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Practicing and Researching Pedagogical Metacognition: Benefits for Graduate Instructors during the First Year of Instruction

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CHAPTER 13.

PRACTICING AND RESEARCHING PEDAGOGICAL METACOGNITION: BENEFITS FOR GRADUATE INSTRUCTORS DURING THE FIRST YEAR OF INSTRUCTION

AUDREY TOCCO

KEY TAKEAWAYS

While reading this chapter, graduate student instructors will be able to:

- Define, identify, and explain the benefits of pedagogical metacognition.
- Understand a graduate student instructor's experience with pedagogical metacognition in a learning community and how it enhanced her reflective and reflexive practices.
- Learn strategies to implement pedagogical metacognition in instruction.

First-year graduate student instructors juggle several responsibilities that require a great deal of thought. These responsibilities may include taking required classes, conducting well-designed research projects, presenting and writing findings, and teaching classes. Intuitively, these tasks could not be completed successfully without thinking. Thinking about one's thinking while engaging in these tasks is also crucial, but less commonly achieved. Metacognition – thinking about thinking – is critical to the learning tasks that graduate student instructors must tackle. When metacognition is practiced in teaching scenarios, it is referred to as pedagogical metacognition. Engaging in these reflective and reflexive practices – reflecting on and acting upon one's teaching – is vital for first-year graduate instructors because it provides an avenue for continuous monitoring and adjustment of instructional techniques and can help graduate student instructors identify areas for improvement.

Metacognition includes planning, monitoring, and adjusting one's cognitive processes (Flavell, 1979). Zimmerman (1990) uses his self-regulated learning model to explain that self-regulated learners

are aware when they know a fact or possess a skill and when they do not. Furthermore, self-regulated learners plan and set goals, organize, self-monitor, and self-evaluate their learning processes (Zimmerman, 1990). Metacognition is so important to learning that Ambrose and colleagues (2010) include it in their seven principles of learning and further define a cycle of self-directed learning that all learners should use: assess the task, evaluate strengths and weaknesses, plan, apply strategies and monitor performance, and reflect and adjust as needed (Ambrose et al., 2010). These cognitive processes comprise metacognition. Because metacognition is crucial to learning, it has been researched widely in educational settings.

Metacognition is a skill that can be taught, practiced, and improved. Students who have used metacognitive strategies while learning, such as metacognitive study guides that ask students to consider what they know and do not know, or metacognitive journals in which students write their reflections and reactions to course content and exams, exhibit increased academic achievement and report being able to plan, monitor, and adjust their learning more efficiently (Agarwal & Bain, 2019; Kuiper, 2004). In addition, coupling an experiential learning format with teaching metacognitive theory can help college students process information at deeper levels and can increase recall and recognition on assessments (Richmond et al., 2017). Furthermore, learners with more sophisticated metacognitive skills can more efficiently adjust their study strategies based on their expectations of task demands (Ross et al., 2006). Metacognitive skills are requisite for successful learning. These self-regulated learning techniques are also necessary for successful teaching.

Despite the abundance of research on metacognition in learning, metacognition in teaching has been relatively overlooked. Planning, monitoring, and adjusting teaching strategies is known as pedagogical metacognition, which closely parallels the idea of reflective and reflexive practice (Kohen & Kramarski, 2018). Reflectivity – looking back and considering what went well and what could have been executed better – combined with reflexivity – taking action based on reflection – are essential to the process of planning, monitoring, and adjusting teaching that comprises pedagogical metacognition (Ryan, 2015). Being reflective about one's teaching is important, as it allows instructors to consider lectures, activities, student questions, assessments, and student feedback. Adjusting one's teaching based on thoughts and ideas brought about during reflection is equally as fundamental to teaching, especially when just beginning the teaching journey. First-year instructors may benefit from practicing pedagogical metacognition by acknowledging areas for improvement and generating teaching adjustments to continuously refine their teaching. Beginning these reflective and reflexive practices early in one's teaching career will help to establish a path of ongoing professional development that first-year graduate instructors can build upon as they gain teaching experience.

First-year graduate student instructors can learn and practice pedagogical metacognition in learning community environments. Learning communities are groups of faculty or students brought together to achieve common goals of building university-wide community around teaching and learning, increasing interest in teaching and learning, increasing collaboration, and encouraging reflection (Cox, 2001). Brower and colleagues' (2007) learning community model of graduate student professional development intentionally brought together graduate students to accomplish shared learning objectives related to teaching and learning. The learning community program focused on four key elements: shared discovery and learning, functional and meaningful relationships among members, inclusive learning environments where diverse perspectives were welcomed, and

connections to other learning experiences outside the learning community (Brower et al., 2007). Metacognition has been implemented and researched in professional learning communities and results in faculty becoming more aware of their thinking and engaging in pedagogical metacognition before, during, and after participating (Prytula, 2012; Tocco, Jameson, McCartin, & Darling, 2021). However, including strategies for graduate students to practice pedagogical metacognition is a new idea. Tocco and colleagues' (2021) review of reflective and reflexive practices in education acknowledges that pedagogical metacognition is under-researched in the higher education literature. Their preliminary findings indicate the importance of planning, monitoring, and adjusting teaching methods for higher education instructors (Tocco et al., 2021). As such, first-year instructors can benefit from learning what pedagogical metacognition is and how to use it to improve their instruction.

A FIRST-YEAR INSTRUCTOR'S EXPERIENCE WITH PEDAGOGICAL METACOGNITION

As a first-year graduate instructor, I threw myself into teaching without much formal training. I was finishing up my master's program in educational psychology, about to transition to the PhD phase of my program. I had one year of training in how students learn under my belt. Still, I felt relatively confident that I would plan my course to the best of my ability, keep track of how well I was teaching and how well my students were learning (if at all), and make adjustments for the next class period, month, and semester. These reflective and reflexive practices that I used to help me think about pedagogy are my example of pedagogical metacognition.

My first year of teaching as a graduate instructor followed the steps of pedagogical metacognition at both the semester level and the individual class level. To plan the layout of my introductory psychology course, I decided which chapters I would be covering from the textbook that our group of graduate instructors chose together. Then, I read each chapter and created an outline of the key points that I thought would be important for students to know by the end of the semester. As I was creating these outlines, I would monitor my progress and ask myself if the content I had created was covering the most critical components of introductory psychology. Assessments and learning activities followed once the key takeaways and outlines were finished. I then evaluated my progress and adjusted many of the materials to make sure they were aligned with each other and with how students learn.

At the individual class level, I would also plan, monitor, and adjust my teaching. Lecture materials, plans for learning activities, and questions to ask my students would be planned ahead of time. The process of planning helped me feel more prepared to facilitate my students' learning. While I was teaching, I would monitor a few things. First, I monitored if I was on track to cover everything I had planned for that day. This aspect of monitoring involved tracking time during lecture and class activities. If students did not ask many questions and my lecture was moving more quickly than expected, I would work extra time into an activity. If an activity was taking longer than I had planned, I would curtail some of the time I had allotted for questions at the end of class. Second, I kept track of how engaged my students were. I achieved this by attending to their level of focus during activities or notetaking. Formative assessments such as "minute papers" (having students take a minute to write down a connection they could make between new material and old content) or online polling (multiple choice, word clouds, or free-response questions) also served as monitoring techniques. If students' responses were of adequate length and relevant to the content being discussed, they were

most always engaged. If I saw dazed looks and vague answers, I knew students were not as attentive. Third, I monitored how I felt the lesson was going. I would take stock of my own engagement with the content and how effectively I was conveying ideas by asking myself questions such as: *Are you excited about teaching this material? Do you need to demonstrate more enthusiasm? Do you need to pull back and let students share their ideas?*

These monitoring strategies allowed me to gauge the strengths and weaknesses of my instruction. After teaching, I would think about how I could adjust my pedagogy to help my students learn more effectively. This included taking quick notes about ideas I had during class or research-based teaching strategies I learned from one of my own courses and how I could implement them into the course. Reflecting on my teaching and making adjustments to my pedagogy helped me critically consider my teaching and contributed to instructional improvements during my first year as a graduate instructor.

Although these metacognitive practices took a considerable amount of time while I was planning my course, they were essential to my instruction. If I had not planned and evaluated my learning objectives, assessments, and learning activities before the semester began, I would not have been able to reflect on these plans and propose subsequent changes as effectively. While I was teaching, taking notes after class each day took approximately five minutes and was easily incorporated into my routine after a few weeks. Adopting reflective and reflexive practices may seem time consuming, but dedicating a few extra hours to pedagogical metacognition while planning your course and a few minutes following each class can make all the difference for your teaching.

A LEARNING COMMUNITY FOR GRADUATE STUDENT INSTRUCTORS

Pedagogical metacognition made such an impact on my teaching during my first year of instruction that I wanted to share the same experience with other graduate instructors. The Center for the Enhancement of Teaching and Learning (CETL) at my university had a robust learning community program for faculty, but did not have a learning community dedicated to graduate students. As part of an internship with CETL, I developed just that. The learning outcomes for graduate students participating in the learning community were as follows:

1. Identify foundational concepts related to pedagogical content knowledge.
2. Make decisions about best practices for teaching in their own classroom.
3. Identify the interaction between teaching and learning.
4. Feel confident in applying effective teaching and learning strategies in their classroom.
5. Evaluate best practices for teaching through reflection.

The first four goals aimed to provide graduate student instructors with a community environment in which to discuss teaching and learning with each other, which is something they might not have had access to in their academic departments. The fifth goal of the learning community specifically targeted the promotion and use of pedagogical metacognition.

The learning community met biweekly for 90 minutes over the course of one semester. Each meeting focused on a different topic related to teaching and learning. Some examples of meeting topics were current trends and issues in teaching and learning, backward design and alignment, educational

assessment, and creating an inclusive classroom climate. Meetings consisted of small and large group discussions and activities to help graduate students apply each topic to their own pedagogy. After each meeting, everyone reflected on their teaching according to metacognitive prompts (e.g., How do you think about your teaching plans before and after you teach? What teaching techniques have you used in the past that you might adapt based on what you learned this week and why?). These metacognitive prompts aimed to help graduate student instructors reflect on their teaching with each meeting's topic in mind, in addition to adjusting their pedagogy based on research-based teaching strategies and discussions brought up in the learning community.

IMPACT OF THE LEARNING COMMUNITY ON PEDAGOGICAL METACOGNITION

After facilitating the learning community for one semester, I discerned that graduate student instructors benefitted from the program. I was interested in digging deeper into graduate students' reflections and asking them about their perceptions of their pedagogical metacognition and their teaching. I worked with CETL to obtain approval from our university's institutional review board (IRB) so that I could collect, analyze, and report thoughts and ideas of graduate students' experiences with pedagogical metacognition.

My discussions with these graduate students took the form of individual semi-structured interviews in which I asked questions such as: *Why did you decide to participate in the graduate student learning community? How has participation in the graduate student learning community influenced your perceptions of your teaching and career preparation? Are there any specific topics we discussed that had a particularly strong influence?* Using Creswell and Poth's (2018) framework for conducting a thematic analysis, significant statements and clusters of meaning within interviews and metacognitive reflection responses were formed. This analysis revealed benefits of promoting reflective and reflexive practices, which included helping graduate instructors engage with new research on teaching and learning, adjusting their teaching to implement backward design in future classes, fostering reflection on why assessment is important for student learning, and promoting the exchange of ideas around pedagogy. Table 1 provides examples of each of these benefits and includes quotes to demonstrate graduate students' perspectives on these aspects of teaching along with their pedagogical metacognition.

Table 1. *Examples of Graduate Students' Experiences with Pedagogical Metacognition.*

Example of Pedagogical
Metacognition or Teaching
Strategy Related to Pedagogical
Metacognition

Quote from Graduate Student

Engaging with and reflecting on
research-based practices in
teaching and learning

"All of the resources that we talk about each week, there's always something that I'm like, "Oh that's really interesting. Oh, I might try that!" Or even in our discussion, maybe it didn't come from the resources, maybe it just came from somebody saying, "Oh I tried this [strategy] in my class." And so that's been really helpful and really great about...sparking some ideas about what I'm going to do next semester in my teaching practicum."

Implementing backward design
in future assignments

"It's been really useful especially the section on backward design. Just because I never thought about that, and you know I've done a few presentations and I've done what we're not supposed to do. So I've thought about the content. And then, *after* what I wanted people to learn, but that didn't work...But now that...I'm finding that out. I actually designed my class discussion...based on the backwards design. So I'm already using it."

Reflecting on the importance of
assessment to student learning

"I know that when we were doing the assessment module that folks were talking about how they have multiple options for their students for assessment. And I thought that was really a great idea because I think that students should have multiple different opportunities to show their learning...A standardized test absolutely doesn't work for every student. Like we know. So I thought there are a lot of great ideas about varied assessment."

Interacting with other graduate
students and exchanging ideas

"...being with the group of people who've taught in some capacity at...different levels. Like, I've learned a lot from them too, stuff I wouldn't have thought of. I've been taking notes like "Oh that's a good idea, yeah I'm going to do that, or I'm going to go to that website or look into this."

STRATEGIES FOR IMPLEMENTING PEDAGOGICAL METACOGNITION INTO INSTRUCTION

Make Reflection a Habit

While you are planning your lessons, ask yourself questions such as, *Why am I presenting the content in this way? or How could I drive this idea home in a meaningful way? or How will students perceive this information?* While you are teaching, reflect by monitoring how your lesson is going. Evaluate things like student engagement, participation in activities, student questions, and your perceptions of your own teaching. After teaching, keep a journal to record what went well during each class and what could be improved. Figure 1 is an example of a teaching journal from my first semester of teaching Principles of Psychology. Write down key pieces of information students enjoyed, concepts students did not seem to understand, ideas students asked questions about, or activities that either kept students engaged or did not hold students' attention. Ask yourself questions such as, *What went well today?, What could I have done differently?, or How will I modify my instruction in the future?* (University of Northern Colorado CETL, 2021). These notes will help you improve your next class period and will help you plan for your next semester of teaching. Reflecting before, during, and after teaching can help you incorporate metacognition into your pedagogy and takes only a few minutes after each class.

Figure 1. *Teaching Journal Example.*

Module 3 - Neural and Hormonal Systems

- Started class with an interactive web poll
 - Type one part of the nervous system from last class
 - Answers were all on target. Students remembered or used notes. May need to connect opening activity with today's content more explicitly next time.
- Lecture on parts of a neuron, nervous system organization, nervous system components
 - students were attentive for about 10 min.
 - May need to break up lecture w/ more interactive questions or an activity in the future.
- Video - 2 min Neuroscience - Action potential
 - very quick \Rightarrow probably too fast
 - not enough to solidify concepts
 - next time walk through phases

of action potential after video

- Maybe have students draw graph together in groups.
- Did not get to final word association activity. Will need to add to next class.

What went well?

- interactive polls
- focus and engagement during 1st part of class

Next steps

- modify Module 4 powerpoint to include word association activity
- adjust this lecture to include an activity w/ action potential
 - will help boost understanding and engagement w/ challenging concept.

Image of hand written journal with reflections about teaching.

Make Changes in your Teaching Based on Your Reflection

If the adjustment (or reflexive) part of metacognition isn't happening, there will be little improvement in your teaching. Once you have reflected on your teaching, set goals for your future pedagogy that include specific adjustments you would like to make. For example, if you make a note after class that your small group activity did not engage students as much as you had hoped, revise the activity for next time by adding more information students can relate to or providing an example for students to view as they work through the activity. If you realize that more than half of your class missed a question on an exam, remove or revise that question to reduce the likelihood of that happening again. The actions that come after reflection are critical to becoming a more effective instructor, especially

in the first year. Going further than simply reflecting on your teaching by making changes to your instruction will establish a pattern of iterative planning, monitoring, and adjustment of your teaching. These strategies will help you identify aspects of your teaching that are effective in promoting student learning and which you may want to change. If you adopt these reflective and reflexive practices early in your teaching career, imagine how effective your instruction will be after teaching for a decade or two.

Survey your Students

Another strategy you can use to plan, monitor, and adjust your pedagogy is surveying your students. Do this after every unit, mid-semester, or at the end of the semester to have students tell you what they liked about the course and what they thought could be improved. Ask your students questions like, *What has been the most helpful for your learning so far?*, *What has caused you the most difficulty in this class so far?*, or *What suggestions can you make to enhance your learning in this class?* (University of Northern Colorado CETL, 2021). Reviewing the feedback from your students will allow you to monitor and modify your teaching strategies, along with planning ahead for your next class period or next semester. Drafting questions to collect feedback from students and reviewing their responses will be an hour well-spent and will provide you with valuable information to improve your instruction.

Build Relationships with other Graduate Student Instructors

Talk to other graduate student instructors in your program or across campus. Other graduate instructors are experiencing the same joys and challenges of teaching that you are. It is important for first-year graduate instructors to share how they are teaching and what strategies they are using. It might be intimidating to talk to advisors or other professors in your academic departments. However, graduate student instructors are in a similar position that you are, whether that entails learning the nuances of teaching a large class, facilitating a small seminar for upperclassmen, designing and grading assignments, or learning how to navigate keeping students engaged for the entire semester. Graduate students should be a support system for each other. Sharing teaching ideas with others creates professional and personal bonds and can stimulate your reflective and reflexive practice as a developing educator.

Join or Create a Learning Community

If your university has a learning community program, consider participating. If you think your program or university would benefit from a learning community dedicated to helping graduate students share their teaching experiences with each other, consider developing and implementing one by partnering with your center for teaching and learning. The learning community described in this chapter was focused on promoting discussion about research-based teaching and learning topics critical to promoting high quality student learning, while increasing community among graduate students and providing a space for the exchange of teaching ideas and improving pedagogical metacognition. Participating in a learning community is a greater time commitment than reflecting on your own, but exchanging ideas with colleagues and formalizing your pedagogical metacognition is worth the time and can help you establish habits that can be carried forward into your future instruction.

CONCLUSION

Using pedagogical metacognition to plan, monitor, and adjust one's teaching has many benefits, especially for first-year graduate instructors. Planning encompasses designing a course, assignments, and learning activities. Monitoring involves asking questions about the teaching process, student engagement, and student learning during and after teaching. Adjusting requires reflecting on one's pedagogy and making changes to better support student learning. Actively reflecting on one's teaching and making targeted changes based on reflection comprises reflective and reflexive practice and parallels pedagogical metacognition. Graduate student learning communities are spaces that have promoted pedagogical metacognition. Other ways to incorporate pedagogical metacognition into one's instruction are building relationships with other graduate student instructors, surveying students about benefits and drawbacks of a course, reflecting on teaching regularly, and making an effort to create change in teaching based on reflection. Starting this iterative process of planning, monitoring, and adjusting one's teaching while learning effective teaching strategies during the first year of graduate instruction is critical to establishing a foundation for continual pedagogical development.

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