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

EDCI 645.6M6– Curriculum Development in Mathematics Education
3 Credits, Fall 2019
Tuesdays, 4:30PM-7:10PM, Online

Faculty

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Prerequisites/Corequisites

Admission to the Mathematics Education Leadership Master's Degree Program or instructor permission.

University Catalog Course Description

Analysis, design, and evaluation of school mathematics curricula. Offered by Graduate School of Education. May not be repeated for credit.

Course Overview

EDCI 645 is designed to enable mathematics education leaders to evaluate mathematics curriculum materials appropriate for school mathematics. See also Learner Outcomes and Professional Standards.

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 August 19.

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/Getting_Started/Browser_Support#supported-browsers

  To get a list of supported operation systems on different devices see: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems
- 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. [Delete this sentence if not applicable.]
- 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: [Add or delete options, as desire.]
  - 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. Identify standards-based school mathematics curriculum (K-8); Analyze key characteristics of outstanding curriculum materials for school mathematics
2. Examine learning theories that have been influential in mathematics education and identify ways those theories have been translated into curriculum materials and strategies for teaching.
3. Evaluate commercially developed school mathematics curriculum materials to make informed choices.
4. Present and discuss a set of school mathematics curriculum materials in depth.
5. Design a small curriculum project based on key design principles.

Professional Standards (National Council of Teachers of Mathematics (NCTM))

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

The course follows the NCTM NCATE Standards for Elementary Mathematics Specialists (2012). In your role as a teacher, lead teacher, and/or coach/mentor, elementary mathematics specialist candidates:
3a) Apply knowledge of curriculum standards for elementary mathematics and their relationship to student learning within and across mathematical domains in teaching elementary students and coaching/mentoring elementary classroom teachers.

4b) Plan, create, and coach/mentor teachers in creating developmentally appropriate, sequential, and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge from prior knowledge and experiences.

4c) Incorporate knowledge of individual differences and the cultural and language diversity that exists within classrooms and include and assist teachers in embracing culturally relevant perspectives as a means to motivate and engage students.

4d) Demonstrate and encourage equitable and ethical treatment of and high expectations for all students.

4e) Apply mathematical content and pedagogical knowledge in the selection, use, and promotion of instructional tools such as manipulatives and physical models, drawings, virtual environments, presentation tools, and mathematics-specific technologies (e.g., graphing tools and interactive geometry software); and make and nurture sound decisions about when such tools enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools.

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.

Required Texts

Tomlinson, C. A., Imbeau, M. B. (2010). *Leading and managing a differentiated classroom.* Alexandria, VA: ASCD.

White, D., Crespo, S., & Civil, M. (2016). *Cases for mathematics teacher educators: Facilitating conversations about inequities in mathematics classrooms*. Charlotte, NC: Information Age Publishing.

Required Readings
Additional readings will be posted on the course Blackboard site. You will need your GMU email login and password to access.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

- **Assignments and/or Examinations**

EQUITABLE MATHEMATICS TEACHING PHOTO NARRATIVE PROJECT (10%)
(*NCTM NCATE 3a, 4d, 6d)*

The goal of this project is to take a series of photos (4) that tell the story of equitable and accessible mathematics teaching and learning in your school and/or community. Two pictures should illustrate factors that facilitate equitable and/or accessible teaching and learning of mathematics; two pictures should illustrate factors that hinder equitable and/or accessible teaching and learning of mathematics. Your assignment should include: your goals and objectives of equitable/accessible teaching mathematics, connections between the

photos, and the topics covered by the readings thus far. Additional details for this assignment (project description & rubric) are provided in Blackboard.

CURRICULUM ANALYSIS PROJECT (CAP)

(*NCTM NCATE 3a, 4b, 4c, 4d, 4e, 6d)*

Part of your work as a mathematics specialist will be to understand and evaluate the materials the teachers in your classrooms are currently using. This assignment will include multiple components and address: Ideal Curriculum, Implemented Curriculum, and Ideal & Implemented Curriculum. Each component is outlined below. Additional details for each component (descriptions & rubrics) are provided in Blackboard.

CAP PART I: Ideal Curriculum -- Describe the Materials Used (5%)

This portion of the assignment asks you to determine what materials are currently in use at one school for one of two grade bands (K-4, 4-8). Working as mathematics specialists requires you to understand not only the mathematics of the grade levels at your school but also the development of mathematics vertically. In addition to the textbooks, collect materials such as pacing guides, standards documents, additional frameworks, and any other materials that should be aligned with the textbooks and support teachers' implementation of the mathematics content. See Blackboard for additional details and rubric.

CAP PART II: Ideal Curriculum -- Material Analysis (10%)

This portion of the assignment asks you to identify two mathematics topics and examine and analyze the curriculum, following these topics throughout your chosen grade band (K-4, 4-8). See Blackboard for additional details and rubric.

CAP PART III: Implemented Curriculum -- Teacher Interview (15%)

For this portion of the CAP project, you will interview two teachers (who should remain anonymous) about how they use the materials for planning and instruction. The teachers should be from the grade levels you reviewed in parts I & II. The interviews should be about 30-45 minutes. You should gather their impressions of the materials. See Blackboard for additional details and rubric.

CAP PART IV: Implemented Curriculum -- Equitable Task Creation (15%)

A common challenge math specialists face is finding good problems and tasks for teachers to use to supplement their curriculum materials. For this portion of the project you will create (or edit a pre-existing problem to be) an equitable, rich, open ended task. See Blackboard for additional details and rubric.

CAP PART V: Implemented Curriculum -- Task Implementation & Analysis (15%)

This portion of the assignment asks you to teach the task that you designed in Part IV, collect student work, and reflect on the experience. See Blackboard for additional details and rubric.

CAP PART VI: Ideal and Implemented Curriculum-- Final Reflection (20%)

Think about the entire CAP project (Parts I-V). Write a reflection paper (about 3-5 pages) that includes discussion of the ideal and implemented curriculum and discuss the curriculum from a mathematics specialist/coach perspective. See Blackboard for additional details and rubric.

- **Other Requirements**

ATTENDANCE & PARTICIPATION (10%)

a) 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 field experience assignments. The expectations, demands, and workload of this course are professional and high.

b) A commitment to reading reflectively and critically the assigned readings. The readings will be used to provide a framework and coherent theme to the course content. They have been selected to introduce themes in curricular development as well as research and critical commentary on mathematics curriculum.

c) Attendance: It is your responsibility to attend all class sessions. Please report your reasons for any absences to the instructor in writing.

d) Tardiness: It is your responsibility to be on time for each class session. Please report your reasons for any tardiness to the instructor in writing.

	LEVEL OF PERFORMANCE			
ELEMENT	***Distinguished*** *(10 points)*	***Proficient*** *(7 - 9 points)*	***Basic*** *(5 - 6 points)*	***Unsatisfactory*** *(0 - 4 points)*
Attendance & Participation	The student attends all classes, is on time, is prepared and follows outlined procedures in case of absence. The student actively participates and continually supports the members of the learning group and the members of the class. Presentations demonstrate a deep knowledge of content as well as implications for teaching.	The student attends most classes, is on time, is prepared and follows outlined procedures in case of absence. The student makes active contributions to the learning group and class. Presentations demonstrate sufficient knowledge of content as well as implications for teaching.	The student is absent for multiple classes and follows outlined procedures in case of absence. At times the student is not prepared for class. Presentations demonstrate minimal knowledge of content and/or implications for teaching.	The student is frequently late for class or absences are not documented by following the outlined procedures. The student is frequently not prepared for class and does not actively participate in discussions. Presentations are lacking knowledge of content and connections to teaching.

- **Other Requirements**

All assignments require APA formatting:

American Psychological Association (2010*). Publication Manual of the American Psychological Association*. American Psychological Association: Washington, DC.

- **Grading**

Attendance & Participation (10%)
Equitable Mathematics Teaching Photo Narrative Project (10%)
Curriculum Analysis Project Part I (5%)
Curriculum Analysis Project Part II (10%)
Curriculum Analysis Project Part III (15%)
Curriculum Analysis Project Part IV (15%)
Curriculum Analysis Project Part V (15%)
Curriculum Analysis Project Part VI (20%)

Grading
All assignments are to be turned in to your instructor on time. Late work will not be accepted for full credit. Assignments turned in late will receive a 10% deduction from the grade per late day or any fraction thereof (including weekends and holidays).

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%

For Master's Degrees:
Candidates must have a minimum GPA of 3.00 in coursework presented on the degree application, which may include no more than 6 credits of C. (Grades of C+, C-, or D do not apply to graduate courses. The GPA calculation excludes all transfer courses and Mason non-degree studies credits not formally approved for the degree).

For Endorsement Requirements
Candidates must have a grade of B or higher for all licensure coursework (endorsement coursework).

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:
See https://cehd.gmu.edu/students/polices-procedures/
Students are expected to exhibit professional behaviors and dispositions at all times.

Class Schedule

Textbook Key:
Tomlinson & Imbeau = Tomlinson, C. A., Imbeau, M. B. (2010). *Leading and managing a differentiated classroom.* Alexandria, VA: ASCD.
Cases for MTEs = White, D., Crespo, S., & Civil, M. (2016). *Cases for mathematics teacher educators: Facilitating conversations about inequities in mathematics classrooms.* Charlotte, NC: Information Age Publishing.

Date	Topic(s)	Readings Due	Due
Week 1 Tues Aug 27 **Format** Synchronous	Collaborate Ultra Orientation Syllabus Overview Photo Narrative Project Described What is equitable instruction? What is equitable curriculum? Social Justice in Mathematics (TODOS & NCSM position paper)		Profile picture in Collaborate
Week 2 Tues Sept 3 **Format** Synchronous	Equitable Instruction in Mathematics Education Philosophical Foundations of Curriculum Behaviorism vs. Constructivism CAP Part I Described	**Articles** Social Justice in Mathematics (TODOS & NCSM position paper) Introduction to TRU Framework **Cases for MTEs** -Chapter 1 (Stop when you get to Part I.) -Chapter 2 and corresponding commentary 1, 2, & 3	**Photo Narrative Project Due**
Week 3 Tues Sept 10 **Format** Synchronous	Content and Practice Standards Learning Trajectories and Progressions	**Standards** CCSSM Standards for Mathematical Practice NCTM Process Standards **Choice of One** Clements Video (posted in Bb) OR Sarama & Clements (2009)	**Introduction Letter Due**
Week 4 Tues Sept 17 **Format** Synchronous	High-Level Tasks Maintaining Cognitive Demand Understanding Differentiation for Leading CAP Part II Described	**Articles** Stein & Smith (1998) **Tomlinson & Imbeau** -Part 1: Leading a Differentiated Classroom (Intro for Chs 1-3) -Chapter 1	**CAP Part I (Materials Used) Due**
Week 5 Tues Sept 24 **Format** Synchronous	Issues of Equity Connecting Curriculum to Students' Lived Experiences Avoidance	**Cases for MTEs** -Chapter 20 and corresponding commentary 1, 2, & 3	

Week 6 Tues Oct 1 **Format** Synchronous	Teacher Philosophy and Vision Curricular Vision and Beliefs Ideal VS Implemented Curriculum CAP Part III Described	**Tomlinson & Imbeau** Chapters 2 & 3	**CAP Part II (Material Analysis) Due**
Week 7 Tues Oct 8 **Format** Synchronous	Deficit Language Deficit Language as Curriculum is Implemented	**Cases for MTEs** Chapter 17 and corresponding commentary 1, 2, & 3	
Oct 15	**University Fall Break** **No Class**		
Week 8 Tues Oct 22 **Format** Synchronous	Empowering Students as Doers of Mathematics Connecting to Students' Identities Teachers' Views of Students CAP Part IV Described	**Cases for MTEs** Chapter 16 and corresponding commentary 1, 2, & 3	**CAP Part III (Teacher Interviews) Due**
Week 9 Tues Oct 29 **Format** Synchronous	Tasks Connecting to Students' Lived Experiences CAP Part V Described	**Cases for MTEs** Chapter 19 and corresponding commentary 1, 2, & 3	
Week 10 Tues Nov 5 **Format** Asynchronous	Implementation Coaching Teachers about Environment & Routines	**Tomlinson & Imbeau** Chapters 4, 5	**CAP Part IV (Task Creation) Due**
Week 11 Tues Nov 12 **Format** Synchronous	Differentiation Sticking Points A Teacher's Purpose	**Tomlinson & Imbeau** Chapter 6, 7	
Week 12 Tues Nov 19 **Format** Synchronous	Incorporating Social Justice Themes into Mathematics Curriculum	**Cases for MTEs** Chapter 18 and corresponding commentary 1, 2, & 3	

Week 13 Tues Nov 26 **Format** Synchronous	Culturally Relevant Pedagogy & Curriculum Mathematics Education as a Social System CAP Part VI Described	**Cases for MTEs** Chapter 15 and corresponding commentary 1, 2, & 3	
Nov 27 – Dec 1	Thanksgiving Recess—no classes		
Week 14 Tues Dec 3 **Format** Synchronous	Teaching to the Test & Equity Issues	**Article** Davis & Martin (2018)	**CAP Part V (Task Analysis) Due**
Week 15 Tues Dec 10 **Format** Asynchronous	Independent Work Session		
Week 16 Tues Dec 17 **Format** Synchronous	Hesitant Teachers Addressing Teachers' Deficit Views Advocating for Change	**Cases for MTEs** Chapter 4 and corresponding commentary 1, 2, & 3 **Reread** Social Justice in Mathematics (TODOS & NCSM position paper) Introduction to TRU Framework	**CAP Part VI (Final Reflection) 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 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://coursessupport.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/ .