

“I don’t see myself as an expert at all”: Authority in Facilitating Instructional Change

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Of the many challenges in shifting towards inquiry-oriented instruction from a lecture-based approach is understanding the role of the teacher in this new paradigm. One aspect of that role involves navigating novel classroom authority dynamics as students bear more authority to create and justify mathematical ideas. Supporting teachers as they navigate this shift is one of the many roles of effective professional development (PD). This study of one PD facilitator’s authority as he worked to support instructors’ inquiry-oriented instruction (IOI) revealed a new type of authority, called pedagogical expertise authority, that may be of particular importance to understanding how to best support IOI. Additionally, the results of this study suggest the impacts of facilitators’ beliefs and teaching experiences on long-term professional development.

Keywords: authority, professional development, inquiry-oriented instruction

Best practices for supporting instructors as they take up student-centered instructional practices have been a central focus in the RUME community in recent years (e.g., Johnson, 2019; Andrews-Larson et al., 2019; Henderson et al., 2011). Due to the shift in authority relations inherent to this change, specific attention must be paid to supporting instructors as they begin to teach in ways that invite students to bear authority in classroom discourse. This study investigates one facilitator’s authority during a semester-long professional development (PD) aimed at supporting instructors’ implementation of the Inquiry Oriented Abstract Algebra (IOAA) curriculum materials (Larsen et al., 2013), with a particular eye toward the potential impacts of the facilitator’s teaching experience on his practice.

Background & Theoretical Framing

Because fostering students' mathematical autonomy is one central goal of inquiry-oriented instruction, PD must support teachers as they adjust their behaviors and roles in the classroom to share authority with students. To create more opportunities for students to autonomously build and justify their own mathematical ideas, as well as develop more productive attitudes and mathematical identities, instructors must move away from a classroom authority tradition based on their own power and mathematical expertise (Langer-Osuna, 2017; Wilson & Lloyd, 2000; Amit & Fried, 2005). Sharing authority among teachers and students is a mutual goal of inquiry pedagogies (Gerson & Bateman, 2010; Hicks et al., 2021), but perspectives differ on what precisely constitutes shared authority. In the most hierarchical sense, a teacher must relinquish authority to students (e.g., Bleiler-Baxter et al., 2023; Fried, 2020), or otherwise minimize his or her authority to create and assess mathematical ideas (e.g., Gerson & Bateman, 2010). More progressive conceptions focus not on the teacher's abdication of authority but rather on how it can be used to promote students' authority (e.g., Bishop et al., 2022; Oyler, 1996). In IOI, teachers are tasked with authoritative roles like guiding discussion and leveraging students' ideas to advance the mathematical agenda of the class while simultaneously bolstering students' authority to create and justify their own mathematics. PD facilitators may become key agents in supporting instructors as they adjust their teaching practices to share authority with students in this way.

Since both facilitators and teachers are tasked with guiding others' learning, the practices of teachers who become PD facilitators are a rich territory for research. To this end, I lift a framework for analyzing classroom authority dynamics to the professional development context. I take specific direction from Gerson and Bateman (2010), viewing authority as an enacted relationship between individuals where an authority bearer makes a claim to legitimacy based on their position within a hierarchy, their expertise, or the norms and practices of the mathematical community, and another receives that authority by changing their behavior, i.e., what is said, what is written, how they are thinking. In addition to Gerson and Bateman's ownership and mathematics expertise authorities (summarized in Table 1), I add the construct of *pedagogical expertise authority*. This construct aims to capture those authority relations arising in PD when instructors' claims about mathematics and pedagogy are legitimized by their expertise as teaching professionals, rather than as mathematicians.

Table 1. Authority types and subtypes with definitions.

Type	Sub-type	Legitimized by . . .
Hierarchical	Institutional Granted	position as instructor of facilitator permission from instructor or facilitator
Expertise	Ownership expertise Mathematics expertise <i>Pedagogical expertise</i>	one's creation of an idea or solution one's mathematical expertise one's pedagogical expertise
Mathematical	Mathematics Community Justification	shared norms, ideas, and practices mathematical & logical reasoning

Context & Methods

The professional development in this study took place in the context of an online working group (OWG) within the TIMES project (Teaching Inquiry-oriented Mathematics: Establishing Supports, NSF Awards: #1431595, #1431641, #1431393). The OWG consisted of three instructors new to teaching IOAA, Elena, Laura, and Roger, and one facilitator, Mickey (all pseudonyms). The instructors were introduced to the curriculum materials in the summer workshop and met synchronously online via Google Hangouts once per week to reflect on the curriculum and their implementation with the facilitator. Participants were regularly asked to share reflections on their instruction and investigate the curriculum tasks from a mathematical perspective. Additionally, the facilitator met with one of the TIMES project's principal investigators (PI) each week in a series of Debrief meetings, wherein the facilitator and PI discussed his goals for facilitation, beliefs about teaching IOAA, and updates on the OWG's proceedings. Both Debrief and OWG meetings were recorded for retrospective analysis.

To identify Mickey's orientations to authority in his facilitation, three sets of video data were analyzed: the OWG meetings, the Debrief meetings, and Mickey's teaching with the IOAA curriculum materials in the previous year. This analysis was guided by iterative thematic analysis (Braun & Clarke, 2021) and had four main phases, summarized in Table 2.

Results & Discussion

Mickey's decision-making practices appear to be influenced by an aim to shift traditional authority relationships in both the online working group and the classroom context. Mickey first demonstrates this intention in an explicit discussion of classroom authority in the early weeks of

Table 2. Summary of analysis phases.

<u>Phase</u>	<u>Description</u>
One	Created analytic notes of OWG meetings; organized into five columns: Video File Name, Timestamp, Quote, Speaker(s), and Notes. Memos focused on Mickey's utterances during and about facilitating discussions regarding IOI.
Two	Created analytic notes of Debrief meetings with identical structure to OWG notes, focusing on subject-matter already prevalent in Phase One data log.
Three	Built descriptive themes of Mickey's prevailing behaviors and attitudes based on commonalities between phase one and two logs.
Four	Analyzed videos of whole-class activities from Mickey's teaching, identifying confirming and conflicting instances of Mickey's previously identified orientations.

the OWG meetings. In the following OWG episode, Elena had been reflecting on her pedagogical choice to give her students the definition of bijection when they could not recall it independently.

- Elena:* I didn't feel like that was something they could just "inquiry out" – it wouldn't just happen.
- Mickey:* Sure, but the thing is is that, holistically, are you doing that more often than not? Because . . . What you're seeing is authority- or power-shift.
- Elena:* Right.
- Mickey:* Right. Where is the authority lying? Is it lying with you? Well then, they're only going to do things that satisfy you, instead of doing things that satisfy themselves, you know, for them to learn.

This episode suggests a belief that shifting authority to be shared between teacher and students promotes learning. Mickey's last statement implies that if authority lies with the instructor, then students' engagement will not result in learning. For Mickey, students must take up authority in order to learn. By explicitly motivating participants to attend to these authority dynamics within their own classrooms, Mickey demonstrates his orientation toward authority. This is best characterized as a belief or value in shifting authority structures so that participants, be they students in a classroom or instructors in professional development, rely on their own mathematical or pedagogical expertise to reason about their quandaries, rather than turning to Mickey for his. This practice of shifting authority arises in both the online working group and the classroom when Mickey shares expertise authority with participants while carefully leveraging his authority to advance the agendas in both contexts.

Expertise Authority

Throughout his teaching and his facilitation, Mickey rejects the notion that he is an expert. This refusal to bear expertise authority was displayed in the OWG when Mickey directly discussed his lack of expertise and consistently elicited participants' contributions before making his own, thus sharing pedagogical expertise and ownership expertise authorities among participants. This attitude toward expertise authority is made more apparent in discussions from the debrief meetings and episodes from Mickey's teaching.

In the online working group, Mickey displayed his orientation toward sharing authority by refusing to position himself as the expert in the room, consistently eliciting participant thinking *first* before sharing his own ideas, and sometimes refusing to give advice at all. Often, when a participant asked Mickey a direct question, he would redirect it to the entire group with phrases like, "So that [question] is for everybody, I can answer later," and "I think this [topic] merits at least a three-to-five-minute discussion. I'll add a disclaimer that I have no idea how to handle that situation." In a quintessential episode, Elena has asked Mickey how he would handle the situation of having an exceptionally bright student eager to share all of the answers: "If you're looking at me to be the expert in this situation, I don't have a clue. I have conjectures and thoughts about this, but I want to open it up to everybody in the room."

Mickey directly states that the participants should not view him as an expert. Furthermore, by choosing to give the opportunity to answer Elena's question to the whole group, Mickey receives the pedagogical expertise authority of the remaining participants. This is a clear invitation for participants to bear pedagogical expertise authority to reason about Elena's quandary, as well as ownership expertise authority to create and discuss possible solutions. It can be inferred that Mickey's belief about this practice of sharing expertise authority as essential for participants' learning motivates his decision-making as a facilitator.

Mickey's orientation toward avoiding expertise authority is also apparent in discussions from the Debrief meetings, where he overtly describes his relationship to his own expertise. An instance of dialogue that captures this is:

It's hard even with them sometimes, because when I ask a question, they're seeking "Is this the answer you wanted?" and like, a colleague of mine introduced me the other day as a pedagogical expert and . . . I am so not that.

Even more explicitly, he says: "I don't consider myself an expert in inquiry-oriented [sic] by any means." Rather, than viewing himself as an expert in IOI, Mickey is aware that his position as facilitator garners him institutional authority, but chooses to leverage that authority to share pedagogical and ownership expertise authorities with students. This is indicative of Mickey's orientation toward the importance of sharing expertise authorities in professional development.

Likewise, in discussing his own views on assessment during a debrief meeting in Week 8, Mickey mentioned that his OWG seems to struggle consistently with student learning assessments, trying to lean on his experience for guidance. He said, "This keeps coming up over and over and over again, and I keep asking them, 'What are the goals of your course?' For me, your assessment should match your goals." Mickey shared his personal teaching philosophy but rejected any positioning of himself as the arbiter of what kinds of assessments were best. He encouraged his instructors to create their own standards for assessment, rather than to look for the "correct way" to assess their students based on his expertise. This clearly demonstrates Mickey's goal of sharing expertise authorities. His comments about answering participants'

questions based on his expertise authority emphasize his intention to shift traditional authority structures within his facilitation to create dynamics of shared authority.

Mickey's teaching actions provide additional context for these facilitation practices and the authority beliefs that inform them. Because of the contextual differences between the classroom and the online working group, it is no surprise that this orientation arose differently during Mickey's teaching in the year prior. In the classroom, Mickey's orientation toward traditional authority dynamics can be characterized by his intentional and particular distribution of opportunities to bear expertise authorities among his students through a process-over-product value selection of contributions. Additionally, he invites students to bear mathematical authority to evaluate each other's contributions.

It is often the case that students with correct solutions most consistently bear granted authority to contribute to discussion. Mickey subverts this authority tradition by minimizing the contributions of students with correct solutions and granting authority to students with partial or in-progress solutions to contribute their thinking. In the classroom, this careful distribution of opportunities to bear authority arises when Mickey leverages his institutional authority to prompt students to share their thinking, especially when he asks students to share what he calls "productive failures". One explanation of productive failures that Mickey gives in class is:

"Try stuff. In Algebra, you're going to cook a lot of equations up. Some of them may be fruitful, some of them may not be. The biggest thing, though, is to explore. Because, some help, some don't. Learning from your mistakes, having that productivity when you're failing, is a huge part of this."

Mickey regularly granted students the authority to share these productive failures, and it should be noted that students were expected to discuss these processes as part of their course grade. By granting students authority to contribute their in-progress mathematical ideas, Mickey subverted the tradition that only correct solutions can legitimize a students' mathematics expertise authority, shifting toward a dynamic where students are enculturated into the mathematical community through opportunities to share their informal, in-progress reasoning. In an exemplifying episode, the class is attempting to prove a conjecture about a generating set for a symmetry group. The student who made the conjecture begins to share his completed proof, and Mickey interrupts him to call on a student who is still working on the conjecture, saying, "Hold on, hold on, let's see, Madison, can you help me out with this?" Mickey has not received the mathematical authority the student with the correct solution is attempting to bear, and instead grants authority to Madison to share her reasoning about the conjecture so far. In inviting her to bear granted authority, Mickey creates the opportunity for Madison to bear both ownership expertise and mathematics expertise authorities. This is supportive of Madison's, and arguably many other students', mathematical autonomy because it values the process of creating a proof over the final product, which helps students to develop productive beliefs about their position in the mathematical community (see Serbin et al., 2020, p. 4). This support is also created by centering Madison's in-progress thinking, which aids other students in gaining insight into their classmate's reasoning.

Mickey also shifts away from the tradition that the instructor bears the institutional and mathematics expertise authorities to evaluate students' contributions by inviting students to bear authority to evaluate each other's ideas. Following the episode above where all students have been prompted to share work for task 3 on the whiteboard, Mickey asks, "So, what do we think?"

And remember, we're in a non-judgmental phase in our lives right now, so keep your comments very productive, okay?" By empowering his students to evaluate each other's contributions through constructive feedback, Mickey creates opportunities for students to bear mathematical authority to evaluate each other's work and ownership expertise authority to respond to evaluations of their own ideas. This supports their mathematical autonomy by engaging students in reasoning about the contributed solutions and giving them ownership of mathematical ideas.

Mickey's refusal to bear pedagogical expertise authority in the online working group parallels his refusal to bear mathematical expertise authority to evaluate students' contributions in the classroom, instead inviting students to evaluate each other's contributions. Similarly, inviting OWG participants to share their thinking before sharing his own appears in much the same way as his classroom practice; in both instances, Mickey invites participants to share expertise authorities specific to the learning environment. The practice of sharing authority in both settings demonstrates Mickey's intent to shift traditional authority dynamics. This practice arises as an artifact of Mickey's implicit belief that sharing authority supports the development of subject-specific autonomy in participants.

Authority to Advance the Agenda

Although Mickey refused to bear the expertise authority his participants often requested of him, there was tension between Mickey's authority values and his responsibility to advance the agenda of the OWG. Advancing the agenda required Mickey to bear institutional authority both as the facilitator in the OWG and as the instructor in the classroom.

Mickey often prompted participants and guided group discussion to meet the goals of the OWG, bearing institutional authority in order to advance the agenda of the OWG. This is evidenced on the individual level when Mickey directly asks participants for their thoughts on the mathematics, as seen in the following exchange between Mickey and Roger during a group discussion of the Sudoku task (Larsen et al., 2013).

- Mickey:* Turning toward the content in Lesson 4, why is it, mathematically, that in every group Cayley table, each symmetry appears exactly once in each row and each column?
- Roger:* It has to do with cancellation?
- Mickey:* Can you expand on that? Pardon the pun.

When Mickey bears his authority as the facilitator to prompt Roger to share his thinking, he advances the professional development agenda by guiding participants to engage with the curriculum materials from a mathematical perspective. He also directly prompts the participants to reflect aloud on their teaching experiences. After Laura had discussed a difficulty she was having with using one of her student's contributions to formalize a mathematical idea, Mickey prompted her to dig deeper, saying "Now that you can reflect on it, what went through your mind at that moment when you were handling the situation?" and later directing the remaining participants to discuss potential pedagogical moves to apply to Laura's quandary. By exercising his institutional authority as the facilitator in this way, Mickey advances the agenda of the OWG by inviting participants to engage in pedagogical reasoning.

So, while Mickey shares authority often by refusing to be the bearer of expertise authority in the Online Working Group, he is willing to bear the kind of institutional authority associated with the facilitator's responsibility to advance the agenda to meet the OWG's goals. Although these actions do not depart drastically from hierarchical authority relations, they are consistent

with a motivation to support participants' pedagogical reasoning and autonomy, which is in line with both Mickey's goals and the intent of the instructional support model.

Similarly, Mickey must bear institutional authority in the classroom to direct students' activity by providing tasks and granting students authority to share their solutions. Similar to the OWG, Mickey's orientation toward his own institutional authority is somewhat unsurprising in the classroom context, but by using it to grant authority to students to contribute, Mickey acts with the goals of supporting the development of his students' mathematical autonomy and advancing the mathematical agenda. What is most striking is the way this agenda informs Mickey's choice of which students are granted authority to contribute. By de-emphasizing the mathematical authority of students with correct answers, Mickey creates more opportunities for a wide range of students to bear ownership and mathematics expertise authorities, thereby promoting their mathematical autonomy.

Conclusions

The results of this case study suggest strong parallels between the teaching and facilitating practices of this PD facilitator: across contexts, Mickey balanced the goal of sharing authority with participants with his responsibility to advance the agenda of the group, pointing to the possibility that teachers' beliefs can transcend the classroom and influence the way they facilitate professional development. Mickey's emphasis on OWG participants bearing pedagogical expertise authority to reason about their instructional practices may have arisen from his experiences with balancing authority in an IOAA classroom, where, unlike in other types of inquiry-based learning, the instructor's responsibility to advance the mathematical agenda demands that they carefully leverage their own authority in ways that encourage, rather than stifle, students' authority.

More broadly, this study speaks to the importance of facilitator's prior teaching experience, attitudes, and beliefs about authority, in creating shared authority dynamics that can support the professional development of new instructors. Viewing both instruction and PD facilitation through this lens of shifting authority dynamics can be useful in future research on both IOI and professional development, especially with the added construct of pedagogical expertise authority. Future work should investigate the effects on teaching when participants are bearers of pedagogical expertise authority in professional development, as well as their affect, attitudes, and conceptualizations of shared authority in IOI.

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