George Mason University
EDCI 666-DL1: RESEARCH IN MATHEMATICS TEACHING   *3 credits*

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Office hours   By appointment via Blackboard Collaborate
Online sessions   See course schedule for synchronous and asynchronous sessions

I. Course Description
This course explores current issues and research literature in elementary school mathematics. It emphasizes the development of different styles of teaching and several methods of conducting research about mathematics education.
Prerequisite: Admission to the Mathematics Education Leadership Master's Degree Program

II. Course Learning Outcomes
At the conclusion of this course, students should be able to:
A. Study the teaching of mathematics through reading, interpreting, critiquing, and synthesizing research.
B. Identify and locate scholarly articles about the teaching of mathematics.
C. Design and deliver a high-quality professional development presentation and evaluate professional development programs using research-based criteria.

III. Relationship of Course Learning Outcomes to National Professional Association Standards
EDCI 666 is designed to enable mathematics education leaders to read, interpret, critique, and synthesize issues in mathematics education research that impact mathematics teaching and learning, with a special emphasis on designing and leading professional development. The course follows the *Standards for Elementary Mathematics Specialists* outlined by the National Council of Teachers of Mathematics and the National Council for Accreditation of Teacher Education (2012): *(Outcomes in italics will be assessed in this course.)*

> **3b)** *Analyze and consider research in planning for and leading students and teachers in rich mathematical learning experiences.*

> **4a)** *Exhibit knowledge of adult learning, development, and behavior.*

> **6b)** *Engage in and facilitate continuous and collaborative learning that draws upon research in mathematics education to inform practice;* enhance learning opportunities for all students' and teachers' mathematical knowledge development; involve colleagues and other school professionals, families, and various stakeholders; and *advance the development in themselves and others as reflective practitioners.*

> **6c)** *Plan, develop, implement, and evaluate mathematics-focused professional development programs at the school and/or district level*; use and assist teachers in using resources from professional mathematics education organizations such as teacher/leader discussion groups, teacher networks, and print, digital, and virtual

resources/collections; *and support teachers in systematically reflecting on and learning from their mathematical practice.*

6d) *Demonstrate mathematics-focused instructional leadership through actions such as coaching/mentoring; building and navigating relationships with teachers,* administrators, and the community; *establishing and maintaining learning communities*; analyzing and evaluating educational structures and policies that affect students' equitable access to high quality mathematics instruction; leading efforts to assure that all students have opportunities to learn important mathematics; evaluating the alignment of mathematics curriculum standards, textbooks, and required assessments and making recommendations for addressing learning and achievement gaps; developing appropriate classroom or school-level learning environments; and collaborating with school-based professionals to develop evidence-based interventions for high and low-achieving students.

IV. Nature of Course Delivery and General Expectations

The delivery of this course combines synchronous and asynchronous online learning sessions, independent study, group assignments, and scholarly writing. Students are expected to actively engage in all course activities throughout the semester, which include viewing of all course materials, completing activities and assignments, and participating in discussions and group interactions. Remember, this course is not self-paced. There are specific deadlines and due dates listed in the Detailed Course 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.

- The initial synchronous class session will take place at 4:30 PM Eastern Standard Time on January 19 via Blackboard Collaborate. After the first week, teams will establish a time to meet synchronously online or face-to-face on Tuesdays between 4:30 and 7:00 PM EST.
- Key course material will be delivered through weekly instructional videos on Blackboard. Plan to watch the video **before** the weekly team meeting.
- I will respond to all email inquiries within 36 hours, Monday through Friday.
- Individual consultations can be scheduled on Blackboard Collaborate. Please contact me via email to schedule one-on-one assistance.

V. Technology Use and Support

- Students must logon to Blackboard Collaborate for all scheduled online synchronous class meetings and scheduled team meetings. In addition, students must actively check the course Blackboard site and their GMU email for communications from the instructor at least four times per week.
- Students are expected to demonstrate competence in the use of all course technology. Seek assistance if you are struggling with technical components of the course. It is likely that we will all experience technical difficulties at some point in the semester, so please plan accordingly. Late work will not be accepted based on individual technical issues.
- For questions about technology or Blackboard, please contact the Office of Technology Support. The GMU Blackboard Collaborate support site is at http://coursessupport.gmu.edu/coursetools.cfm?categoryname=Bb%20Collaborate.

Additionally, several ways to contact the office are listed at the bottom of the OTS website: http://cehd.gmu.edu/ots/portal/
- Blackboard also has extensive instructions for students at http://ondemand.blackboard.com/students.htm
- Back-up plan: If you are unable to connect to a Collaborate session through the computer, you can call in through a number that is given when you access a session on the computer. Before you enter the session "room," you will see a screen with "Room Details" that provides a participant phone number and PIN. If you are unable to connect to the Internet at all, please contact a friend in the class who can let your team know that you will join them as soon as your connection is working.
- Technical requirements:
  - High-speed Internet access and Internet Explorer, Mozilla Firefox, or Google Chrome. Safari is not compatible with Blackboard.
  - Consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course
  - 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 the course requirements.
  - A microphone and camera for use with the Blackboard Collaborate web conferencing tool are essential. **Please use earbuds during Collaborate sessions.**
  - Lastly, our goal is to be collaborative, not combative. Experience shows that even an innocent remark in the online environment can be misconstrued. I suggest that you always re-read your responses carefully and consider the tone. Be positive in your approach to others and diplomatic with your words. I will do the same. Remember, you are not competing with each other but sharing information and learning from one another as well as from the instructor.

VI. Required Texts
Loucks-Horsley, S., Stiles, K., Mundry, S., Love, N., & Hewson, P. (2010). *Designing professional development for teachers of science and mathematics.* (3rd ed.). Thousand Oaks, CA: Corwin.

McMillan, J. & Wergin, J. (2010). *Understanding and evaluating educational research.* (4th ed.). Boston: Pearson.

Additional readings will be provided electronically through the GMU library online resources.

VII. Course Requirements and Assignments
As current and future leaders in mathematics education, you are and will be responsible for working closely with other educators. Therefore, this course includes a strong element of teamwork. Team assignments are designed to promote collaboration and discussion during synchronous online team meetings. The written outcomes of these discussions should be concise.

Separate from the team assignments, the Performance-Based Assessment is an individual project that culminates in an expository paper. This work will be evaluated based on the **research** cited to support key ideas put forth in the paper, the **quality of the professional development** as planned and delivered, and the evidence of **leadership and collaboration** with the participants. The paper should follow APA Sixth Edition formatting guidelines.

Rubrics for each assignment will be available on Blackboard.

A. **Individual quizzes and Key Points reflections** *(15% of final grade)* A critical component of team-based learning is that each person be fully prepared before the team meeting. No amount of team discussion can compensate for lack of individual preparation. To assess your understanding of the readings, there will be three multiple-choice quizzes. Each quiz must be completed by 4:00 PM EST on the date due <u>or you will receive a zero for that assignment</u>. Additionally, at the end of each major content section you will have the opportunity to consolidate your learning through a Key Points reflective journal entry.

B. **Team quizzes** *(10% of final grade)* Team quizzes are comprised of the same questions as the individual quizzes. However, this iteration of the quiz will be submitted with input and discussion from all team members during your team's synchronous meeting. The team quiz is due on the day of your synchronous team meeting before 8:00PM, and you will have immediate access to your team's results. All members of the team receive the same score on the team quiz.

C. **Team assignments** *(25% of final grade)* Team assignments are designed to promote discussion about key concepts. The majority of your synchronous team meeting time should be spent discussing the readings and assignment. Rather than requiring a lengthy written response, team assignments will be submitted on a concise template. Team assignments are due by 8:00PM on the day of the team meeting unless otherwise noted. Additionally, the team's weekly reporter will post a brief summary of the gist of your team's discussion, due by the end of the day of the team meeting.

D. **Performance-Based Assessment** *(40% of final grade)* In conjunction with a school administrator or group of teachers, identify a topic or area of improvement to address through professional development with one or more teachers. Using research from the fields of mathematics education and professional development, **develop and deliver** a professional development session or sessions. Meet with participants to discuss the potential impact of the professional development and to reflect on your role as a teacher leader. **Maximum length: 15 double-spaced pages.**
TK20 Performance-Based Assessment Submission Requirement
Every student registered for any Mathematics Education Leadership course <u>with a required performance-based assessment</u> is required to submit these assessments, the Professional Development Project Report and the Self-Study Teacher Research Project Report to TK20 through Blackboard (regardless of whether the student is taking the course as an elective, a onetime course or as part of an undergraduate minor). Evaluation of the performance-based assessment by the course instructor will also be completed in TK20 through Blackboard. Failure to submit the

assessment to TK20 (through Blackboard) will result in the course instructor reporting the course grade as Incomplete (IN). Unless the IN grade is changed upon completion of the required TK20 submission, the IN will convert to an F nine weeks into the following semester.

E. **Peer evaluations** *(10% of final grade)* The quality of this course depends heavily on the participation of all involved. Participation includes taking part in synchronous and asynchronous discussions informed by critical reading and thinking. Two peer evaluations will be used (mid-semester and end of course) to assess your contributions to your team.

VIII. Evaluation Criteria

Determination of the Final Grade: Graduate Grading Scale

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

IX. George Mason University Policies and Resources for Students

A. Students must adhere to the guidelines of the George Mason University Honor Code [See http://oai.gmu.edu/the-mason-honor-code-2/].

B. Students must follow the university policy for Responsible Use of Computing [See http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/].

C. George Mason University values diversity. Through the office of Diversity, Inclusion, and Multicultural Education, GMU seeks to create and sustain inclusive learning environments where all are welcomed, valued, and supported. If you will be absent due to religious observances, please notify the professor within the first two weeks of the semester. [See (http://ulife.gmu.edu/calendar/religious-holiday-calendar/ for the dates of religious holidays.)

D. Students are responsible for the content of university communications sent to their George Mason University 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 the Mason email account. Also, please remember general rules of netiquette.

E. The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu/].

F. Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu/]. Please contact Disability Services with appropriate documentation to request accommodations [See http://ods.gmu.edu/students/documentation.php].

G. Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.

H. The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing [See http://writingcenter.gmu.edu].

I. Core Values Commitment: The College of Education & Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles [See http://cehd.gmu.edu/values/].
For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website http://gse.gmu.edu/.

X. **Course Schedule Synopsis**
Teams will meet synchronously online or face-to-face on Tuesday between 4:30 and 7:00 PM EST unless otherwise noted. Your team will determine the specific meeting times for your group.
Jan. 19   Introduction to the course and to Team-Based Learning: Synchronous session with Dr. Johnson, 4:30 PM
Jan. 26   Reading Educational Research
Feb. 2   Reading Educational Research
Feb. 9   Reading Educational Research
Feb. 16 Reading Educational Research: Team meeting not required
Feb. 23 Locating and Evaluating Research: Synchronous session with GMU distance librarian Anne Driscoll, 5:00-6:00
Mar. 1   Locating and Evaluating Research
GMU SPRING BREAK (Week of March 7)
Mar. 15 Locating and Evaluating Research: Concept map and team bibliography due March 20.
Mar. 22 Research-based Professional Development: Team meeting not required
          SCHOOL DISTRICTS' SPRING BREAK
Mar. 29 Research-based Professional Development
Apr. 5   Research-based Professional Development
Apr. 12   Research-based Professional Development
          Draft or plan for problem-based assessment due Sunday, April 17
Apr. 19   Research-based Professional Development: Team meeting not required
Apr. 26   Presentation of Research Reports to Teams:
          Problem-based assessment due Tuesday, May 3 to TaskStream.

Please see the following detailed course schedule for weekly topics, assignments, and due dates.

Approved March 2004. Revised June 2015.

XI. Detailed Course Schedule

Week of	Topic/Learning Experiences	Work to complete before class (Further details to be provided in weekly emails.)	In-class assignments
Week 1 Jan. 19	Introduction to the course and team-based learning	-Team formation survey -Teamwork reflection -Log on to Blackboard -Optional: Explore the team-based learning website http://www.TBLcollaborative.org	**-Attend synchronous session at 4:30.** -Meet your team. -Team quiz (ungraded) -Recorder posts summary of discussion.
Week 2 Jan. 26	Reading and understanding research (Introduction and Qualitative Designs)	-Watch minilecture -Read McMillan and Wergin (2010) Ch. 1 and Ch. 4; -Read Thompson (1984) and Francis (2015)	-As a team, label sections of one supplemental article. (submit, but it will not be graded) -Recorder posts summary of discussion.
Week 3 Feb. 2	Reading and understanding research (Quantitative Designs)	-Watch minilecture -Read McMillan and Wergin (2010) Ch. 2 and Ch. 3; - Read Good and Grouws, (1979) and Telese, (2012) -**Take individual quiz** about qualitative and quantitative research designs **(due Feb. 2, 4:00PM)**	-**Take team quiz one (graded, due Feb. 2, 8:00PM)** -Use the Credibility Scorecard to discuss one article. -Answer one question from the Evaluation Criteria Questions about the type of article you selected (p. 47, p, 82, or p. 107) and submit (ungraded) -Recorder posts summary of discussion.
Week 4 Feb. 9	Reading and understanding research (Action/Practitioner Research)	-Watch minilecture -Read McMillan and Wergin (2010) Ch. 6; and p. 173-185 -Read Raymond and Leinenbach (2000) and Gningue et al. (2014)	-**Team assignment one:** Analyze the weakest article using the Credibility Scorecard. Elaborate on one of the article's strengths and two weaknesses. (**graded, due Feb. 9**) -Recorder posts summary of discussion.
Week 5 Feb. 16	Reading and understanding research (Consolidation of learning)	-Watch minilecture -Read discussion board posts from previous weeks as needed. -Complete and submit reflective journal entry about Key Points **(due Feb. 16)**	-No synchronous team meeting required

Week of	Topic/Learning Experiences	Work to complete before class (Further details to be provided in weekly emails.)	In-class assignments
Week 6 Feb. 23	Locating and evaluating research (GMU online resources overview)	-Watch minilecture -Asynchronous team discussion about topics for bibliography assignment	-**Attend synchronous online session with distance librarian Anne Driscoll at 5:00.** -Decide topic for concept map assignment. -Use GMU library resources to find one article about topic. -Recorder posts summary of discussion.
Week 7 Mar. 2	Locating and evaluating research (Apply search and analysis skills)	-Watch minilecture -**Take individual quiz** about finding research articles and using GMU resources **(due Mar. 1, 4:00)** -Locate 2 strong articles to contribute to team bibliography	-**Take team quiz two (graded; due Mar. 1, 8:00PM)** **Begin team assignment two:** -Share 2 articles from each team member -Choose 5 articles to include on bibliography and concept map (**graded, due March 20)** -Recorder posts summary of discussion.
Mar. 8	*Mason Spring Break—no class*		
Week 8 Mar. 15	Locating and evaluating research (Apply search and analysis skills)	-Complete work as needed for bibliography and concept map -Read discussion board posts from previous weeks as needed -Complete reflective journal entry about Key Points **(due Mar. 15)** -Complete peer evaluations for weeks 1-7 **(due Mar. 15)**	**Team bibliography and concept map due March 20** -Complete work as needed for bibliography and graphic organizer.

Week 9 Mar. 22	Reflective practice	-Watch minilecture
		-Ball (1993) required
		-Choose one:
		   -Lampert (1990)
		   -Ghaye (2011)
		-"Thinking Hats" asynchronous post
			No synchronous team meeting required (school districts' spring break)

Week of	Topic/Learning Experiences	Work to complete before class (Further details to be provided in weekly emails.)	In-class assignments
Week 10 Mar. 29	Research-Based Professional Development (Theories and best practices of adult learning)	-Watch minilecture -Knowles (1972) -Loucks-Horsely et al. (2010), chapter 2; begin chapter 5 -Read PD program descriptions posted online	-Team assignment (ungraded): Use theories presented in the articles to record pros and cons of two PD programs. -Recorder posts summary of discussion.
Week 11 Apr. 5	Research-Based PD (Theories and best practices of adult learning)	-Watch minilecture -Holyoke and Larson (2009) -Taylor and Lomeraux (2008) -Miriam (2001) -Continue Loucks-Horsely et al. (2010), chapter 5 -**Take individual quiz** about adult learning and PD **(due April 5, 4:00)**	-**Take team quiz three (graded, due Apr. 5, 8:00PM)** -**Team assignment three (graded, due Apr. 5, 8:00PM):** Which PD program is most likely to lead to transformational learning, and what makes you say that? -Recorder posts summary of discussion.
Week 12 Apr. 12	Research-Based PD (Consolidation of learning)	-Watch minilecture -Read discussion board posts from previous weeks as needed -Complete reflective journal entry about Key Points **(due April 12, 8:00PM)** -**PBA plan or rough draft due Sunday, April 17**	Synchronous team meeting optional this week
Week 13 Apr. 19	Research-Based PD	-Watch minilecture -Work on PBA -Decide on peer review structure	-Peer review PBA plans or drafts
Week 14 Apr. 26	Research-Based PD	-Watch minilecture -Prepare one-page overview of PBA to share with the class (due Apr. 26)	-Group closure
Week 15 May 3	**Upload PBA to TaskStream**	**Problem-based assessment due to Task Stream** -Complete peer review two (due May 3)	