Making Technology Count for K-8 Mathematics

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Technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. Technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods.

Course Description
In this course, participants will learn how to integrate technology directly into their mathematics instruction, creating technology-integrated projects that are aligned with the Common Core State Standards Initiative for mathematics. Participants will gain a better understanding of some key issues surrounding technology integration, such as how to meet technology standards and which types of technology are best for which purposes. During the course participants will be working with a variety of technology, such as computers, gaming systems, recording devices, and smart phones. Participants will identify potential lessons in their mathematics classrooms that may benefit from technological enhancement, and then devise a plan for integrating technology into their mathematics lessons. In addition, participants will learn how to differentiate products based on students’ interests, strengths, and available technology.

Course Goals
By the end of this course each participant will have created a unit that integrates multiple technological components and effectively disseminate the unit in his/her math instruction. Upon completion of their unit in their classroom, educators will reconvene to discuss the positive and negative aspects of their experience, focusing on construction models that increase student motivation and learning, while utilizing resources effectively and efficiently.

Upon Completion of the course the professional educator should have acquired:

- Review and utilize research regarding the impact of technology in the math classroom.
- Maintain a critical perspective towards the use of instructional technology in math education.
- Recognize the capabilities of a variety of instructional technologies for use in the math classroom.
- Use resources and materials available to assist in designing, delivering, and assessing technology-enhanced instruction.
- Design and implement technology-enhanced math lessons.
- Evaluate the effectiveness of technology-enhanced math lessons.
Course Objectives

Course participants are immersed into the generational characteristics, which define their own, and their students' learning preferences. Participants are teachers of K--8 students who use their specific teaching and learning styles to engage the digital student. Participants will participate in a learning community to share best practices, create a math—learning unit using a variety of technologies and reflect on the experience. By the end of the course all participants are expected:

- Identify potential mathematic lessons or common core standards that may benefit from technology integration
- Devise a plan for integrating technology into new and existing lesson plans.
- Identify and evaluate different types of technology.
- Determine which considerations concerning technology use apply to the classrooms.

Course Requirements

The course is designed as a collaborative four—week online learning experience. Course material is arranged in modules and should be viewed in the order listed. There is no textbook to buy. All material is posted on the University eLearning platform — Canvas. The first two modules are open when the course begins. The last two will be made available after the second week. Students may expect to spend three hours each week participating on the discussion board, posting to a private Journal or class collaboration space, and reviewing course material.

Essential Question

- Why should we make the effort to connect students to math through the technology integration?
- How can technology be used in the math classroom to increase student conceptual understanding and performance?
- What technology tools are specifically designed for the math classroom and instruction?
- What technology tools could be used in the math classroom and instruction?

Grading Criteria

Grades are recorded in the course grade book on a weighted points system. Students may view their progress using the My Grades Tool listed under Student Tools. The orientation activity, posts to the discussion board and class collaboration are all included in the Participation grade. Students are also expected to post weekly private reflections to a Blog and submit a written assignment as the final grade.
Course Expectations

Participation in all assignments and course discussions is required. If you anticipate being away during any part of this course, make plans to have access to a computer connected to the Internet. Late work is not accepted.

Participants are also expected to have basic computer skills, know how to search the web, understand how to send an email and attach a file, and have basic file management skills. A fairly new computer connected to the Internet works best with Canvas and familiarity with the learning management tool is also advised.

If you are new to Canvas or online courses, please review the Canvas student tutorial before you begin the course. By logging into Canvas, you agree to the university Acceptable Use Policy, which also covers academic honesty. To become more familiar with this policy, click here.

Massachusetts Frameworks/Standards

Each weekly unit will incorporate 2016 Massachusetts Digital Literacy and Computer Science Curriculum and ISTE Standards for Teachers.

2016 Massachusetts Digital Literacy and Computer Science Curriculum Standard 2: Digital Tools and Collaboration (DTC)

- Digital tools are applications that produce, manipulate, or store data in a digital format (e.g., word processors, drawing programs, image/video/music editors, simulators, Computer-Aided Design (CAD) applications, publishing programs).
- Digital tools are critical for conducting research, communicating, collaborating and creating in social, work, and personal environments. The use of digital tools is integral to success in school and career.

  - Digital Tools: Digital tools are used to create, manipulate, analyze, edit, publish, or develop artifacts. Individuals and groups identify, evaluate, select, and adapt new tools as they emerge.
  - Collaboration and Communication: A variety of digital tools are used to work collaboratively anytime and anywhere, inside and outside the classroom, both synchronously and asynchronously, to develop artifacts or solve problems, contribute to the learning of others, and communicate.
  - Research: A variety of digital tools are used to conduct research, answer questions, and develop artifacts to facilitate learning and convey understanding. Access to the internet.

ISTE Standards for Educators

1. **Learner:** Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning. Educators:
   1c: Stay current with research that supports improved student learning outcomes, including findings from the learning sciences.

2. **Leader:** Educators seek out opportunities for leadership to support student empowerment and success and to improve teaching and learning.
   2b: Advocate for equitable access to educational technology, digital content and learning opportunities to meet the diverse needs of all students.
   2c: Model for colleagues the identification, exploration, evaluation, curation and adoption of new digital resources and tools for learning.

3. **Designer:** Educator’s design authentic, learner-driven activities and environments that recognize and accommodate learner variability. Educators:
5a: Use technology to create, adapt and personalize learning experiences that foster independent learning and accommodate learner differences and needs.
5b: Design authentic learning activities that align with content area standards and use digital tools and resources to maximize active, deep learning.
5c: Explore and apply instructional design principles to create innovative digital learning environments that engage and support learning.

4. Design and Develop Digital Age Learning Experiences and Assessments
5. Model Digital Age Work and Learning

Course Schedule

Module 1: What does Technology Integration look like in the Math Classroom?

Objective: Explore the meaning of technology integration. How to infuse technology in math classroom instruction seamlessly?

Quiz: Edutopia: Tech Integration Quiz: Tech Savvy Teaching: How Do You Rank?

Discussion Board: How do I approach technology integration?

Assignment:

- Technology Integration Matrix
  - Lesson Review
  - Review and determine how the NETS can integrate with state and local standards.
- Explore the SAMR Model and what it means for the Math Classroom
- Setup a Diigo Social Bookmarking site [http://www.diigo.com/education](http://www.diigo.com/education) Share your link with the class in the discussion forum.

Discuss Board:

- What principles should guide your approach for integrating technology into instruction?

Optional Reading: Technology Integration from George Lucas Foundation: Edutopia A site with technology integration examples, video, lessons, and many useful links. If you click on the Teaching Modules link you will find subject area specific integration resources.
Module 4: Final Assignment: Write a lesson for your class, which incorporates 21st-century literacies, aligns with the unit goals and objectives and supports your personal teaching preferences. Include in your introduction, how this lesson will be received in your classroom. Is this a shift from your normal mode of teaching.

Questions
If you have general questions or need assistance, post your comments to the Class Café discussion board of the course. You may also send an email to jnajarian@framingham.edu. Questions will be answered within 24 to 48 hours. Office hours are by appointment.

Accommodations
Framingham State University offers equal opportunities to all qualified students, including those with disabilities and impairments. The University is committed to making reasonable accommodations as are necessary to ensure that its programs and activities do not discriminate, or have the effect of discriminating, on the basis of disability. Academic Support serves students with learning and psychiatric disabilities as well as students with visual, mobility and hearing impairments.
For further information about this, please visit the website at: http://www.framingham.edu/center-for-academic-support-and-advising/disability-services/index.html or contact Ms. LaDonna Bridges, Director of Academic Support/Disability Services, in the Center for Academic Support and Advising (CASA) at 508-626-4906 or lbridges@framingham.edu.

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