

George Mason University
College of Education and Human Development
School of Education
Mathematics Education Leadership

EDCI 857 001 Preparation and Professional Development of Mathematics Teachers
3 Credit, Fall 2022
Mondays at 7:20 - 10:00pm
Hybrid: Horizon 4001 and Synchronous Online

Faculty

Name: Dr. Theresa Wills
Office Hours: By appointment
Office Location: Thompson Bldg Suite 2400A
Office Phone: 703-993-6215 Cell: (703) 740-7691
Email Address: twills@gmu.edu

Prerequisites/Corequisites

This seminar is for students in the Mathematics Education Leadership Ph.D. program. Students study attributes of effective professional development in mathematics education, develop expertise in designing and teaching mathematics methods courses, and learn to create and teach professional development experiences for practicing teachers. Prerequisite: Admission to the Mathematics Education Leadership Ph.D. program.

University Catalog Course Description

Students study attributes of effective professional development in mathematics education, develop expertise in designing and teaching mathematics methods courses, and learn to create and teach professional development experiences for practicing teachers.

Course Overview

This course enables mathematics education leaders to identify, develop and use instructional strategies consistent with the key attributes of effective professional development experiences for mathematics pre-service and inservice teachers.

Course Delivery Method

This course will be delivered using a lecture format.

Learner Outcomes or Objectives

At the conclusion of this course, students should be able to:

1. Research and study design models for the delivery of mathematics professional development activities and research about mathematics teacher knowledge,
2. Test theories and techniques of mathematics professional development in field experiences with adult learners,
3. Develop expertise in designing and teaching mathematics methods courses and in organizing and teaching professional development experiences for practicing teachers,
4. Select and use technology to facilitate and support learning goals, and
5. Summarize and present the results of a pilot professional development activity in mathematics following its implementation.

Professional Standards

EDCI 857 is designed to enable mathematics education leaders to identify, develop and use instructional strategies consistent with the key attributes of effective professional development experiences for mathematics teachers. The course was developed according to the joint position statement of the Association of Mathematics Teacher Educators and the National Council of Teachers of Mathematics, *Principles to Guide the Design and Implementation of Doctoral Programs in Mathematics Education*. This position statement indicates that the core knowledge expectations for doctoral study in mathematics education include:

- Participate in mentored clinical experiences that develop expertise in designing and teaching mathematics content and methods courses for teachers,
- Organize and teach professional development experiences for practicing teachers,
- Demonstrate knowledge about research on teaching and teacher education,
- Articulate knowledge of historical, social, political and economic factors impacting mathematics education
- Become familiar with reports from major commissions, committees, and professional organizations,
- Help practicing teachers acquire knowledge of research on teaching and translate it to their own practice,
- Demonstrate confidence and competence in choosing and using effective instructional strategies consistent with mathematics learning goals, and
- Critically reflect about one's own teaching

Texts

This course will use articles available through the George Mason University Library Catalog.

Course Performance Evaluation

Students are expected to submit all assignments on time on Blackboard.

Course Assignments

1. Position Statement Paper (5%)

In your position statement, briefly discuss your own professional preparation and professional development. How can we best prepare teachers and continue to develop them in the field? What role do you see yourself serving in preparing and developing teachers? If your PD had to have a focus, what would it be and why? Finally, what do you hope to gain from this course?

2. Curriculum Vitae and Cover Letter (5%)

You will update your curriculum vitae and write a cover letter describing your experiences as a mathematics educator.

3. Teacher Knowledge, Learning and Development Literature Review Paper with Annotated Bibliography (30%)

The review of the research in this course will focus on mathematics teacher knowledge, learning and development. To extend that work and to help you to prepare for the literature review process for your dissertation, in this course you will be learning how to assemble literature, organize literature into themes, and construct a literature review paper. The assignment will be completed progressively throughout the course with benchmark assignments. Each week, students will read and annotate a research article central to the research interest.

4. Discussion Leadership Assignment (10%)

In order to engage you in synthesizing ideas across readings, each participant will be responsible for coordinating one class discussion (and/or some activity designed to support ideas presented in the readings) and supporting another of your fellow classmates in one other session related to the assigned readings. You will be required to submit a powerpoint with discussion questions and small group activity to delve into the main ideas.

5. Planning for PD and Assessing Teacher Learning (total 50%)

Using research on teacher professional development, you will write a proposal for a professional development grant and design and deliver a module. You will write a 3-4 page draft proposal outlining preliminary plans for a PD grant and a topic for PD of your choosing related to mathematics teaching.

Once that proposal is approved, you will work on writing a formal grant Part A & design and deliver a module Part B.

Part A. Professional Development Grant (25%)

You will elaborate on the proposal and submit a 10-12 page paper which will include a) Needs Assessment, b) Research Base with supporting literature, c) Description of Program Goals, Activities and Timeline, and d) Evaluation plan

Professional Development Grant Proposal Guidelines:

Needs Assessment: A needs assessment should be included with a brief description of the methodologies used to collect this information.

Research Base: A description of the demonstrated connection of project activities with scientifically-based research and appropriate methodology for project implementation.

Provide a list of references and resources used to complete this narrative.

Description of Program Goals, Activities and Timeline: This section should show a clear connection between project goals and planned activities, along with a description of the activities and how professional development needs are addressed. A clear description of the implementation plan, where the programs will be offered, and an activity timeline should also be addressed.

Data Collection and Evaluation Plan: Describe the plan that will be used to evaluate the program. This plan must include:

- a. rigorous measures of the impact that implemented intervention activities have on increasing student learning or teacher learning;
- b. a research design with measurable objectives to increase the knowledge of mathematics teachers who participate in content-based professional development activities;
- c. measures of progress towards meeting the assessed needs

Part B. PD Module-Design and Pilot Professional Development Session & Reflection (25%)

Design and deliver a Professional development session for local, regional, national conference/or teach a session in a methods course or a professional development course.

Map out a scope and sequence for a PD program that has sustained duration (multiple days, longer duration than one-shot PD). Elaborate on one of the module that will be implemented in a PD setting. The highlighted session will include the activities and annotations for a professional development provider. After implementing the session, write a reflection and share out the major components of the PD that was successful in developing teacher knowledge through a PowerPoint and a brief paper integrating what you have read and the how the design and content reflections your understanding of effective professional development (Scope and sequence; Elaborated Module pages may vary; Including a reflective paper that evaluates the effectiveness of the PD and what you learned about teacher knowledge within that topic. (Reflective paper ~10-15 pages).

Grading Policy

As a doctoral student, it is your job to learn as much as you can from this course, the assignments and the readings. The assignments have been designed to allow you to pursue independent interests within the boundaries of the topics of the course. The assignments and readings are also designed to help you both learn about the content of the course and develop your skills as a mathematics educator.

Grading Policies Graduate Grading Scale

A 93%-100% A- 90%-92% B+ 87%-89% B 80%-86% C 70%-79% F Below 70%

Assignments are graded on a four-level scale: exceeds expectations, meets expectations, needs revision, and unacceptable. Specific requirements for each assignment will be provided with the assignment descriptions.

Policy on Incompletes:

If circumstances warrant, a written request for an incomplete must be provided to the instructor for approval prior to the course final examination date. Requests are accepted at the instructor's discretion, provided your reasons are justified and that a *major* percentage of your work has already been completed. Your written request should be regarded as a contract between you and the instructor and must specify the date for completion of work. This date must be at least two weeks prior to the university deadline for changing incompletes to letter grades.

Every student registered for any MEL course with a required performance-based assessment (will be designated as such in the syllabus) is required to submit this assessment (*Professional Development Grant Proposal*) to Blackboard (regardless of whether a course is an elective, a one time course or part of an undergraduate minor).

Professional Dispositions

See <https://cehd.gmu.edu/students/policies-procedures/>

Proposed Class Schedule: *Readings may be subject to change based on seminar discussions*

	Readings Discussion for Weekly Seminar	Assignments DUE
Session 1 8/22/22	Overview and introduction AMTE and NCTM statements and resources available. <ul style="list-style-type: none">● Review statements● Website● Needs assessment	Discussion board question

Session 2 8/29/22	Teacher Education and PCK, MKT, TPACK Unpacking the High leverage Practice	Position Paper (Upload to Blackboard 3-5 pages: 5%) Blackboard reading & media choice board
Session 3 9/12/22	Methods for Mathematics Teacher Preparation Online module- ANALYSIS of Method courses and syllabus Search for 2-3 Methods Syllabi and critical evaluate the syllabus and share a practice based assignment that you'd like to share with the class- Check out two activities for PSTs	Blackboard reading & media choice board
Session 4 9/19/22 Online	Measuring Teacher Knowledge and MQI Examining the MQI tools & Videos Presentations on Syllabi for PSTs	<i>Curriculum Vitae and Cover Letter (5%)</i> Blackboard reading & media choice board
Session 5 9/26/22 Online	Teacher Noticings and Video based PD	Blackboard reading & media choice board
Session 6 10/3/22	Designing Professional Development-Defining Models and Process Comparing and contrasting PD Design Models	CV Blackboard reading & media choice board

Session 7 10/10/22*	TEACH MATH & Cases for Math Educators Examine TEACH MATH project	PD Idea draft Blackboard reading & media choice board
Session 8 10/17/22 online	Designing Professional Development & Lesson Study and Cognitive Demand Improving Classroom Instruction: Generative Change	Blackboard reading & media choice board
Session 9 10/24/22 Online	Professional Learning through Student Work & TRU Framework Examine TRU Framework	PD grant proposal paper (25%) Blackboard reading & media choice board
Session 10 10/31/22 Online	Teacher Professional Learning	Blackboard reading & media choice board
Session 11 11/7/22	Teacher Preparation and Professional Learning Examine MIST project & Professional Development Session	Blackboard reading & media choice board
Session 12 11/14/22 Online	Teacher Beliefs & Identity Examine Teacher Efficacy Scales	Blackboard reading & media choice board

Session 13 11/21/22	Large Scale Studies of Professional Development Examine MIST project & Professional Development Session	Literature synthesis due(30%) Blackboard reading & media choice board
Session 14 11/28/22	Perspectives on Teacher Learning Examine MIST project & Professional Development Session	Blackboard reading & media choice board
Session 15 12/5/22 Online	Pulling it all together Professional Development Session & Reflection-Class Presentations	<i>Designing a Professional Development Session with Reflection due (25%)</i> Blackboard reading & media choice board

Blackboard & Media choice boards readings will include the following. Students will record their reading choices on a weekly basis.

Recommended:

Charalambous, C. (2010). Mathematical Knowledge for teaching and task unfolding: An exploratory study. *The Elementary School Journal*, 110(3), 247-27.

Darling-Hammond, L. (2010). Teacher education and the American future. *Journal of Teacher Education*, 61(1-2), 35-47.

Desimone, L., Smith, T., Phillips, K. (2013). Linking student achievement growth to professional development participation and changes in instruction: A longitudinal study of elementary teachers in Title I schools. *Teachers College Record*, 115, 1-46.

Garet, M.S., Wayne, A. J., Stancavage, F., Taylor, J., Eaton, M., Walter, K., & Warner, E. (2011). *Middle school mathematics professional development impact study: Findings after the second year of implementation*. Washington, DC: National Center for Educational Statistics & U. S.

Department of Education. Executive Summary (pp. xv-xxviii).

- Heck, D. J., Banilower, E. R., Weiss, I. R., & Rosenberg, S. L. (2008). Studying the effects of professional development: The case of the NSF's local systemic change through teacher enhancement initiative. *Journal for Research in Mathematics Education*, 39(2), 113-152.
- Hiebert, J. Dawn Berk, Emily Miller, Heather Gallivan, & Erin Meikle. (2019). Relationships Between Opportunity to Learn Mathematics in Teacher Preparation and Graduates' Knowledge for Teaching Mathematics. *Journal for Research in Mathematics Education*, 50(1), 23-50. Retrieved from <https://www-jstor-org.mutex.gmu.edu/stable/10.5951/jresematheduc.50.1.002>.
- Charalambous, C. Y. (2015). Working at the intersection of teacher knowledge, teacher beliefs, and teaching practice: a multiple-case study. *Journal of Mathematics Teacher Education*, 18(5), 427-445.
- Greenberg, J., & Walsh, K. (2008). No common denominator: The preparation of elementary teachers in mathematics by American's education schools (Executive Summary). Washington, D.C., National Council on Teacher Quality.
- Jacobson, E., & Kilpatrick, J. (2015). Understanding teacher affect, knowledge, and instruction over time: an agenda for research on productive disposition for teaching mathematics. *Journal of Mathematics Teacher Education*, 18(5), 401-406.
- Kazemi, E., & Hubbard, A. (2008). New directions for the design and study of professional development: Attending to the coevolution of teachers' participation across contexts. *Journal of Teacher Education*, 59(5), 428-441.
- Lampert, M. (2012). Improving teaching and teachers: A "generative dance"? *Journal of Teacher Education*, 63: 361-367.
- Lewis, C., Perry, R., Friedkin, S., & Roth, J. (2012). Improving teaching does improve teachers: Evidence from lesson study. *Journal of Teacher Education*, 63, 368-375.
- National Council for the Accreditation of Teacher Education. (2010). Transforming teacher education through clinical practice: A National Strategy to prepare effective teachers. Report of the Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Student Learning. Washington, DC: NCATE
- Transforming teacher education through clinical practice: A National Strategy to prepare effective teachers.
<http://www.ncate.org/LinkClick.aspx?fileticket=zzeiB1OoqPk%3D&tabid=7>
- van Es, Elizabeth A. (2014) A Framework for the Facilitation of Teachers' Analysis of Video. *Journal of Teacher Education*. 65: 340-356.

Zeichner, K. (2012). The turn once again toward practice-based teacher education. *Journal of Teacher Education*, 63, 376-382.

Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college- and university-based teacher education. *Journal of Teacher Education*, 61(1-2), 89–99. doi:10.1177/0022487109347671.

NCTM Website for the Council of the Accreditation of Educator Preparation (CAEP).

<http://www.nctm.org/Standards-and-Positions/CAEP-Standards/>

<http://www.highered.nysed.gov/TELDH.pdf>

Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/>).
- Students must follow the university policy for Responsible Use of Computing (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <https://ds.gmu.edu/>).
- Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursesupport.gmu.edu/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/students/> .

Added rubric below to guide your assignment write ups

Part A. Professional Development Grant (25%)

You will elaborate on the proposal and submit a 10-12 page paper which will include a) Needs Assessment, b) Research Base with supporting literature, c) Description of Program Goals, Activities and Timeline, and d) Evaluation plan **Due March 28th**

Idea Paper	You will write a 3-4 page draft proposal outlining preliminary plans for a PD grant and a topic for PD of your choosing related to mathematics teaching. Due March 7th	5pts
Needs Assessment:	A needs assessment should be included with a brief description of the methodologies used to collect this information	4pts
Research Base:	A description of the demonstrated connection of project activities with scientifically-based research and appropriate methodology for project implementation. Provide a list of references and resources used to complete this narrative.	6pts
Description of Program Goals, Activities and Timeline:	<input type="checkbox"/> This section should show a clear connection between project goals and planned activities, along with a description of the activities and how professional development needs are addressed. <input type="checkbox"/> A clear description of the	6pts

	implementation plan, where the programs will be offered, and an activity timeline should also be addressed.	
Data Collection and Evaluation Plan	Describe the plan that will be used to evaluate the program. This plan must include: <ul style="list-style-type: none"> <input type="checkbox"/> rigorous measures of the impact that implemented intervention activities have on increasing student learning or teacher learning; <input type="checkbox"/> a research design with measurable objectives to increase the knowledge of mathematics teachers who participate in content-based professional development activities; <input type="checkbox"/> measures of progress towards meeting the assessed needs 	4pts

Part B. PD Module-Design and Pilot Professional Development Session & Reflection (schedule session) (25%)

(Scope and sequence; Elaborated Module pages may vary; Including a reflective paper that evaluates the effectiveness of the PD and what you learned about teacher knowledge within that topic. (Reflective paper ~10-15 pages). **Due May 9, 2019**

Description of Scope and sequence and rationale and brief examples	Map out a scope and sequence for a PD program that has sustained duration (multiple days, longer duration than one-shot PD).	5pts
Module sample	Elaborate on one of the module that will be implemented in a PD setting. The highlighted session will include the activities and annotations for a professional development provider.	5pts
Practice-based activity with educators	Design and deliver a Professional development session for local, regional, national conference/or teach a session in a methods course or a	5pts

	professional development course.	
Reflective paper	After implementing the session, write a reflection and share out the major components of the PD that was successful in developing teacher knowledge through a brief paper integrating what you have read and the how the design and content reflections your understanding of effective professional development	5pts
Presentation	Powerpoint presentations in class summarizing the first four components.	5pts

Literature Review Rubric

Description of Assignment:

You are to locate research articles on your topic. You are to write a 12-15 page summary the general theme(s) of these articles as it pertains to your topic. A reference sheet, listing the articles should also be included (this does not count toward your page limit). APA format.

Teacher Knowledge, Learning and Development Literature Review Paper with Annotated Bibliography (30%) Final paper due April 25, 2019

The review of the research in this course will focus on mathematics teacher knowledge, learning and development. To extend that work and to help you to prepare for the literature review process for your dissertation, in this course you will be learning how to assemble literature, organize literature into themes, and construct a literature review paper. The assignment will be completed progressively throughout the course with benchmark assignments. The final paper and mini presentation will be due April 25, 2019

Grading of Assignment:

The following rubric will be used to assess your literature review.

Rubric:

	Rating				Score
	5	4	3	2-1	
ASSIGNMENT BASICS					
Articles	Information is gathered from multiple, research-based sources.	Information is gathered from multiple sources.	Information is gathered from a limited number of sources.	Information is gathered from a single source.	
Theme	Well organized, demonstrates logical sequencing and structure.	Well organized, but demonstrates illogical sequencing or structure.	Weakly organized with no logical sequencing or structure.	No organization, sequencing, or structure.	

Background/Founda tion	Detailed conclusions are reached from the evidence offered.	Conclusions are reached from the evidence offered.	There is some indication of conclusions from the evidence offered.	No conclusions are made from the evidence offered.	
Research Question	Research question(s) are formed through the literature review and clearly stated.	Research question(s) are formed through the literature review.	Research question(s) were not formed but could be formed through the literature review.	Research question(s) were not formed and are not apparent from the literature review.	
Length	Adheres to 12-15 page criteria.	Exceed or does not meet 12-15 page criteria by ½ page or less.	Exceed or does not meet 12-15 page criteria by ½ to 1 page.	Exceed or does not meet 12-15 page criteria by more than 1 page.	
Format/Grammar References	Font, spacing, and APA format are correct. Information is cited properly and in APA format.	Font and spacing, font and APA, or spacing and APA are correct. Information is cited properly.	Font, spacing, or APA format is correct. Information is cited, but has errors.	Font, spacing, and APAP format are incorrect. Information is not cited or is cited incorrectly.	
TOTAL POINTS					