

Mathematics Methods for Elementary Teachers
MSEd 426
Northwestern University
Fall 2021
Fridays, 9:00am-12:00pm
Annenberg Hall, Room 303

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Office hours on zoom by appointment

*This syllabus is modeled on the syllabus of Dr. Jen Munson for this same course in 2019.

Dear students: I recognize that we are learning together at a time when the world around us is dizzying. We all feel and experience this pandemic and other distressing realities differently, and our experiences differently impact our participation in this course. Please know that I prioritize your health and well-being, and I encourage you to do the same. We will work together to make this course both feasible and worthwhile for your development as teachers. I am so excited to learn with you this quarter. I expect us all to have a lot of mathematical fun! --Mari

Course Description

MSEd 426 is designed to support future teachers of elementary mathematics develop a vision of mathematics teaching and learning, center student thinking in the mathematics classroom, and develop pedagogical tools for facilitating sensemaking. In each session of this course, we will experience, analyze, and reflect on mathematics teaching and learning, and then use these experiences to develop student-centered pedagogies.

Course Objectives

In this course, future teachers will:

- Develop a vision of mathematics teaching and learning that is consistent with research in mathematics education.
- Position student thinking at the heart of teaching by learning how to attend to, interpret, and respond to student sensemaking.
- Identify and develop rich mathematical tasks which elicit and provoke student thinking.
- Plan for and facilitate mathematical discussions which center, elicit, and build on student thinking.

Course Texts

You will need five texts and one free downloadable pdf. Any additional readings will be posted on Canvas. There is also one recommended, optional reference text for future use in your classroom.

Required texts:

1. Carpenter, T. P., Franke, M. L., Johnson, N. C., Turrou, A. C., & Wager, A. A. (2017). *Young Children's Mathematics: Cognitively Guided Instruction in Early Childhood Education*.
2. Carpenter, T.P., Fennema, E., Franke, M.L., Levi, L., & Empson, S.B. (2015). *Children's Mathematics: Cognitively Guided Instruction*. 2nd edition.
3. Kazemi, E., & Hintz, A. (2014). *Intentional Talk*.
4. *Choose one (or both) of the following texts on number talks. Note that they cater to different grade levels.*
 - a. Humphreys, C & Parker, R. (2015). *Making Number Talks Matter, Developing Mathematical Practices and Deepening Understanding, Grades 3-10*.
 - b. Parrish, S. (2014). *Number Talks: Whole Number Computation, Grades K-5*.
5. *Choose one (or both) of the following texts for rich, mathematical tasks.*
 - a. Lilburn, P., & Ciurak, A. (2010). *Investigations, Tasks, and Rubrics to Teach and Assess Math, Grades 1 – 6*.
 - b. Sullivan, P., & Lilburn, P. (2020). *Good Questions for Math Teaching, K –5*.
6. *Download the following:* Common Core State Standards for Mathematics (<http://www.corestandards.org/Math/>)

Optional text:

1. Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (6th or later edition). *Elementary and Middle School Mathematics: A Developmental Approach*. (Used or new, electronic or print are all fine.)

Course Assignments

All assignments are due at the beginning of class, except for the final lesson planning assignment, which is due on the Wednesday following the last class session. Submit the Math Story, Student Interview and Analysis, and Lesson Plan assignments via Canvas.

Assignment	Due Date
<p><i>Math Story</i> Reflect on your past and present experiences as a math learner and how these experiences impact your identity and beliefs as a teacher. Details provided Week 1.</p>	<p>Week 2 10/1/21</p>
<p><i>Fascinating Student Thinking</i> In your practicum, pay attention to students' mathematical thinking and bring to class one (or more) examples of student thinking that fascinates you. Bring artifacts (such as photos, student work, or dialogue of a conversation) to make this case come to life. Examples may include thinking that confuses you, novel ideas or strategies, intriguing errors, interesting ways of communicating or connecting ideas, or any mathematical thinking that sparks your curiosity. We will reserve time at the start of each week for sharing fascinating student thinking.</p>	<p>Weeks 3-10 (Bring to any class session)</p>
<p><i>Number Talk Rehearsal</i> In class, you and a partner will rehearse, or practice facilitating, a number talk where the rest of us will act as students. You and your partner will (1) choose a number talk, (2) plan a learning goal, (3) consider what thinking or strategies your students might share, and (4) be ready together to facilitate a 10 minute number talk. You and your partner will co-facilitate, meaning that each person must play a meaningful role. We will schedule who is leading Number Talks on a week-by-week basis.</p>	<p>Weeks 4-10 (Bring to class based on schedule)</p>
<p><i>Student Interview and Analysis</i> Interview two students about their attitudes toward mathematics and their mathematical thinking about a given concept. Write up an analysis of student thinking which interprets how these students are currently making sense of and experiencing mathematics. Details will be provided Week 2.</p>	<p>Week 5 10/22/21</p>
<p><i>Designing a Lesson Plan</i> Design a full lesson plan, using the structure provided, around a learning goal of your choice. Your lesson plan should include a high-quality task, a clearly matched learning goal, an intentional launch, anticipated student struggles and responses, and planned discussion questions. Provide a brief reflection on the challenges you faced in planning, what you learned, and questions you are now asking about planning. We will begin to discuss this assignment during Weeks 5 and 6.</p>	<p>Draft Week 8 11/12/21 Final Plan 12/8/21</p>

<p><i>Participation</i></p> <p>Our whole class learning is enhanced when everyone reads carefully and fully participates in class activities and discussions.</p>	<p>Every week</p>
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Grades

Class participation and completion of all assignments are critical to your preparation to teach. This includes coming to class having read and/or completed tasks on time. Your course grade will be based on the quality of the following:

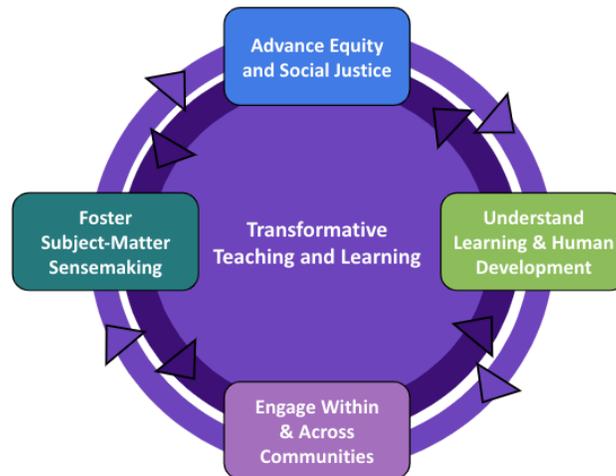
Participation in and preparation for class	20%
Math Story	15%
Fascinating Student Thinking Assignment	15%
Number Talk Rehearsal	10%
Student Interview and Analysis	15%
Designing a Lesson Plan	25%

Course at a glance: Week-by-Week

Date	Focus	Readings and Assignments (Due)
Week 1 9/24/21	Building a vision of learning and teaching mathematics: How much is a billion?	----
Week 2 10/1/21	<p>What are the implications of your Math Stories?</p> <p>What is the structure of a math lesson?</p> <p>How do students learn to count and work with number?</p> <p>What is a Number Talk?</p>	<p>Reflect and write:</p> <ul style="list-style-type: none"> ● Math Story Assignment <p>Read:</p> <ul style="list-style-type: none"> ● Excerpt from Boaler (2008). What's Math Got To Do With It? (<i>on Canvas</i>) ● Young Children's Mathematics: CGI (Chapters 1-3)
Week 3 10/8/21	<p>How do students develop understanding of addition and subtraction?</p> <p>How do you elicit and make sense of student thinking?</p> <p>What is a Number Talk and how are they structured?</p>	<p>Read:</p> <ul style="list-style-type: none"> ● Children's Mathematics: CGI (Chapters 1-3 and Chapter 9: Eliciting Student Thinking, pg 140-151)
Week 4 10/15/21	<p>How do students develop understanding of multiplication and division?</p> <p>What questions can you ask after observing teaching to support your learning?</p>	<p>Read:</p> <ul style="list-style-type: none"> ● Children's Mathematics: CGI (Chapters 4, 6-7)
Week 5 10/22/21	<p>What makes a rich task?</p> <p>What are Mathematical Practices and how are they connected to our vision of math teaching?</p>	<p>Reflect and Write:</p> <ul style="list-style-type: none"> ● Student Interview and Analysis <p>Read:</p> <ul style="list-style-type: none"> ● Chapter 5 from Andrews & Trafton (2002). Little Kids–Powerful Problem Solvers (<i>On Canvas</i>) ● Boaler (2015). Fluency Without Fear (<i>On Canvas</i>) ● CCSS for Mathematics: Standards for Mathematical Practice, pg 6-8 (<i>downloadable pdf</i>)
Week 6 10/29/21	How are the Mathematics Content Standards structured and how do we make sense of them?	<p>Read:</p> <ul style="list-style-type: none"> ● CCSS for Mathematics <ul style="list-style-type: none"> ○ Introduction, pg 3-5

	How do we plan with Big Ideas and Guiding Questions?	<ul style="list-style-type: none"> ○ Choose one grade level (1st- 5th) and read the standards <p>Bring to class:</p> <ul style="list-style-type: none"> ● When reading the grade level standards, what do you notice? Annotate the standards with your observations.
Week 7 11/5/21	How do we identify, adapt, and write Rich Tasks?	<p>Bring to class:</p> <ul style="list-style-type: none"> ● 2-3 examples of tasks from your practicum classroom's mathematics materials that you think have the potential to be Rich Tasks ● Your task book (Sullivan & Lilburn or Lilburn & Cieurak)
Week 8 11/12/21	<p>How could you revise your task to make it richer or clearer?</p> <p>How do you launch a task without reducing the cognitive demand?</p> <p>What are the goals and structure of a Productive Mathematical Discussion?</p>	<p>Write:</p> <ul style="list-style-type: none"> ● Lesson Plan Draft (<i>Bring to class, and if you want feedback, submit on Canvas in addition.</i>) <p>Read:</p> <ul style="list-style-type: none"> ● Smith, Bill, & Hughes (2008) (<i>On Canvas</i>) ● Intentional Talk, Chapter 1
Week 9 11/19/21	<p>How do you facilitate discussion?</p> <p>What kinds of discussions are there?</p>	<p>Read:</p> <ul style="list-style-type: none"> ● Intentional Talk, Chapter 2, 8, plus one other chapter between chapters 3-7 (<i>We'll decide who will read what in class during week 8</i>)
<i>No Class on 11/26/21 (Thanksgiving)</i>		
Week 10 12/3/21	<p>What student thinking could you anticipate in your lesson?</p> <p>How could you respond?</p> <p>Reflection and Goal Setting</p>	<p>Read:</p> <ul style="list-style-type: none"> ● Samples from Fosnot (2007, 2008). Organizing and Collecting; The T-Shirt Factory; The Teachers' Lounge. (<i>On Canvas</i>) <p>Due Wednesday, December 8:</p> <ul style="list-style-type: none"> ● Designing a Lesson Plan Assignment

NU Teacher Education Guiding Commitments



The Northwestern Teacher Education Program's Guiding Commitments are:

- A statement of values about education for dignity, theories of learning as a social, cognitive, ethical and cultural process, and belief in the power of practices that create culturally sustaining & anti-racist learning environments
- Tools for strengthening our cultural life living through Course, "Discipline", Program, and Community
- Opportunities to build knowledge, enact practices/ performances, cultivate dispositions

NU Teacher Education Professional Dispositions

At Northwestern University, we affirm that teaching is a scholarly, complex endeavor that requires an understanding of the intertwined nature of theory and practice. Teachers need to develop knowledge, skills, practices, and critical reflection, while they also actively and consistently demonstrate professional dispositions. We define dispositions as professional attitudes, stances, values and beliefs; we have collaboratively developed our program dispositions for transformative teaching and learning. Through integrated coursework, developmental advising, and field experiences, we commit to supporting educators as they develop both their pedagogy and professional dispositions.

Commitment to Advancing Equity and Justice

- Engage in self-reflection to understand your own identity, internalized biases, positional privileges, and your impact in any space.
- Demonstrate a recognition that teaching grounded in equity and social justice is essential in any setting and in the teaching of all subject matter.
- Work to understand how inequity shows up in different settings and take steps to disrupt those patterns.
- Identify and strive to address inequities and power relations of systemic racism, sexism, socioeconomic classism, heteronormativity, ableism, and other forms of human oppression.
- Cultivate interactions that demonstrably value all students and stakeholders and their ideas.

Sense of Professional Responsibility and Commitment to Ongoing Growth

- Demonstrate self-awareness and self-management.
- Engage in self-reflection to understand your own identity, internalized biases, positional privileges, and your impact in any space.
- Demonstrate an openness to feedback and integrate feedback into action.
- Seek out resources, feedback, and support based on interests and/or needs.
- Engage in critical self-reflection and reflection on practice; explain rationale for decisions grounded in research, theory, and lived experience.
- Apply feedback and demonstrate a willingness to make changes.
- Take action to learn and meet the professional expectations for each context (this includes everything from professional records to attendance to attire).
- Meet all legal and ethical requirements (including related to how to appropriately engage with students, colleagues, and stakeholders).
- Engage in a way that is reliable and trustworthy (this includes being punctual, prepared, present, etc.).

Reverence for Learners and Learning

- Demonstrate a commitment to all students as individuals with unique strengths and experiences; seek to understand and build relationships with all students.
- Maintain high expectations for all students; value and prioritize opportunities to advance learning.
- Recognize the complexity of teaching and learning.
- Demonstrate a strengths-based perspective and actively question and push back on deficit thinking.
- Value students' contributions and their diverse ways of knowing and being; commit to understanding students' thinking.

Focus on Collaboration

- Seek to build meaningful relationships by understanding, working with, and learning from others.
- Value the contributions of families and community members and actively work to meaningfully connect with them.
- Seek to understand and build relationships with schools, families, and communities as particular types of intersecting systems within a larger ecosystem that shape our students' lives.
- Maintain a focus on recognizing students' strengths, advancing learning (own and others), and finding positive solutions during all interactions.

MSEd Student Attendance Policy and Exceptions to Class Modality

Class sessions for this course will occur in person. Individual students will not be granted permission to attend remotely except as the result of an Americans with Disabilities Act (ADA) accommodation as determined by AccessibleNU. Student attendance at every class meeting is expected. Your presence as part of a collaborative learning community is key to your development and the development of your colleagues. If for some reason you must be absent from a class session, you must inform the instructor before your absence. Because of the short number of overall class sessions in the quarter system, missing two class sessions puts your ability to pass the class in jeopardy. Missing three class sessions will result in an automatic grade of "Incomplete" and you will have to retake the class at another time.

Maintaining the health of the community remains our priority. If you are experiencing any symptoms of COVID do not attend class and update your Symptom Tracker application right away to connect with Northwestern's Case Management Team for guidance on next steps. Also contact the instructor as soon as possible to arrange to complete coursework. Students who experience a personal emergency should contact the instructor as soon as possible to arrange to complete coursework.

Should public health recommendations prevent in person class from being held on a given day, the instructor or the university will notify students.

COVID-19 Testing Compliance

To protect the health of our community, Northwestern University requires unvaccinated students who are in on-campus programs to be tested for COVID-19 twice per week. Students who fail to comply with current or future COVID-19 testing protocols will be referred to the Office of Community standards to face disciplinary action, including escalation up to restriction from campus and suspension.

COVID-19 Classroom Expectations

Students, faculty, and staff must comply with University expectations regarding appropriate classroom behavior, including those outlined below and in the COVID-19 Code of Conduct. With respect to classroom procedures, this includes:

- Policies regarding masking and social distancing evolve as the public health situation changes. Students are responsible for understanding and complying with current masking, testing, Symptom Tracking, and social distancing requirements.
- In some classes, masking and/or social distancing may be required as a result of an Americans with Disabilities Act (ADAaccommodation) for the instructor or a student in the class even when not generally required on campus. In such cases, the instructor will notify the class.
- No food is allowed inside classrooms. Drinks are permitted, but please keep your face covering on and use a straw.
- Faculty may assign seats in some classes to help facilitate contact tracing in the event that a student tests positive for COVID-19. Students must sit in their assigned seats.

If a student fails to comply with the COVID-19 Code of Conduct or other University expectations related to COVID-19, the instructor may ask the student to leave the class. The instructor is asked to report the incident to the Office of Community Standards for additional follow-up

Class Recordings

This class or portions of this class may be recorded by the instructor for educational purposes and available to the class during the quarter. Should recording take place, your instructor will communicate how you can access the recordings. Portions of the course that contain images, questions or commentary/discussion by students will be edited out of any recordings that are saved beyond the current term.

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's Copyright Policy, faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

MSEd Accommodations for Students with Disabilities

In compliance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act, Northwestern University is committed to providing equal access to all programming. Any student requesting accommodations related to a disability or other condition is encouraged to register with AccessibleNU (accessiblenu@northwestern.edu; 847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. All information will remain confidential.

MSEd Academic Integrity Policy

MSEd students are expected to comply with the policies found in the booklet, "[Academic Integrity at Northwestern University: A Basic Guide](#)" For details regarding academic integrity at Northwestern, visit: www.northwestern.edu/provost/students/integrity/. Students' written work may be electronically tested for plagiarized content using TurnItIn via Canvas.

Support for Wellness and Mental Health

Northwestern University is committed to supporting the wellness of our students. Student Affairs has multiple resources to support student wellness and mental health. If you are feeling distressed or overwhelmed, please reach out for help. Students can access confidential resources through the Counseling and Psychological Services (CAPS), Religious and Spiritual Life (RSL) and the Center for Awareness, Response and Education (CARE). Additional information on all of the resources mentioned above can be found here:

<https://www.northwestern.edu/counseling/>

<https://www.northwestern.edu/religious-life/>

<https://www.northwestern.edu/care/>