



REFLECTIVE WRITING IN A GRADUATE COURSE ON MATHEMATICS TEACHING

Matthew Coles

University of British Columbia

Costanza Piccolo

University of British Columbia

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A GRADUATE COURSE ON MATHEMATICS TEACHING

MATH 599 Mathematics Teaching Techniques

- One term
- 1 credit
- Pass/Fail
- Mandatory only for those who want to teach in our department
- Enrolment capped at 20 students
- Focused on the teaching of Mathematics at the university level

COURSE OUTCOMES

At the end of this course, students should be able to

- articulate their own **teaching philosophy**
- choose and explain mathematical examples and concepts that are appropriate for first-year students
- demonstrate competence in **designing and delivering a standard lecture** in a “live” first-year Math course.

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**start to develop their
identity as instructor**

COURSE ELEMENTS

- Weekly readings
- In-class discussions
- weekly reflection assignments
- micro-teaching (*mini presentations in front of peers and instructor*)
- Classroom observations
- Guest speakers
- Teaching statement (*due at the end of exam period*)
- Guest lecture ("*practicum*")

Evaluation: based on

- attendance and participation in in-class activities
- completion of weekly reflections and teaching statement
- quality of guest lecture

Course was offered
online with synchronous
classes

Enrollment = 13 students

“WRITING” ELEMENTS

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- In-class discussions
- **weekly reflection assignments**
- micro-teaching (*mini presentations in front of peers and instructor*)
- Classroom observations
- Guest speakers
- **Teaching statement** (*due at the end of exam period*)
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WEEKLY REFLECTION ASSIGNMENT

Prompt:

- Reflect on the week's classes.
- Write a few sentences answering the question: What stood out to you this past week about the practice of teaching and what makes it effective?
- [Matt and Costanza will look at your responses, but there's no write or wrong answer. Think of these writings as a way to collect your thoughts as we go through the course. This way, you'll have lots of ideas recorded when it comes time to write your teaching philosophy.]

POST LECTURE REFLECTION

After delivering their guest lecture, students were asked to submit written reflections about their lecture.

Prompt:

- What went well?
- What would you do differently if you were to give the same class again?
- In terms of your teaching practice, what do you want to work on in the future?

END OF TERM COURSE REFLECTION

Prompt:

Think about your teaching journey in MATH 599.

- Reflect on the question: How have you changed since the start of MATH 599?
- Reflect on this in the context of your beliefs about teaching and your teaching practice when working with students.
- If you were to describe your experience in MATH 599 to a friend who was thinking about taking the course, what would you tell them?

STUDENT RESPONSE

Very high level of participation:

90-100% submission rate each week (except prior to guest lecture)

High Level of engagement with the writing tasks:

- reflections ranged from a few lines to several paragraphs
- thoughtful and personal comments related to their experience around teaching

REFLECTION TASKS: A TOOL FOR ASSESSING STUDENT LEARNING?

- most common themes addressed in the weekly reflection statements tend to match the topic of in-class discussion that week, showing engagement with the content
 - how learning works
- some themes persisted throughout the term
 - technical aspects and choreography of teaching
- other themes emerged early in the term and only reappeared in the end-of-term reflection
 - importance of human interactions while teaching

THEMATIC ANALYSIS OF END-OF-TERM REFLECTIONS

Five main themes emerged:

1. The course gave students an **increased exposure** to the technical aspects, and associated challenges, of teaching.

“The mechanics of a lecture, pausing after questions, how to structure the board/page, the art of asking questions and handling responses, emphasis and tone, effectively getting students learning actively in class, were all things that I had at least unconsciously been working on, but this course brought them to the forefront and educated me on the different strategies out there and their pros and cons.”

“I got a sharp reality check in terms of how hard it is to prepare lectures, how many practical concerns there are to teaching”

THEMATIC ANALYSIS OF END-OF-TERM REFLECTIONS

Five main themes emerged in the end-of-term course reflections:

2. Students commented on how the course made their **pre-existing beliefs about teaching more explicit** and intentional and **promoted reflective habits** about their own teaching practices and philosophies.

“This course has made myself as an instructor, and my ideas of my practice, much more intentional...”

“probably the biggest thing I got out of the course was an opportunity to reflect on my personal ideology. I have long had strong beliefs about pedagogy and the positive impact it can have on peoples' lives. But I never really solidified any of it until this course, and particularly in writing the teaching philosophy.”

THEMATIC ANALYSIS OF END-OF-TERM REFLECTIONS

Five main themes emerged:

3. The course generated awareness of the “**human aspect**” of teaching. That is, the importance of establishing a rapport with students by treating them with empathy and respect, and how particular choices of teaching practices can foster or under student-teacher relations.

“learning about different ways of teaching, their effect, and the impact of even our smallest pedagogical choices has left me ...more certain that my main goal as an instructor is to respect students' humanity, to treat them as humans with their own important narrative and mathematical ideas.”

“something that I never really considered when I thought about teaching before this course, was how important the sense of community and trust is in the classroom....”

THEMATIC ANALYSIS OF END-OF-TERM REFLECTIONS

Five main themes emerged:

4. The course fostered the idea that teaching is a **skill that can be learned**.

“I had an implicit assumption in my mind that teaching is a skill that is innate to some significant degree, or at least a skill that can only naturally develop by practice. This course has eliminated this implicit misconception of mine. Much like all other skills, significant improvement is always within reach and intentional study of the field of mathematics pedagogy, as well as practice, and taking the time to be aware of the state of our own practice and teaching philosophy, is the best way to improve and develop new skills as an instructor.”

THEMATIC ANALYSIS OF END-OF-TERM REFLECTIONS

Five main themes emerged:

5. Students expressed an **increase in confidence** surrounding their own teaching skills.

“The course provided us with numerous resources and opportunities to discuss, which made me more confident about teaching and hence, less nervous.”

“I'm feeling fully prepared to teach a course now”

IS THE COURSE MEETING ITS LEARNING GOALS?

1. increased **exposure to the technical aspects**, and associated challenges, of teaching.
2. made students' **pre-existing beliefs about teaching more explicit** and intentional and **promoted reflective habits** about their own teaching practices and philosophies.

➡ Goal #1: articulate own teaching philosophy

3. increase in **confidence** surrounding their own teaching skills.

➡ supports the goal #3 around developing competence in the classroom

IS THE COURSE MEETING ITS LEARNING GOALS?

4. awareness of the “human aspect” of teaching.
5. fostering the idea that teaching is a skill that can be learned.

➔ the course fostered **additional learning goals** that are not explicitly built in any specific course activities, they emerge naturally from in-class discussions

REFLECTION TASKS: A TOOL FOR COURSE EVALUATION

The end-of-term course reflection provided a rich picture of the students' perceptions of the effectiveness of the course.

- 11 (/13) students reported to **have enjoyed the course** or described the course positively or would recommend the course to a peer.
- 13 (/13) students reported to have learned something in the course or to have **experienced a change** in their approach to teaching after taking the course
- 7 (/13) students mentioned change not as a foundational transformation of beliefs or practice, rather an **increased awareness** of the many practical aspects involved in teaching
“My core beliefs about teaching and my own teaching practice remain the same, but I understand them much better and have a clearer picture of the ideal instructor after which I seek to model myself.”

WHAT DID WE LEARN FROM THIS?

- students do engage in regular reflective writing tasks when they are part of the course activities they are expected to complete, even without any grade incentive
- reflections can provide an effective tool for assessing that part of student learning that is not measurable from standard summative assessment
- reflections can bring to surface additional learning outcomes that emerge naturally from in-class discussions

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- reflections can bring to surface additional learning outcomes that emerge naturally from in-class discussions

“What truly made me less nervous about teaching was the realization that teaching isn't about me, it's about them.”



Thank you!

Matthew Coles: colesmp@math.ubc.ca

Costanza Piccolo: costanza@math.ubc.ca