GEORGE MASON UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
ELEMENTARY EDUCATION

EDCI 547
Integrating Technology in Elementary Classrooms: Math
Sec. DL1

Fall 2015, Online	1 Credit Hour
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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 Social Studies and Fine Arts 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 in class. Students will also participate in large group discussions led by the instructor and in small group discussions and activities with their classmates. Sixty percent of the course will be online.

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 Standards (2011):
Standard #4: Content Knowledge. The teacher understands the central concepts, **tools of inquiry**, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content.

Standard #6: The teacher understands and uses multiple methods of assessment to engage learners in their own growth to monitor learner progress and to guide the teacher's and learner's decision making.

Standard #7: The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

Standard #8: Instructional Strategies. The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

ACEI Standards:

2.3 Mathematics—Candidates know, understand, and use the major concepts, procedures, and reasoning processes of mathematics that define number systems and number sense, geometry, measurement, statistics and probability, and algebra in order to foster student understanding and use of patterns, quantities, and spatial relationships that can represent phenomena, solve problems, and manage data.

3.1 Integrating and applying knowledge for instruction—Candidates plan and implement instruction based on knowledge of students, learning theory, subject matter, curricular goals, and community.

3.2 Adaptation to diverse students—Candidates understand how elementary students differ in their development and approaches to learning, and create instructional opportunities that are adapted to diverse students.

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

Other ACEI 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) Standards for Teachers:
1. Facilitate and inspire student learning and creativity
2. Design and develop digital-age learning experiences and assessments
3. Model digital-age work and learning
4. Promote and model digital citizenship and responsibility
5. Engage in professional growth and leadership

REQUIRED READINGS:

Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2013). *Elementary and middle school mathematics: Teaching developmentally* (8th ed.). Upper Saddle River, NJ: Pearson.

A list of required readings is available on MyMason. There are readings associated with each module. Some of the articles are available on GMU's e-reserves which can be accessed within Blackboard.

Grading Scale:

A	94-100
A-	90-93
B+	86-89
B	80-85
C	70-79
F	Below 70

Description of Assignments:
Assignment #1: Personal Learning Network, 20 points, due: 11/12 [Outcomes 1, 2, 3]
Students will create a Personal Learning Network (PLN). Students will collect resources for teaching and assessing mathematics. These will be organized in a way that makes it easy to use and locate the resources. Students may choose to create a website or use a simple chart to organize the information. The chart should include a column for the resource, a description of

what it provides, and how it will be incorporated into their teaching and learning. Ten to 20 resources should be identified. Students will build on this PLN throughout the technology courses.

Assignment #2: Using a Calculator, 15 points, due: 10/8 [Outcomes 1, 2, 3]
Working in small groups, students will create a top ten list of math concepts that can be taught using a calculator. Students are encouraged to be creative in creating their top ten list. This should NOT be an academic paper, but should follow the top ten lists modeled online.

Assignment #3: Student Error, 30 points, due: 10/29 [Outcomes 1, 2, 3]
Students will identify a common math error being made in their field placement. This could be an error made by one child or several. Students will assess the error and determine what the error is and what is causing it. Students will identify ways to correct this error and ways to teach this conceptually. Students will create a video that shows what the error is and one way to teach the concept so that the error can be corrected.

Assignment #4: Math Centers, 35 points, due: 12/3 [Outcomes 1, 2, 3]
Students will plan and create four math centers. Students will write a lesson plan for the centers. The lesson plan will include, for each center, the objectives and standards of learning addressed, the math levels of the students (grade level, beginning or advanced, etc.), a description of the activity, technology used, how the center will be assessed, length of time spent at the center, and the level of teacher involvement.

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 by 11:30 PM on the due date. Late assignments will not be accepted without making arrangements with the instructor.

The following criteria will be used in the form of a grading criteria sheet or a rubric:

Is the required information presented?
Is the content of the submission accurate?
Does the paper cover the issues discussed in class and in the readings?
Are the ideas presented in a thoughtful, integrated manner?
Does the project show creativity and original thought?

GMU 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. 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 their Mason email account.

d. 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/].

e. 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/].

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

g. 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/].

PROFESSIONAL DISPOSITIONS

Students are expected to exhibit professional behaviors and dispositions at all times. [See http://cehd.gmu.edu/teacher/professional-disposition]

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 [See http://gse.gmu.edu/].

EMERGENCY PROCEDURES

You are encouraged to sign up for emergency alerts by visiting the website https://alert.gmu.edu. There are emergency posters in each classroom explaining what to do in the event of crises. Further information about emergency procedures exists on http://www.gmu.edu/service/cert

Important information needed for successful completion of licensure:

IMPORTANT INFORMATION FOR LICENSURE COMPLETION

Student Clinical Practice: Internship Requirements

Testing

Beginning with Spring 2015 internships, **all** official and passing test scores must be submitted and in the Mason system (i.e. Banner/PatriotWeb) by the internship application deadline. Allow a minimum of six weeks for official test scores to arrive at Mason. Testing too close to the application deadline means scores will not arrive in time and the internship application will not be accepted.

Required tests:

Praxis Core Academic Skills for Educators Tests (or qualifying substitute)
VCLA
Praxis II (Content Knowledge exam in your specific endorsement area)
For details, please check http://cehd.gmu.edu/teacher/test/

Endorsements

Please note that ALL endorsement coursework must be completed, with all transcripts submitted and approved by the CEHD Endorsement Office, prior to the internship application deadline. Since the internship application must be submitted in the semester prior to the actual internship, please make an appointment to meet with the Endorsement Specialist and plan the completion of your Endorsements accordingly.

CPR/AED/First Aid

Beginning with spring 2015 internships, verification that the Emergency First Aid, CPR, and Use of AED Certification or Training requirement must be submitted and in the Mason system (i.e. Banner/PatriotWeb) by the application deadline. Students must submit one of the "acceptable evidence" documents listed at http://cehd.gmu.edu/teacher/emergency-first-aid to CEHD Student and Academic Affairs. In order to have the requirement reflected as met in the Mason system; documents can be scanned/e-mailed to CEHDacad@gmu.edu or dropped-off in Thompson Hall, Suite 2300.

Background Checks/Fingerprints

All local school systems require students to complete a criminal background check through their human resources office (not through George Mason University) **prior to beginning field hours and internship**. Detailed instructions on the process will be sent to the student from either the school system or Mason. Students are **strongly advised** to disclose any/all legal incidents that may appear on their records. The consequence of failing to do so, whether or not such incidents resulted in conviction, is termination of the field hours or internship.

Please Note

Your G-Number must be clearly noted (visible and legible) on the face of the document(s) that you submit.

Application

The internship application can be downloaded at http://cehd.gmu.edu/teacher/internships-field-experience

Deadlines

Spring internship application:
Traditional: September 15

Fall internship application:
Traditional: February 15
Year Long Internship: April 1 (All testing deadlines are August 1 immediately preceding the fall start; RVE deadline is December 1)

BLACKBOARD REQUIREMENTS

Every student registered for any Elementary Education course with a required performance-based assessment (will be designated as such in the syllabus) is required to submit this assessment to Blackboard (regardless of whether a course is an elective, a onetime course or part of an undergraduate minor). Evaluation of your performance-based assessment will also be provided using Blackboard. Failure to submit the assessment to Blackboard will result in the course instructor reporting the course grade as Incomplete (IN). Unless this grade is changed upon completion of the required Blackboard submission, the IN will convert to an F nine weeks into the following semester. **Please Note: There is no program-level, performance-based assessment in EDCI 547.**

ASSIGNMENT #1 Personal Learning Network
20 points possible

Purpose: This assignment enables students to develop a personal learning network, to gather resources that can be used to teach and assess Mathematics to K-6 students.

Procedures:

- Students will read articles provided and explore the resources on personal learning networks.
- Students will join a social network site, a RSS Reader/News Aggregators site, and a social bookmarking. List of possibilities for each are provided in the Resource folder. These tools will enable students to collect and organize information for and assessing math.
- Students will begin gathering technology-based resources for teaching and assessing math to K-6 students. Ten to 20 quality resources should be identified.
- Students should explore the recourses provided in the modules in Blackboard to find additional resources and to understand ways to integrate these resources in the classroom.
- Students will organize the resources in an appropriate manner. Resources might be organized by topic, grade level, technology, or by a system that makes sense to the student.
- Students will create a website or chart to organize their resources. The following information should be included: the name of the resource, a description of what it provides, and how it will be incorporated into their teaching and learning.
- Students will explain the reason why they included each resource and/or how they plan to use it in the classroom. (Common resources may be grouped together with one explanation provided, i.e. there are multiple places available for accessing virtual manipulatives. These can be grouped together and one explanation provided)

Evaluation Criteria:

	Meets Requirements (4 Points)	Partial Requirements (2 Points)	Needs Improvement (1 Point)
Number of Resources	20 or more resources are included.	Ten to Nineteen resources are included.	Less than 10 resources are included.
Organization	There is a clear organization to the resources. The organization makes it easy to locate the appropriate resource for what is being taught.	There is a somewhat clear organization to the resources. The organization makes it easy to locate a given resource. The organization may not connect to a given topic.	There is no clear organization of the resources. It is difficult to find a given resource.
Quality of Resources	There was an effort made to find high	There was some effort to find good	There was little effort to find high quality

	quality resources. The student was selective in what they chose to include in the Personal Learning Network.	quality resources. Although some of the resources are questionable the majority are acceptable.	resources. Student included whatever they could find without considering the worth of the resource.
Variety of Resources	A variety of resources are included. Different types of technologies are included. Resources are appropriate for different grade levels and different topics. There is a balanced variety of technologies for teachers to use and for students to use.	A variety of resources are included. Different types of technologies are included. Resources are appropriate for different grade levels. Although resources identified on Blackboard are included, the majority are unique resources. The majority of the technologies are for students to use.	There is a lack of variety in the resources. The majority of the resources were chosen form Blackboard material. The majority of the resources focus on one grade level or topic. The majority of the technologies are for teachers to use.
Explanation	The student provides a clear explanation for why each of the resources (or group) was chosen. This focuses on how to integrate in the classroom.	The student provides a somewhat clear explanation on the majority of the resources. This focuses on how to integrate in the classroom.	The student does not provide a clear explanation or provides it for less than half of the resources. The focus is on the technology as opposed to integration.

ASSIGNMENT #2 Using a Calculator
15 points possible

Purpose: This assignment enables students to identify ways to integrate calculators and the mathematical concepts taught with the use of calculators. Creating such activities as a Top Ten List is a good way to conduct formative assessments.

Procedure:

- Students will read pages 115-118 from the textbook. These discuss mathematical concepts taught with a calculator.
- Students will read articles provided and explore the resources on using calculators.
- Students will be placed in groups based on their field experience placement.
- Working in groups, each group will create a Top Ten list of Mathematical Concepts Taught with a calculator. All group members are expected to participate and contribute ideas to the group.
- One person from the group will post the Top Ten List on the Discussion board in Blackboard. Students will earn a group grade for this assignment.

Evaluation Criteria:

	Meets Requirements (5 Points)	Partial Requirements (3 Points)	Needs Improvement (1 Point)
Appropriate	Ten appropriate mathematical concepts have been identified.	Seven to nine appropriate mathematical concepts have been identified.	Six or less appropriate mathematical concepts have been identified.
Effort	It is obvious that the students read the material and put effort into creating the top ten list.	It is somewhat obvious that the students read the material and put some effort into creating the top ten list.	It is obvious that the students did not read the material and put little effort into creating the top ten list.
Creativity	Students were creative in how they listed the top ten items. They went beyond just making a list of items.	Students were somewhat creative in how they listed the top ten items. An attempt was made to go beyond just listing the items.	Students were not creative in how they listed the top ten items. They merely listed the items.

ASSIGNMENT #3 Student Errors
30 points possible

Purpose: This assignment will enable students to identify and demonstrate the ability to correct common mathematical errors made by K-6 students.

Procedure:

- Read Ch. 7 from the text book.
- Read the articles in Research on Student Errors folder.
- Explore the Resources on Student Errors folder.
- Explore the articles and resources in the Screencasts folder. These will help you understand how to create a video.
- Identify a child or small group of children who are having difficulty in math.
- Identify the error being made and think about how you could teach this error.
- Create a video that shows how to teach students the concept that is causing the error. Post the video on Edthena.

Evaluation Criteria:

	Meets Requirements (6 points)	Partial Requirements (3 points)	Needs Improvement (1 Point)
Quality of video	The video is clear. It is well organized and easy to follow. It is clear the video was well-rehearsed before filming.	The video is clear for the most part. It is generally well organized and easy to follow. It is clear that there was some rehearsal, but it would have benefited from more.	The video is not clear. It is not well organized and difficult to follow. More rehearsal is needed to avoid sounding like the script is being read.
Narrative	Narrative is clear and loud enough. The narrator uses appropriate inflections.	Narrative is either unclear or not loud enough. Narrator may speak clearly, but the reader has to strain to hear.	Narrative is unclear and not loud enough to hear. Narrator mumbles throughout.
Reason for Student Error	The students' error has been properly identified. Student is able to thoroughly explain the reason for the error and the mistake being made.	The students' error has been somewhat identified. Student is able to adequately explain the reason for the error and the mistake being made.	The students' error has not been properly identified. Student is unable to explain the reason for the error and the mistake being made or had

			identified it incorrectly.
Instructions	Student is able to teach the mathematical concept in a way that is clear for the grade level identified. The instruction is clear and engaging.	Student is somewhat able to teach the mathematical concept for the grade level identified. Although clear for the most part there is still some confusion.	Student is unable to teach the mathematical concept in a way that is appropriate for the grade level identified. The instruction is confusing or uninteresting.
Correction of Error	The instructions provided match with the identified error. It is clear that the instructions were intended for the identified error.	The instructions provided sort of match with the identified error. It is clear that the instructions were intended for the identified error, but parts are confusing or do not seem to fit.	The instructions provided do not match with the identified error. It is not clear that the instructions were intended for the identified error.

ASSIGNMENT #4 Math Centers
35 points possible

Purpose: Students will plan a series of four math centers for use with K-6 students. These math centers will represent appropriate math instruction and will include appropriate use of technology.

Procedure:

- Read the articles in the Research on Math Centers folder.
- Explore the Resources on Math Centers folder.
- Choose a math topic for the grade level you are placed in.
- Create four Math centers for students to rotate through.
- Provide a lesson plan that describes each of these centers. Include the following information: the objectives and standards of learning addressed, the math levels of the students (grade level, beginning or advanced, etc.), a description of the activity, technology used, how the center will be assessed, length of time spent at the center, and the level of teacher involvement.
- Include any technology or websites you or the students will use during the centers.
- Post the lesson plan under Assignments in Blackboards

Evaluation Criteria:

	Meets Requirements (5 Points)	Partial Requirements (3 Point)	Needs Improvement (1 Point)
Math Centers	Four math centers were included. All necessary components are included.	Three math centers were included. The majority of the components are included.	Two or less math centers were included. Less than half of the components are included.
Objectives	The objectives clearly state what students will do during the centers. The objectives are tied to state/national standards. The objectives are tied to the activity and assessment.	The majority of the objectives state what students will do during the centers. The majority of the objectives are tied to state/national standards. The majority of the objectives are tied to the activity and assessment and it is clear how the objectives are assessed.	No objectives are stated or inappropriate objectives are used. Objectives are not distinguishable from state/national standards. Few of the objectives are tied to the activity and assessment. It is not clear how objectives will be assessed.

Materials	A list of materials used during the centers is provided. A copy of the materials is included with the lesson plan. A variety of materials are used in each center (manipulatives, technology, etc.). Appropriate materials are selected for the concepts being taught. The lessons do not *overuse* worksheets.	A partial list of materials used is provided. A copy of some of the materials is provided. There is a lack of variety of materials used. Most of the materials are appropriate for the concepts being taught, but some need more modifications.	No list of materials is provided or materials chosen are not appropriate for the concepts being taught. The materials chosen do not reflect differentiation among the centers. The centers *overuse* worksheets.
Integration of Technology	Integration of technology is appropriate for the concepts being taught. The technology is used to enhance the lesson and to provide a deeper understanding of the material presented. The technology is student-centered.	Integration of technology is appropriate for the concepts being taught. The technology aids to the understanding, but is not necessary for the lesson. The technology is student-centered.	Integration of technology is not appropriate for the concepts being taught. The technology does not aid in the understanding of the concepts. The technology is teacher-centered.
Activity	The activities for all centers are thoroughly explained. The chosen activities will aid in developing students understanding of the math concepts being taught.	The activities for the majority of the centers are thoroughly explained. The majority of the chosen activities will aid in developing students understanding of the math concepts being taught.	The activities for the majority of the centers are not thoroughly explained. The majority of the chosen activities will not aid in developing students understanding of the math concepts being taught. Although the activities are engaging, they do not develop a deeper understanding of the concepts.

Time	An adequate amount of time is provided at each center. Students will be able to complete the assignment in the allotted time. Students will not finish too soon.	An adequate amount of time is provided at the majority of the centers. Students will be able to complete the assignment in the allotted time for the majority of the centers. One center might finish too soon.	An inadequate amount of time is provided at the majority of the centers. Students will not be able to complete the assignment in the allotted time. Students will finish too soon.
Assessment	The assessment describes what the teacher does to assess the students and is clear enough that another person could conduct the assessment. The assessment describes in detail what the students do to demonstrate their understanding of the concept. The assessment is aligned with the objectives.	The description of the assessment is a little vague, but could be implemented by another. The assessment describes what the students will do, but there is a lack of detail provided. The assessment is somewhat aligned with the objectives.	The description of the assessment is unclear. Another person could not implement the assessment. It is not clear what the students will do to demonstrate their understanding. The assessment is not aligned with the objectives.

Class Schedule and Assignments

Access Blackboard for additional information, links, and documents for the class at http://mymason.gmu.edu

Date	Assignment Due (work may be submitted early)	Module to Work On During this Time Period
9/3 Online	Explore the Introduction to Online Learning. Explore the Introduction to the Course.	Personal Learning Networks
9/24 Online	Begin identifying resources for your Personal Learning Network (PLN). Post in MyMason the URL for your PLN.	Calculator
10/8 Online	**Top Ten Uses of a Calculator Due.** Post in MyMason. View each other's top ten uses of a calculator and post comments. Post resources to your PLN.	Student Errors
10/29 Online	**Student Error video due.** Choose two videos to watch. Provide feedback on what you learned and additional resources for teaching the concept addressed. Post resources to your PLN.	Teaching Math
11/12 Online	**Personal Learning Network due.** Complete your PLN website.	Teaching Math
12/3 Online	**Math Center lesson plan due.** Submit to Assessments in Blackboard.	