Creating a Context for Graduate Student Learning through Constructivist Inquiry: Introduction to Academia as Learning through Play

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Abstract: In this article, I explore the impact of receiving mentorship into research and theory of the field that was guided by a social constructivist learning lens. I reflect on the ways that my conception of research and research agenda were framed subconsciously by early experiences investigating my secondary mathematics teaching practice under the mentorship of Dr. Terry Wood. Terry mentored through listening, posing questions, creating cognitive conflict, and encouraging my autonomous exploration. What stood out from this process are the parallels between her words about constructivism, applied to the elementary mathematics classroom, and her ways of mentoring me into the space of mathematics education research, theory, and practice. Her patient and student-centered mentorship had profound impact on my ways of framing and studying teacher learning.
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For teacher practitioners entering graduate school, an introduction to the theory and research of their field(s) of education can be daunting. I’ve heard many graduate students express mixed feelings towards theory and research, and wonder if they should “go back to” or stay in their careers in the classroom because navigating the theoretical and research worlds of academia requires a cultural capital that is challenging to access. In this article, I describe how assimilation into the research and theoretical worlds of (mathematics) education, through a constructivist mentorship approach such as that used by Terry Wood, can feel like a luxurious extension of teaching - an opportunity to pursue intrinsic curiosities of practice.

Terry Wood was my mentor and graduate advisor from 2005-2008, during formative years as I completed my masters while teaching grades 8-11 mathematics locally, and then for the first year of my PhD program after I left the classroom and took a graduate fellowship teaching prospective secondary mathematics teachers. As many others have written in this special issue, Terry “lived constructivism.” Her constructivist philosophies infiltrated her mentorship in every possible way: in conversations in her office that seemed intentionally designed to foster reflection and learning from practice; in interactions she facilitated to explore ideas with peers and scholars; in her design and teaching of graduate courses; and in her feedback to prompt further growth in my writing.

I recently returned to Terry’s published work (e.g., Wood, 1999, 2001; Wood, Cobb, & Yackel, 1990), reviewing her words with a goal to understand her values and interpretations of how cognitive theories and social constructivism guided teaching and learning in the classrooms she studied. What stood out from this process are the parallels between her words about constructivism, applied to the elementary mathematics classroom, and her ways of mentoring
me into the space of mathematics education research, theory, and practice. The 2 contexts are quite distinct: the elementary teacher facilitating children’s mathematics learning compared with the professor/advisor mentoring a mathematics teacher into the knowledge of the field. Yet, she attended to creating a context for my inquiry into exploring the connections between research, theory, and practice such that—rather than eying an insurmountable ivory tower—the process felt like an accessible and adventurous climb. In the following sections, I pull from Terry’s words and interpretations about constructivism, written in the context of elementary mathematics classrooms, teachers, and children, and use these as indications of her values regarding teaching and learning. I use her words, in turn, to highlight her intentional ways of mentoring me and preparing me for the work of mathematics teaching and teacher education.

**Conversations to Facilitate Reflection and Learning from Practice**

I recall sitting in Terry’s office on many occasions, having collegial conversations focused on my teaching practice. Terry’s approach to facilitating these conversations consisted of a variety of talk moves: questioning, listening, validating, probing, introducing other voices/ideas to challenge my understandings, and encouraging me to experiment in my classroom. She scaffolded the process of teacher research through her gradual nudges towards exploring the implication of research and theories of the field in my practice. Her questions and encouragement empowered me to try new things without trepidation, and her validation of my noticing and reflections and encouragement to write about them made me feel like I generated prized knowledge worthy of dissemination. This experience helped me to see teacher research as an accessible, inviting adventure. It later fueled my readiness for and interest in teacher action research, and led to a path of studying and empowering teacher researchers in ways
subconsciously modeled after ways in which Terry mentored me.

Terry’s work applied the frameworks of Piagetian cognitive development theory (Piaget, 1970) and constructivist ways of children’s ‘coming to know’ in the mathematics classroom. “[T]eachers need to understand and to some extent accept the fundamental tenets that distinguish a constructivist theory of learning from other theories” (Wood, 1999, p. 171).

Through her reading, research and experimentation in her own practice, Terry had come to understand these fundamental tenets so deeply that she applied them to her mentorship of mathematics teachers and researchers. She understood that we each come to know and understand mathematics teaching and mathematics education in diverse ways through our own journeys renegotiating our understandings.

One of these tenets is focused on the diverse ways in which children come to know about the world, including the many ways in which children use their strategies to make sense of mathematics. Interest in supporting children's ways of knowing creates a certain tension for teachers who are fully cognizant of society's insistence on students' acquisition of culturally established knowledge. (Wood, 1999, pp. 171-172)

When I started working with Terry, she had been an active scholar for 20 years, and was in the midst of serving as series editor of a multi-volume international handbook on mathematics teacher education (Jaworski & Wood, 2008; Krainer & Wood, 2008; Sullivan & Wood, 2008; Tirosh & Wood, 2008). Yet I have no memories of her conveying her knowledge directly, no memories of her expositing her years of experience gleaned from teaching and researching teaching. I imagine that she could have easily summarized that I could do X, Y, and Z to efficiently enhance my role as teacher and improve students’ learning opportunities. Yet while
she was cognizant of the wealth of knowledge of mathematics education that “society” or the field might insist that her mentees acquire, she never made knowledge acquisition the central focus, nor did she reveal the tension that she silently managed so carefully as she nudged my growth in gentle ways. Rather, through her gentle scaffolding and probing, she prompted me to explore relevant theories and research of the field while allowing me to discover my own emerging understandings.

Through conversations in her office, Terry took a student-centered approach to my learning: asking about my teaching, probing my responses further, and suggesting other scholars whose ideas I should read and consider. She did not get lost in the end goal, but focused on her role as “teacher,” supporting the process of my coming to know at my own pace, from my current understanding of math teaching and learning. For example, I remember her asking questions about my practice and subsequently introducing me to the idea of classroom norms. She prompted me to make a list of norms I wanted to establish in my classroom, and sent me off to read William’s (2000, 2002) learning-from-practice about selecting high-quality mathematics tasks and establishing norms that demonstrated “having faith in the students’ ability to think mathematically” (2002, p. 5). Later, as I began to make progress in these areas, Terry directed me to Bloom’s Taxonomy as it had been applied to children’s mathematical thinking (Wood, Williams & McNeal, 2006), suggesting that I audio record students’ group work and analyze students’ verbalized cognitive demand. This in turn fostered my learning about the connectedness of task selection, teacher questioning, peer discourse, and students’ levels of cognitive demand.

Terry’s office conversations allowed me space to muse about noticing and wonderings.
Rather than give answers, she would respond to my queries with more questions, or suggest the relevant “voices” from other scholars’ work, which she continuously provided as resources to consider. Though it was above my cognizance at the time, Terry modeled for me how to scaffold the student (myself) in coming up with the answers to her own questions. “This exchange exemplifies a different form of teaching -- one in which the children rather than the teacher provide not only the solution to the problem but an explanation for their answers.” (Wood, 2001, pp. 110-111). While these strategies for facilitating learning may seem more indirect to produce knowledge than traditional teaching-by-telling methods, the opportunities to inquire into and make meaning of my practice offered the precious gain of a transferable and sustainable joy of learning. She encouraged me to write about my experimentation and learning in practice, which I eventually published (Umbeck, 2011). By sharing her role as the authority of knowledge, and allowing me to co-construct learning in the series of conversations together, an autonomous learner was born.

Mentoring graduate students to learn in ways that allows them to make meaning and answer their own questions takes a longer period of time than traditional teacher-directed methods. Terry was willing to take the time necessary to allow me to make meaning of the theoretical world at my own pace, through experimentation in my own teaching practice. While the process of facilitating graduate student-centered learning can be slow, the end product may greatly contrast the more efficient and outcome-driven modes of question answering and information conveying that align with traditional knowledge acquisition strategies.

[Learning] usually takes place over an extended period (Inhelder, Sinclair, & Bovet, 1974) and is accompanied by a sense of inner satisfaction (Labinowicz, 1985; Skemp,
The need to give meaning and coherence to experience accounts for changes in children's perspectives of the world as they develop and become increasingly adept members of cultural communities. (Wood, Cobb, & Yackel, 1990, pp. 496-498)

Terry’s constructivist-oriented mentorship transformed learning to merge the theoretical and practice-based worlds of mathematics education into an accessible and enjoyable adventure that created deep satisfaction. It prepared me to become an “increasingly adept member of the cultural community” of mathematics education, aiding in the development of my cultural capital (Ladson-Billings, 1995) to see myself as a teacher researcher, able to navigate and enjoy the process of experimentation and learning from practice. Formal research methods could come later, but in the initial stages, the inquiry into my practice that Terry facilitated was more akin to learning through play. This experience situated me to develop a passion for teacher action research, which similarly positions the teacher as expert of their practice with a valued insider vantage point. Later, my fascination for autonomous teacher learning led me to study other mathematics teachers’ learning and change through teacher action research.

**Creating Spaces for Interactions and Productive Discourse with Others**

Terry analyzed how teachers create contexts for interaction and productive mathematical argument to promote learning, writing “the teacher participated with the students to create patterns of interaction and discourse that enabled children to shift their cognitive attention from making social sense to making sense of their mathematical experiences” (Wood, 1999, abstract). Similarly, in her role of teacher-mentor she attended to creating patterns of interaction and discourse that enabled her graduate students to shift their cognitive attention from making social sense to making sense of their understanding of good mathematics teaching.
Terry saw great importance of the concept of “thinking with others,” and she used this to frame the interactions she created between her graduate students and peers and scholars of the field, as well as interactions she created within her courses. She wrote

We took this approach because we believed thinking with others was an important aspect of children’s cognitive process and thus their knowledge construction; moreover, thinking with others was generally viewed as a necessary facet in developing virtual dialogue (thinking alone) and thinking as higher functions (Bruner, 1996; Vygotsky, 1978). It is by and large agreed that engaging in thinking with others allows “individuals to bypass their own cognitive limitations” (Rochat, 2001, p. 139) in the reconstruction and mutual consolidation of thoughts and ideas. (Wood, Williams, & McNeal, 2006, p. 228)

I remember how Terry introduced me to one of her more senior graduate students, Carla Gerberry, and strategically positioned us to learn together and from each other through experimenting in my 8th-grade mathematics classroom. In this way, she created a context for our learning how to bring the theoretical world of mathematics education into practice in my classroom. Terry gave Carla some 8th-grade Connected Mathematics Project workbooks (Lappan et al., 1998), and tasked her with selecting or adapting tasks for us to try out together. She suggested readings that pushed us to think about the norms that we would need to set up as we shifted to open-ended student-centered inquiry. She was always willing to support us as needed, but exuded a trust and belief in our success. Looking back, I realize that “success” from Terry’s point of view must have been four inevitable learning from the experience, more so than a flawless implementation.
Terry’s mentorship around theory into practice in my classroom was invaluable and formative to my development as a mathematics teacher and later as a teacher educator. As a teacher prepared at the cusp of NCTM’s (2000) vision for school mathematics, I had taken up this vision but lacked the knowledge needed to carry it out. The mode of experimentation, with the support of a peer who had time and resources to select and plan tasks, was transformative to my understanding of how inquiry-based teaching can look and feel in my own classroom, and made me aware of ways I needed to grow myself to develop the norms needed to continue this work beyond my current resources.

**Teaching Graduate Courses**

Terry also infused her value of scaffolding learning through thinking with others in her teaching within the graduate classroom. Much like the elementary teachers she studied, she attended to creating opportunities for her graduate students to think with and discuss their ideas with peers. She structured these interactions through the norms and routines that she created around class discussions, routines, and projects.

To revisit Terry’s approach to teaching graduate courses, I dug out an old file folder that I hadn’t opened in 14 years: it held the syllabi, course readings, and a few papers that I wrote from the last course I completed with Terry, “Teaching Mathematics: Insights and Issues,” in Fall 2007. I knew exactly where it was, as it had traveled with me through 4 office moves, yet I saved it as a time capsule of Terry’s mentorship during the semester prior to her sudden retirement. Finally, I opened it. An examination of the course syllabus revealed how an intentionality around creating opportunities for interaction with diverse ideas had infiltrated every aspect of course design. There were peer interactions planned throughout every aspect of
the learning: partner work in facilitating reading discussions, note takers to document the
discussions for later review, and team presentations about key reform policy documents. The
course schedule was framed with a variety of questions: overarching questions, weekly
questions, and more questions, dispersed among key readings to present multiple perspectives
and opportunities for sense-making discussions. Figure 1 shows an excerpt from the course
schedule, illustrating the layers of framing questions as well as the weekly assigned student
partners and collaborative tasks.

[Insert Figure 1 here]

The assignments outlined in the syllabus also reveal intentionality around creating
interactions with scholarship of the field and assessing students’ evolving understandings. Each
week, readings sets were designed to offered multiple perspectives, with framing questions
guiding us to compare, contrast or synthesize perspectives through class discussions. In
addition, there were frequent writing assignments. The writing assignments generally built upon
each other, creating a series of opportunities for her to assess and probe our thinking about
mathematics teaching. The first writing assignment consisted required 2 pages about our
definition of good mathematical teaching, and subsequent writing assignments related to
developing competencies around becoming a mathematics education researcher, such as
chunking the tasks of the final project, gradually scaffolding our thinking towards developing a
research proposal around an area of our own curiosities. These assignments created the
opportunity for her to access and push my thinking in personalized ways, questioning me about
things I wrote, or prompting me to seek out a carefully prescribed relevant scholar’s work. This
process of assessing and probing student thinking, in the asynchronous context of feedback on
writing, again resembles the teacher’s role that Terry espoused for the elementary mathematics
classroom.

The teacher's role in such a setting was to infer the way children understood their mathematics and offer probes or suggestions that could help them reflect on or reorganize their current thinking. She [the classroom teacher] did this by closely observing and listening as the children discussed their solutions in the course of both pair or whole-class interactions. These interactions constituted opportunities for the teacher to learn about her students’ mathematical knowledge. (Wood, Cobb, & Yackel, 1990, p. 509)

Terry’s intentional course design seemed to maximize interactions, creating opportunities for students to learn from each other, but also for her to assess and probe her students’ knowledge of mathematics teaching. Like the elementary mathematics teacher she described above, she did this by closely listening to our ideas, and creating interactions through readings, discussions, group work, and feedback on our writing. In the following section I focus more specifically on the ways that her feedback on my work pushed my thinking further, offering relevant questions and suggestions to facilitate my reflection and renegotiation of my understandings.

**Feedback To Prompt Growth In Writing**

In her published work, Terry applied Piaget’s theory of “cognitive conflict and resolution as the mechanism for transforming thought in knowledge production” (Wood, 1999, p. 173) to children’s learning through interactions in the mathematics classroom.

Children learn on the basis of their experiences as they interact in their physical and social environments, and new learning occurs when current ideas give rise to
problematic situations and students construct new concepts to restore coherence and meaning to experience. (Wood, Cobb, & Yackel, 1990, p. 496)

Much like recent growth mindset research (e.g., Moser et al., 2011) that emphasizes the important learning that happens at the moment of making mistakes, Terry recognized the importance of cognitive conflict in fostering learning by supporting the reorganization of one’s beliefs and transformation of thinking. “Confusion and conflict often occur during class discussion in classes in which the emphasis is on students' thinking and reasoning. These instances of disagreement arise from the diverse ideas by children” (Wood, 1999, p. 172). Terry conceptualized confusion and conflict in students’ thinking as a productive precursor for learning. Moreover, in addition to applauding instances of cognitive conflict in the mathematics classroom, she also applied this lens in her praxis, mentoring graduate students. Terry’s value for designing questions to foster cognitive conflict was particularly evident in the ways that she gave feedback on my work.

Terry’s feedback on written work created contexts for cognitive conflict that served to further my thinking. It took the form of raising new questions, pointing out contradictions among my ideas, and prescribing additional scholars’ work to read. Often written in purple ink to avoid the stigma of red marking, I rediscovered her feedback on 3 writing pieces that I had saved from the course. There was the affirming feedback: the “good point,” and “some good thinking about this issue.” There was the feedback focused on developing my competencies with writing a research proposal, such as revoicing my idea with adaptations to assimilate to the writing norms of the field. And lastly, there were the questions. Much like her verbal questions in response to my reflections in her office, her probing questions were one of the places where
she nudged me to think further, often pushing me towards cognitive conflicts that would further my learning.

In a series of Terry’s comments across the initial writing assignments in her course, I trace Terry’s feedback and assert that she was posing questions to allow cognitive conflict to further my understandings. First, in my assigned 2-page paper defining mathematics teaching, she picked out my comments about classroom management, and asked probing questions to push me to consider how classroom management might look differently in an inquiry-based mathematics classroom. The following are short excerpts of my paper, with the corresponding dialogue from Terry:

**Author’s paper:** Classroom management, while having nothing to do with mathematics, is an essential characteristic to the effective mathematics classroom.

*Terry:* I agree with you. Do you think, with ideas of reform, classroom management might be conceived in a slightly different way?

**Author’s paper:** With effective classroom management in place, students will be able to work in groups, perform tasks, and participate as desired by the teacher. Establishing an appropriate classroom environment and classroom norms is also an essential characteristic because it helps students to feel safe and confident to express their ideas freely.

*Terry:* Would you consider this [classroom environment and classroom norms] to be in the category of class management? Norms determine expected behavior.

**Final comment at end of the paper:** For next week - can you write something that would recast classroom management differently?
Terry’s comments on my paper evidenced that she is highlighting my ways of speaking about classroom management as separate from good teaching. Her questioning provided the opportunity for adding complexity to my oversimplified understanding that classroom management was separate from establishing a productive classroom environment and norms. This raised my awareness to this area of cognitive conflict, prompting me to reorganize my ideas, and formulate new understandings. What impresses me the most about Terry’s patience and persistence in prodding my thinking is how little telling she does, and yet how much learning her questions and subsequent cognitive conflicts create.

Moreover, it is thought that situations of confusion and clash of ideas in which students are allowed to struggle to resolution are precisely the settings that promote learning with understanding. Therefore, in order to create these situations for mathematical learning in classrooms, teachers must resist their natural inclination to tell students information, make the task simpler, or step in and do part of the task. (Wood, 2001, p. 116)

Terry lived these words far beyond her research and into her life, without any observable contradictions. I have no memories of her conveying her knowledge directly, just many memories of her affirming, probing, pushing, and exuding an overall belief in my ability to figure things out through my own thinking. Within the string of feedback shared, Terry had requested that I write about how classroom management is recast in reform teaching. My response showed a shift towards talking about classroom management as a process of developing classroom norms and supporting students in developing autonomy in a new mathematics classroom environment. Her response was, “Some good thinking about this idea.” She applied enough positive affirmation to develop my self-efficacy and autonomy as a thinker,
but never evaluated my work as finished.

**Imprint on My Life Work**

Through this reflective inquiry into memories and artifacts from my time under Terry’s mentorship, I arrived at a surprising revelation about the ways that Terry’s modeling of constructivist strategies for teacher education left a lasting imprint on my own work as a teacher educator. When I set out to write this paper, my aim was to describe the ways that Terry’s strategies for mentoring made the process of learning about and enacting research and theory of the field seem inviting and accessible, and empowered me as an autonomous teacher/researcher/learner. An additional layer that I became aware of through reflective writing and conversations with Carla, was that my own framings for teaching and developing prospective and practicing teachers is clearly inspired by my experiences learning through constructivist inquiry.

Terry’s retirement began in 2008, yet unbeknownst to me, the effects of Terry’s mentorship continued to impact my learning in subsequent years. Throughout my subsequent years as a PhD student, I was drawn to learning about and practicing teacher action research because of the way it empowered teacher experimentation and autonomous learning. In hindsight, what I valued about teacher action research was how closely it emulated the joyful process of self-led inquiry into one’s teaching practice, where under Terry’s mentorship I was a teacher learner with the opportunity to “provide not only the solution to the problem but an explanation for their answers” (Wood, 2001, 111). Through action research I could ask questions out of my curiosities, and seek to systematically answer them.

When designing my dissertation study, I wasn’t conscious of the many ways that Terry’s
model of mentorship infiltrated the design of my teacher learning community. I developed a
learning community for secondary mathematics teachers stemming from the desire to cast
professional development differently, in a democratic way that empowered teacher autonomy.

Inspired by the model of collaborative action research of Capobianco (2002), I facilitated
and studied a group of secondary mathematics teachers collaboratively inquiring into their practice
(i.e., Keazer, 2014). In the study design, I was drawn to the words of Stenhouse (1975), who
suggested applying curricular recommendations to the formation of one’s action research
inquiry, stipulating that “the crucial point is that the proposal is not to be regarded as an
unqualified recommendation but rather as a provisional specification claiming no more than to
be worth putting to the test of practice” (p. 142). This quote represented to me the ideal way to
honor teachers’ knowledge and autonomy in professional development settings, and empower
teachers to answer their own questions. I realize now, however, that this positioning of teachers
in my dissertation research didn’t originate from my read of Stenhouse (1975). My first teacher
education modeler and question-asker positioned me in this same way, which has
subconsciously impacted my choices in professional development framing, research design, and
the ways that I have positioned and studied teachers since then.

I continue to draw on Terry’s framing of teacher as autonomous learner, to guide the
ways that I work with teachers and seek to support their learning. This positioning empowers
teachers to venture on their own journey of teacher change, journeys which take different paths
and directions (Keazer, 2014). My research emulates Terry’s model for supporting teacher
inquiry, while adding the context of a collaborative action research group, with a layer of
intentional data collection to research teachers’ experiences and outcomes.
Conclusion

Due to Terry’s eschewal of teaching through telling, her quiet but far-reaching imprint on my academic life went almost unnoticed. It wasn’t until I began reflecting on the connections between her work, her mentorship, and the development of my teacher education research that I connected new and significant dots. When I originally set out to write this paper, my goal was to focus on how Terry lived out constructivism; and the resulting joy and satisfaction her mentorship strategies brought to my learning about mathematics teaching and teacher inquiry in the past. Yet what I didn’t expect was that this process of writing would create new cognitive conflict and resolution, yielding a new understanding of how much the experience of working with Terry continued to impact my work still today. Even as I consider my current research projects, I am struck by the prominence of Terry’s approach for supporting teacher learning.

Terry flipped the standard norms for advisor/mentee and professor/graduate student. Rather, she adhered to the norms for mentorship that she espoused for the constructivist mathematics classroom, truly exemplifying what it means to put theory into practice. While she was arguably an expert on mathematics teacher education at that time, she continued to frame myself—a novice teacher—as expert of my own practice. She took the time to affirm and probe my naive reflections, never seeing my current understandings as inferior to her own.

Teachers should attempt to view children's solutions from the perspective of the students and recognize that what seem like errors and confusions from an adult point of view are merely children's expressions of their current understandings (Labinowicz, 1985, 1987). (Wood, Cobb, & Yackel, 1990, p. 498)

Terry saw the best in my efforts to learn, and seemed to view my current understandings as
sensible for my stage of learning. The resulting approach was a constructivist inquiry into putting theory into practice in my classroom.

Terry’s model of mentorship serves as an example of how our learning theories can and should play out in all contexts of teaching and learning: modeling our theories in practice. As a second layer, The constructivist approach to mentorship created a supportive environment for self-led exploration with appropriate scaffolding, nudging, and probing, allowing me to explore research and theories from the field in my teaching practice. Terry’s scaffolding also provided cultural capital around teacher research as I investigated students’ learnings, and my own, as a result of changes made. This context facilitated my assimilation from teacher to researcher, as I gradually became an “increasingly adept [member] of cultural communities,” (Wood, Cobb, Yackel, 1990, p. 496-498). This introduction to research transformed the experience into an accessible and adventurous climb, building the groundwork for my love of research, akin to learning through play. Now, more than ever, after having undergone this reflective writing journey, I am thankful for Terry’s willingness to support and nudge my learning at my own pace, and to share in the authority of knowledge creation and solution co-construction, as it resulted in learning autonomy that can be sustained far beyond the term (or life) of the teacher.
References


Vol 2.

Umbeck, L. (2011). Navigating classroom change. *Mathematics Teaching in the Middle School, 17*, 89-95. [https://doi.org/10.5951/mathteacmidscho.17.2.0088](https://doi.org/10.5951/mathteacmidscho.17.2.0088)


Additional Resources for Classroom Use


This book offers a handbook for guiding teachers through learning about and conducting teacher action research on their own classroom practice. Teacher action research positions teachers as autonomous professionals able to apply theory into practice and build new knowledge of practice into theory.


This chapter argues for the need for constructivist theories of learning proposed for students’ learning of mathematics - such as listening to students’ thinking and challenging it, rather than telling them what to think - to be applied to the learning of teachers as well, to position teachers as autonomous professionals.


[https://doi.org/10.1002/jcop.22567](https://doi.org/10.1002/jcop.22567)

This article offers another perspective on how healthy autonomous decision making can be developed through positive mentoring relationships.
### Excerpt of Course Schedule

#### COURSE SCHEDULE

<table>
<thead>
<tr>
<th>TEACHING AND MATHEMATICS TEACHING</th>
<th>Overview Questions</th>
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</thead>
<tbody>
<tr>
<td>August 20</td>
<td>What is a good teacher? What is good mathematics teaching? What should be the goals of our mathematics teaching?</td>
</tr>
<tr>
<td>Week 1</td>
<td>Introduction &amp; Overview of Course What is teaching? What is effective teaching?</td>
</tr>
<tr>
<td>Week 2</td>
<td>What are the essential aspects of effective teaching? What should we be able to do as a teacher of mathematics?</td>
</tr>
</tbody>
</table>

#### November 9-12

- December 8-12 (Final Exam & Presentations)

**Notes:**
- Overview