GEORGE MASON UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
ELEMENTARY EDUCATION

EDCI 547 (Section 001)
Integrating Technology in Elementary Classrooms: Mathematics (1 credit)
Fall 2010

Instructor	Dr. Christopher Johnston
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Class Meets	Robinson A350, 4:00 – 6:30 p.m. Tuesdays, September 7 – October 19, 2010
Office Hours	Thursdays, 2-4 p.m.

COURSE DESCRIPTION:

A. Prerequisites: Admission to the Elementary Licensure Program.
B. Corequistites: Enrollment in EDCI 552.
C. Course description from the university catalog: This course studies the development and integration of technology in the Elementary Education Mathematics curriculum.

NATURE OF COURSE DELIVERY:

Students in this course will participate in individual and group activities that focus on the integration of technology by using computers and other technology resources in class. Students will also participate in large group discussions led by the instructor and in small group discussions and activities with their classmates. Students will also be required to use asynchronous (Blackboard) postings to reflect upon their own learning.

LEARNER OUTCOMES:

This course is designed to enable teacher candidates to:

1. plan interdisciplinary learning experiences that enable elementary students to integrate knowledge, skills, and methods of inquiry within the Mathematics curriculum;
2. identify how students differ in their approaches to learning and create instructional opportunities that are adapted to diverse learners;
3. select appropriate materials, tools, and technologies to achieve instructional goals with all learners.

PROFESSIONAL STANDARDS: This course addresses the following National and State Standards:

INTASC

6. The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

Other INTASC Standards identified on rubric are addressed in the companion method course.

The Virginia State Technology Standards for Instructional Personnel:

1. Instructional personnel shall be able to demonstrate effective use of a computer system and utilize computer software.
2. Instructional personnel shall be able to apply knowledge of terms associated with educational computing and technology.
3. Instructional personnel shall be able to apply computer productivity tools for professional use.
4. Instructional personnel shall be able to use electronic technologies to access and exchange information.
5. Instructional personnel shall be able to identify, locate, evaluate, and use appropriate instructional hardware and software to support Virginia's Standards of Learning and other instructional objectives.
6. Instructional personnel shall be able to use educational technologies for data collection, information management, problem solving, decision making, communication, and presentation within the curriculum.
7. Instructional personnel shall be able to plan and implement lessons and strategies that integrate technology to meet the diverse needs of learners in a variety of educational settings.
8. Instructional personnel shall demonstrate knowledge of ethical and legal issues relating to the use of technology.

International Society for Technology in Education (ISTE) National Educational Technology Standards:

1. TECHNOLOGY OPERATIONS AND CONCEPTS - Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:
    1. demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Students).
    2. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.
2. PLANNING AND DESIGNING LEARNING ENVIRONMENTS AND EXPERIENCES - Teachers plan and design effective learning environments and experiences supported by technology. Teachers:
    1. identify and locate technology resources and evaluate them for accuracy and suitability.
3. PRODUCTIVITY AND PROFESSIONAL PRACTICE - Teachers use technology to enhance their productivity and professional practice. Teachers:
    1. use technology resources to engage in ongoing professional development and lifelong learning.
    2. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

3. use computer-based technologies including telecommunications to access information and enhance personal and professional productivity.
4. apply technology to increase productivity.
5. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

REQUIRED TEXT:

Moyer-Packenham, P. S. (2010). *Teaching mathematics with virtual manipulatives*. Didax.

This textbook is available at the GMU Bookstore.

REQUIRED READINGS (ARTICLES):

***Drier, H. S. (2000). Investigating mathematics as a community of learners. *Teaching Children Mathematics, 6,* 358-363.

Garofalo, J., Drier, H., Harper, S., Timmerman, M.A., & Shockey, T. (2000). Promoting appropriate uses of technology in mathematics teacher preparation. *Contemporary Issues in Technology and Teacher Education* [Online serial], *1* (1). Available: http://www.citejournal.org/vol1/iss1/currentissues/mathematics/article1.htm

***Kafai, Y., Franke, M., & Battey, D. (2002). Educational software reviews under investigation. *Education, Communication & Information, 2,* 163-180.

Niess, M. L. & Walker, J. M. (2010). Guest editorial: Digital videos as tools for learning mathematics. *Contemporary Issues in Technology and Teacher Education, 10*(1). Available: http://www.citejournal.org/vol10/iss1/mathematics/article1.cfm

***These articles are available on the GMU Library website, via: http://library.gmu.edu/phpzone/ej.php. If you are using a non-campus computer, you will need to log in with your GMU email account information.

Also required for this course is access to Blackboard, available at http://courses.gmu.edu.

COURSE REQUIREMENTS, PERFORMANCE-BASED ASSESSMENT, AND EVALUATION CRITERIA:

A. Requirement #1: Students will evaluate three Illuminations lesson plans which incorporate a technology tool. Students will evaluate the lesson plans based on the manner in which technology is integrated (based on the five guidelines for technology integration, as discussed in class) and offer suggestions for modifications. Students will use an evaluation form to complete this assignment. The evaluation form will be posted on Blackboard. (30%)

B. Requirement #2: Students will evaluate an existing spreadsheet activity for use with elementary students. The resources will be selected from http://eusesconsortium.org/edu/problems.php. Students will use an evaluation form to complete this assignment. The evaluation form will be posted on Blackboard**.** (10%)

C. Requirement #3: Students will post, on Blackboard, one journal article which focuses on the use of technology in elementary mathematics education. The article should be linked as a PDF, and students should write a two- paragraph summary of how the article will impact their own future teaching of a particular mathematical topic with technology as a support. Suggested journals include: *Teaching Children Mathematics, Mathematics Teaching in the Middle School, School Science and Mathematics, Journal of Technology and Teacher Education, Computers in Schools, Contemporary Issues in Technology and Teacher Education.* (10%)

D. Performance-based assessment: Modeling Mathematics Concepts Using Applets and Virtual Manipulatives. This assignment includes two parts, as noted below. (40%)

- **a.** Part One: Identify one specific mathematics concept (such as the concept of base ten, place value, linking fractions/decimals/percent, money, time, etc.) and locate at least five different virtual manipulatives or applets which support the learning of that concept (such as those found at the National Library of Virtual Manipulatives, Illuminations, Shodor, etc.) Using a template posted on Blackboard, answer questions about the models you have selected and evaluate them on their effectiveness and fidelity to the mathematical concept.
- **b.** Part Two: Choose one of the models from Part One. Interview one elementary student (i.e. from your placement) and give that student several tasks to perform using the model. Evaluate the effectiveness of the model based on the student's interaction with the virtual manipulative or applet. Include the questions you asked the student, the pluses, minuses, and interesting things you observed, and the math amplified by the model. Specific guidelines are posted on Blackboard.

E. Class participation and attendance. See rubric on the next page. (10%)

During each class session, students are expected to attend class and arrive on time. Exceptions (due to extreme circumstances) must be discussed with the instructor.

ATTENDANCE POLICY

Students are expected to attend the class periods of the courses for which they register. Although absence alone is not a reason for lowering a grade, students are not relieved of the obligation to fulfill course assignments, including those that can only be fulfilled in class. Students who fail to participate (because of absences) in a course in which participation is a factor in evaluation, or students who miss an exam without an excuse, may be penalized according to the weighted value of the missed work as stated in the course syllabus (GMU University Catalog, pg. 32).

	LEVEL	OF	PERFORMANCE	
ELEMENT	*Distinguished (9 – 10 points)*	*Proficient (8 points)*	*Basic (6 - 7 points)*	*Unsatisfactory (1 - 5 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 supports the members of the learning group and the members of the class.	The student attends all 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.	The student is on time, prepared for class, and participates in group and class discussions. The student attends all classes and if an absence occurs, the procedure outlined in this section of the syllabus is followed.	The student is late for class. Absences are not documented by following the procedures outlined in this section of the syllabus. The student is not prepared for class and does not actively participate in discussions.

Criteria for evaluation: Since this is a graduate level course, high quality work is expected on all assignments and in class. Points for all graded assignments will be based on the scope, quality, and creativity of the assignments. All assignments are due at the beginning of class. Late assignments will not be accepted without making arrangements with the instructor.

Grading scale: 94-100 = A 90-93 = A- 86-89 = B+ 80-85 = B 70-79 = C below 70 = F

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT STATEMENT OF EXPECTATIONS:

All students must abide by the following:

Students are expected to exhibit professional behavior and dispositions. See http://gse.gmu.edu/facultystaffres/profdisp.htm for a listing of these dispositions.

Students must follow the guidelines of the University Honor Code. See http://www.gmu.edu/catalog/apolicies/#Anchor12 for the full honor code.

Students must agree to abide by the university policy for Responsible Use of Computing. See http://www.gmu.edu/facstaff/policy/newpolicy/1301gen.html.
Click on responsible Use of Computing Policy at the bottom of the screen.

Students with disabilities who seek accommodations in a course must be registered with the GMU Disability Resource Center (DRC) and inform the instructor, in writing, at the beginning of the semester. See http://www.gmu.edu/student/drc/ or call 703-993-2474 to access the DRC.

PROPOSED CLASS SCHEDULE
EDCI 547-001 FALL 2010 Johnston (TUESDAYS)

Class Session	Topics/Learning Experiences	Readings and Assignments (due this class session)
1 (Tues., 9/7)	Introduction to class Review syllabus Appropriate uses of technology in mathematics education	In class: Read Garofalo, et al. (2000)
2 (Tues., 9/14)	Online Resources: National Library of Virtual Manipulatives, Illuminations Designing Effective Lessons Using Technology	Read Moyer-Packenham, Chapters 1-4, 6
3 (Tues., 9/21)	**ONLINE MEETING/ASSIGNMENT** Using Videos in Mathematics Education Reviews of Educational Software	Read Niess & Walker (2010) Read Kafai, et al. (2002) Evaluation of Illuminations Lesson Plans Due (Assignment A)
4 (Tues., 9/28	More Technology Resources: Shodor, Ambleside, Geometers Sketchpad, and Graphing Calculators Introduction to Spreadsheets	Post article and two-paragraph reflection - due (Assignment C) Read Drier (2000)
5 (Tues., 10/5)	**ONLINE MEETING/ASSIGNMENT** Evaluation of Spreadsheet Activities (Assignment B) http://eusesconsortium.org/edu/problems.php	
6 (Tues., 10/19)	SmartBoard Technologies Non-Computer Based Tools: CBRs, LiveScribe, probes, and other non-math specific tools Course Evaluations	PBA Due (Assignment D)

Note: Your PBA for this course, Assignment D, may be submitted anytime during the semester. However, it must be submitted no later than Tuesday, October 19, 2010.

SCHEDULE AND SYLLABUS updated 8/7/10.