

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

EDCI 855 DL1 – Mathematics Education Research on Teaching and Learning
3 Credits, Spring 2024
Mondays, 7:20-10:00 p.m.; Synchronous Online

Faculty

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Prerequisites/Corequisites

Admission into the Mathematics Education Leadership program.

University Catalog Course Description

Students survey most current research literature in mathematics education and engage in research, study and discussion on teaching and learning in school settings.

Course Overview

Not Applicable.

Course Delivery Method

This course will be delivered online (76% or more) using a synchronous format via Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on January 16.

Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

Technical Requirements

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:
https://help.blackboard.com/Learn/Student/Ultra/Getting_Started/Browser_Support
- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a headset microphone for use with the Blackboard Collaborate web conferencing tool.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
 - Adobe Acrobat Reader: <https://get.adobe.com/reader/>
 - Windows Media Player:
<https://support.microsoft.com/en-us/help/14209/get-windows-media-player>
 - Apple Quick Time Player: www.apple.com/quicktime/download/

Expectations

- Course Week:
Our course week will begin on the day that our synchronous meetings take place as indicated on the Schedule of Classes.
- Log-in Frequency:
Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 3 times per week. In addition, students must log-in for all scheduled online synchronous meetings.
- Participation:
Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- Technical Competence:
Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues:
Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.
- Workload:
Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the

student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.

- Instructor Support:

Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.

- Netiquette:

The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words.* Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.

- Accommodations:

Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

Learner Outcomes or Objectives

This course is designed to enable students to do the following:

1. Analyze and reflect on mathematics education research about student learning. [SEP]
2. Understand major theoretical positions in mathematics education. [SEP]
3. Explain the development of theories of mathematics education. [SEP]
4. Begin to conduct mathematics education research.

Professional Standards (Association of Mathematics Teacher Educators (AMTE))

Upon completion of this course, students will have met the following professional standards:

EDCI 855 is designed to enable mathematics education leaders to understand learning and teaching in mathematics as introduction to foundational theories and research in the field. 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 the following under "learning": [SEP] "Fundamental theories of learning mathematics provide the foundation for thinking about issues in mathematics education. Mathematics educators need to understand these theories and the distinctions among them in terms of both the kind of learning they are trying to explain and the theoretical constructs that have proven useful over time. A treatment of both historic and contemporary theories of learning should be a part of all doctoral programs in mathematics education. Drawing on current theories and research, doctoral students should understand how people of different ages, mathematical backgrounds, and aptitudes learn

mathematics. This understanding may be accomplished by various means including courses, seminars, or special readings focusing on theories of learning and the accompanying research evidence. In addition, a doctoral program should provide opportunities for candidates to link their knowledge to practice in designing or evaluating curricula, setting learning goals, and creating cognitively appropriate patterns of instruction” (p. 5-6, AMTE, 2002).

Required Texts

Weekly readings will be posted in the Blackboard Learning Management System (LMS). Students will need to log into the University Library in order to access these readings.

Recommended Texts

American Psychological Association (2020). *Publication manual of the American psychological association*. APA.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, VIA, hard copy). Detailed instructions and rubrics for all assignments will be posted to the Blackboard site for the course at <http://mymason.gmu.edu>. Please refer to these documents when completing your work. All written assignments should be submitted using APA 7th Edition for formatting.

All assignments should be submitted in Blackboard by 11:59 pm on the due date for the assignment. Extensions may be provided at the instructor's discretion only with permission provided by email *prior* to the deadline. Assignments submitted after the deadline will be subject to a 10% reduction in grade for the assignment.

- **Assignments and/or Examinations**

- A. **CLASS PARTICIPATION (10%)**

- Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and facilitating and/or participating in course discussions and group interactions. A commitment to participation in class discussions and course depends heavily and primarily on the regular attendance and participation of all involved. Participation will include taking part in discussions informed by critical reading and thinking, leading discussions about selected mathematics problems, and sharing with the class the products of various writing, reflection, lesson planning, and assignments. The expectations, demands and workload of this course are professional and high.

B. CURRICULUM VITAE (15%)

Update and submit a copy of your curriculum vitae (CV). Your CV should be in APA (7th edition) format. For samples, you can visit CEHD faculty web pages to find their CVs. Additionally, <http://gecd.mit.edu/jobs/find/prepare/cv> is a guide to CV writing and provides additional links.

C. MATHEMATICS KNOWLEDGE AND UNDERSTANDING REVIEW (45%)

Submit a 20-page paper reviewing the research literature related to a particular mathematics topic. The review should include references from peer-reviewed journals and books describing the development of students' understanding and how various researchers have examined the topic.

D. CLINICAL INTERVIEW (30%)

Find 3 students or adults and create a problem set to provide them during a clinical interview session about their understanding of a particular mathematical topic. Write a 5-10 page analysis of the interview results. What were their struggles? What concepts do they understand? Part of your work as a mathematics educator and researcher involves conducting interviews and understanding how people think about mathematics. This assignment is intended to help you develop both of these skill sets.

• **Other Requirements**

- **Attendance** It is your responsibility to attend all class sessions. You are held accountable for all information from each class session whether you are present or not. Reasons for any absence must be reported to the instructor in writing.
- **Tardiness** It is your responsibility to be on time for each class session. Reasons for any absence must be reported to the instructor in writing.
- **Formatting Assignments:** All papers should follow the guidelines in the *Publication Manual of the American Psychological Association (7th Ed.)* for formatting reference lists, citations, the body of the paper, etc. As most classes and your dissertation will require APA 7th formatting, I strongly recommend purchasing the APA 7th Handbook.
- **Late Assignments:** All assignments are due on the date listed in the schedule. 10% of points earned will be deducted for late work if students have not notified the instructor in advance of late submission and had the late submission approved.

• **Grading**

The final evaluation criteria utilizes the graduate grading scale and is as follows:

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

• **Course Performance Evaluation Weighting**

10% Participation

15%	Curriculum Vitae
45%	Mathematics Knowledge and Understanding Review
30%	Clinical Interview

Professional Dispositions

Students are expected to exhibit professional behaviors and dispositions at all times. Education professionals are held to high standards, both inside and outside of the classroom. Educators are evaluated on their behaviors and interactions with students, parents, other professionals, and the community at large. At the College of Education and Human Development, dispositions may play a part in the discussions and assignments of any/all courses in a student's program (and thus, as part or all of the grade for those assignments). For additional information visit:

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

This course will require students to audiotape, videotape, or use the audio/video conferencing feature. Students should dress professionally, speak professionally, and aware of their recording surroundings and backgrounds. Background noise (such as television, music, conversations, etc.) and inappropriate background video are distracting, unprofessional, and not allowed in this course.

Class Schedule

Date	Topic(s)	Readings	Due
Week 1 1/22 Format Synchronous	Syllabus Overview Community Agreements Justifying Conclusions and Interpretations of Data		Profile picture and information posted in Zoom.
Week 2 1/29 Format Asynchronous	Thinking Critically about Teaching and Learning Mathematics: Synthesizing Perspectives Writing A Curriculum Vitae Determine Math Knowledge Paper Topic	<i>Ongoing: Math Knowledge Paper Research</i>	Curriculum Vitae Due
Week 3 2/5 Format Synchronous	Thinking Critically about Teaching and Learning Mathematics: Synthesizing Perspectives Sharing of Math Knowledge Paper Research	Martin (2015) Briars et al. (2015) Meyer (2016) <i>Ongoing: Math Knowledge Paper Research</i>	

Week 4 2/12 Format Asynchronous	Race and Mathematics Education Research on Core Practices in K-12 Mathematics Teaching Writing Workshop	<i>Ongoing: Math Knowledge Paper Research</i>	
Week 5 2/19 Format Synchronous	Race and Mathematics Education Research on Core Practices in K-12 Mathematics Teaching Sharing of Math Knowledge Paper Research	Martin et al. (2017) Jacobs & Spangler (2017) <i>Ongoing: Math Knowledge Paper Research</i>	
Week 6 2/26 Format Asynchronous	Writing Workshop	<i>Ongoing: Math Knowledge Paper Research</i>	
Week 7 3/4 Format Synchronous	Math Knowledge Paper Presentations	<i>Ongoing: Math Knowledge Paper Research</i>	Math Knowledge Paper Due
Week 8 3/11 Format Synchronous	Assessment in the Era of Teacher Accountability Developing Clinical Interviews	Kloosterman & Burkhardt (2017) Hunting (1997) De Araujo et al. (2018)	
Week 9 3/18 Format Synchronous	Writing Workshop Individual Consultations		Clinical Interview Problem Set Due
3/25	NO CLASS MEETING		
Week 10 4/1 Format Asynchronous	Research Implementation Workshop Conducting Clinical Interviews		<i>Conduct Clinical Interviews</i>

Week 11 4/8 Format Synchronous	Instruction that Meets the Needs of Students with Mathematics Disabilities and Difficulties Creativity and Giftedness in Mathematics Education	Foegen & Dougherty (2017) Sriraman & Per Haavold (2017)	<i>Conduct Clinical Interviews</i>
Week 12 4/15 Format Synchronous	Justifying Conclusions and Interpretations of Data	Cai et al. (2019)	
Week 14 4/22 Format Asynchronous	Writers Workshop Clinical Interview Interpretation & Write Up		
Week 15 4/29 Format Synchronous	Clinical Interview Presentations		
Week 16 5/6 Format No Class Meeting			Clinical Interview Paper Due

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

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 <https://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 VIA should be directed to viahelp@gmu.edu or <https://cehd.gmu.edu/aero/assessments>. Questions or concerns regarding use of Blackboard should be directed to <https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking:

As a faculty member, I am designated as a “Non-Confidential Employee,” and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to Mason’s Title IX Coordinator per [University Policy 1202](#). If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as [Student Support and Advocacy Center](#) (SSAC) at 703-380-1434 or [Counseling and Psychological Services](#) (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason’s Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

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