagement in the intellectual challenges he expected of them:

> Sitting in the student role is the most powerful and most fun part of it because you're—the way it was set up, it felt like I was actually sitting in that role for a moment and you felt anxiety and stress in a way that I think kids probably do. […] I'm always trying to prepare kids for or help them understand that they're going to feel a certain way through understanding or lack of understanding of something, and how to then respond to that.

Mr. Emerson pointed out that by having a better understanding of how students might feel when engaging in the investigations and discussions of the storyline curriculum, he felt better able to prepare them to persist through feelings of anxiety or stress that might arise. Mr. Emerson also demonstrated how the student hat was pushing on his understanding of his students during the PD discussion. He and his partner had made a model demonstrating how light behaved on either side of a one-way mirror and during the discussion, he took particular care to make his thought process clear, saying:

> I struggled with representing the shapes on the walls. Because they're cone shaped, so I wanted to demonstrate the cone but also represent it on the wall, so I'm not sure if it's the right cone shape. But then as I did it, I forgot what happened underneath in this part. I was like, "did we see the image?" I'm assuming we did based on all the other things we've seen, but I wasn't sure if I had seen it.

Mr. Emerson spoke slowly and deliberately here, discussing how he had forgotten what happened in one part of the system while paying attention to another and that he "wasn't sure if [he] had seen" light below the one-way mirror. These actions did not serve to improve his understanding of the behavior of light—he already knew that light can travel through and be reflected off of one-way mirrors—but rather demonstrated how he was making sense of what his students might be confused by in this task and how it could support their learning.

We also saw teachers taking on the types of thinking they might expect of their students even when having difficulty remaining in student hat. For example, when explaining his model, Mr. Donahue reached to a familiar phenomenon to use as an analogy for different intensities of light. He said:

> This would be like a, a Bud, and this would be like a Bud Light, and this would be like a Bud Dry—some strange thing that you wouldn't really make. Sorry we're in 6th grade! This is like a Coke, this is like a Diet Coke, and this is Coke Zero [laughter].

Although he was clearly pulling on experiences that his 6th grade students likely would not have, the way that Mr. Donahue called on previous knowledge outside of the domain of light science to make sense of the model reflects an approach to sensemaking that is frequently seen in student thinking (Rosebery, Ogonowski, Dischino, &

Warren, 2010). In this example, therefore, we saw Mr. Donahue slipping out of student hat but doing it in a way that reflected a fundamental attention to how students might think during the sensemaking discussion.

Discussion

Past work in teacher education has shown that in order to effectively support students in coming to understand new ideas, teachers need to know a range of things, including the content being taught (Ball, Thames, & Phelps, 2008), the curricular and policy context in which the teaching takes place (Cohen, 1990), and the unique sensemaking and discourse practices of their students (Rosebery et al., 2010). In-service teacher professional development has the potential to support all three of these goals. Our study suggests that the student hat can be used as a pedagogical tool to push on multiple objectives, including developing teachers' understanding of content, curricular approaches, and their students (see Figure 1).

One key feature of storyline curricula is that they are coherent from the student perspective, meaning that during investigations and discussions students can explain what they are figuring and why it is important (Zivic et al., 2018). Supporting teachers in learning to facilitate this coherence can be particularly difficult because it requires stepping out of the traditional emphasis on the canonical answer and thinking about how students make sense of classroom experiences. As Ms. Mendell pointed out, many teachers "don't think like my students. I want my students to think like me." Our study suggests that by directing teachers' focus to how students might participate in sensemaking discussions and why they are valuable, the student hat can support teachers' understanding of this difficult feature of storyline curricula.

Recent work suggests the importance of developing more equitable science classrooms in which students diverse sense-making repertoires are noticed and supported (Bang, Brown, Calabrese Barton, Rosebery, & Warren, 2017). Student hat can support teachers in empathizing with how students might feel, speak or think during the unit. This type of empathy may help expand teachers understanding of what counts as students' meaningful engagement in science moving beyond rigid scientific language to notice and support their thinking and use of language in more expansive ways.

References

Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content Knowledge for Teaching: What Makes It Special? *Journal of Teacher Education*, *59*(5), 389–407.

Bang, M., Brown, B., Calabrese Barton, A., Rosebery, A., & Warren, B. (2017). Towards more equitable learning in science: Expanding relationships among students, teachers, and science practices. In C. V. Schwarz, C. Passmore, & B. J. Reiser (Eds.), *Helping students make sense of the world using next generation science and engineering practices* (pp. 33–58). Arlington, Virginia: NSTA Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Cohen, D. K. (1990). A Revolution in one classroom: The case of Mrs. Oublier. *Educational Evaluation and Policy Analysis*, *12*(3), 311–329.

Fishman, B. J., Davis, E. A., & Chan, C. K. K. (2014). A learning sciences perspective on teacher learning research. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (2nd ed., pp. 707–725). New York, NY: Cambridge University Press.

Gibbons, L. K., & Cobb, P. (2017). Focusing on teacher learning opportunities to identify potentially productive coaching activities. *Journal of Teacher Education*, *68*(4), 411–425.

Lampert, M., Franke, M. L., Kazemi, E., Ghousseini, H., Turrou, A. C., Beasley, H., … Crowe, K. (2013). Keeping it complex: Using rehearsals to support novice teacher learning of ambitious teaching. *Journal of Teacher Education*, *64*(3), 226–243.

Rosebery, A. S., Ogonowski, M., Dischino, M., & Warren, B. (2010). "The coat traps all your body heat": Heterogeneity as fundamental to learning. *Journal of the Learning Sciences*, *19*(3), 322–357.

Schwarz, C. V., Passmore, C., & Reiser, B. J. (2017). Moving beyond "knowing about" science to making sense of the natural world. In C. V. Schwarz, C. Passmore, & B. J. Reiser (Eds.), *Helping students make sense of the world using next generation science and engineering practices* (pp. 3–21). Arlington, Virginia: NSTA Press.

Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (3rd ed., pp. 443–466). Thousand Oaks, CA: SAGE Publications.

Zivic, A., Smith, J. F., Reiser, B. J., Edwards, K. D., Novak, M., & McGill, T. A. W. (2018). *Negotiating epistemic agency and target learning goals: Supporting coherence from the students' perspective*. Presented at the International Conference of the Learning Sciences, London, U.K.