Math Technology Integration
Syllabus

Course Description

Course participants will develop instructional skills needed for integrating educational technologies into their existing math curriculum. Participants will reflect upon how technology enhances teaching and learning and prepares students for further study and professional work in the 21st century. Using cases and online resources as a launching point, teachers will be given the opportunity to participate in on-line discussions regarding beliefs, best practices, challenges, current research, and ways to apply them to their own teaching practice. Case studies present problem solving opportunities that involve course participants in revising and improving math lessons using technology.

Competencies

Upon completion of this course, participants will be able to

- 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.

Materials

All materials are accessed via the CaseNEX website using the PIN provided and the user name/password you create.
All readings listed can be found by going to Class Materials→Virtual Library→Readings (Search).

If you do not have the most recent versions of the following software, please download each from the given sites.

- Windows Media Player
- Adobe Reader
- QuickTime

Cases Used

- Adventure at the Speed of Sound
- Missing the Mark
- The Real World

Course Schedule

Find session dates by selecting Syllabus on the top menu bar. For typical courses, final Discussions, Journals, and Workbooks are due by Saturday at midnight unless otherwise noted. Please see the News Flash for any alterations of the course schedule posted by your instructor.
**Introductory Session**  
*Exploring the CaseNEX Site*

Complete these tasks prior to the beginning of Session 1.

**Readings**

Read the course requirements, paying special attention to the Case-Analysis and Workbook Assignment Rubrics. They will be used by your instructor throughout the course to evaluate assignments where appropriate.

**Discussion**

Post one entry introducing yourself to your classmates. You may choose to describe your professional background and experience, relevant personal information, or why you are taking this course. (100 words or fewer)

**Journal**

What do you find inspiring and challenging about your work in education? (100 words or fewer)

**Note**

Use CaseMail to send a note to your instructor stating that you will be taking this course. To do so, click on CaseMail on the top menu bar and then 'Click here to create a new message.' Use the marked link to look up an address. Continue linking down until you see the class list. Select the instructor’s name and then compose your message and hit ‘Post Message.’
Session 1
Assessing the Use of Technology in Your Classroom

Case
None this session

Readings
- Project Tomorrow: Speak Up
- Digital Disconnect
- How Teachers View Technology
- Technology Self-Assessment Tool
- Technology Integration
- Thinking (and Talking) about Technology in Math Classrooms

Discussion

In the article “Project Tomorrow-Speak Up” the change in the digital learner evolves over time. As the digital learner has emerged over the past ten years, we have noticed a significant shift in the student perspective on using technology for learning. In 2003, the students’ focus was on getting access to the Internet, and learning how to circumvent the obstacles in their school that limited their access. Today, while access is still not universal for all students, the students’ attention is now focused on how to use a wide range of digital tools and resources to enable a highly personalized learning experience.

Now think about your perspective of technology integration in your classroom and how it has changed over the past decade. How has your focused shifted with the changing times? Do you feel that your school is ahead of the digital learner, right along with the digital learner or far behind the digital learners of today?

Journal

In order to be able to meet the individual needs of your digital learners you need to first evaluate their understanding of technology and the ways they are able to use it independently. Create a technology survey for your students using SurveyMonkey or another online survey tool. Give the assessment to your students and then collect the results. Reflect on their responses. What issues arise as a result of this assessment and what actions do you plan on taking as a result?
Describe the specific issues that you will need to consider for your classroom.

Note

Check your CaseMail (linked from top menu bar) and News Flash (on the right when you login) for notes from your instructor every time you log on to the site.

Workbook

None this session
Session 2
Collecting Quality Math Resources

Case
Adventure at the Speed of Sound

Readings
• Guidelines for Technology Integration in Mathematics
• How to Teach With Technology: Science and Math
• Sample Technology Lesson Plans
• Illuminations

Optional Readings
• Technology Integration for Math engagement
  http://timeproject.edublogs.org/
• Winning Equation: How technology Can Help Save Math Education
  http://www.edutopia.org/technology-math-education

Discussion
Discuss the Lesson Plans reading from the perspective of both Cherisa and Charlie. Drawing from your own experience and using knowledge from the reading, critique the two lesson plans presented in the case. What actions do you suggest Cherisa and Charlie take to improve their plans?

Journal
Take a closer look at the Illuminations website. How could you utilize this site as an educator? How could this site be utilized for students? Plan one way that you could incorporate this site in your classroom. Share your experiences in searching for resources to help you create technology-enhanced lessons. What issues do you face? What measures are in place at your school to assist you? Upon completion of this course, what actions can you take keep your own collection of quality resources updated?

Workbook
None this session
Session 3
Integrating Technology in Math Instruction: Prezi

Case
The Real World

Readings
- Prezi: The New PowerPoint
- Prezi in the Classroom
- Prezi: Advantages and Disadvantages
- Prezi Presentation Ideas and Tutorials

Discussion

According to some, Prezi is “the new PowerPoint.” Research demonstrates that there are pros and cons to integrating Prezi in the classroom. Making reference to the knowledge that you have gained from the readings, share how you could integrate Prezi into your classroom. If you used a tool like Prezi in your classroom, what would be the consequences for your learners?

Journal

Like PowerPoint, Prezi can be a valuable instructional tool for teachers as well as an engaging assessment option for students. Making reference to the knowledge you have gained from the readings, critique Lena’s PowerPoint presentation in Scene 2 of the case. Consider the lesson from the perspective of her students. What actions could she take to improve upon the PowerPoint lesson? What consequences do you expect for her students?

Workbook

None this session
Session 4  
*Integrating Technology in Your Math Instruction: Excel*

**Case**  
Adventure at the Speed of Sound

**Readings**  
- EXCEL-lent Middle School Math Lessons!  
- Collecting and Analyzing Data The Soda Survey  
- Integrating Technology into the Classroom to Bridge the Minority Gap

**Discussion**

Compare Cherise and Charlie’s lesson from the case to the lessons presented in the Collecting and Analyzing Data reading. Consider the technologies each teacher made use of, and the actions each took to promote deeper analysis and understanding through the use of these technologies. Discuss the consequences for their students. Making reference to the readings, what modifications and/or additional knowledge would you offer Cherise and Charlie to improve their unit for future classes?

**Journal**

Cherise and Charlie are frustrated with the data collection portion of their lesson. Consider the issues they face from the perspectives of students, teachers, and families. Using knowledge from the readings, suggest actions they might take in response. How critical is the source of data for this lesson? What other sources of data could they use? If applicable, reflect on a similar personal experience.

**Workbook**

Prezi or Excel Math Lesson Plan

Incorporate a Prezi presentation or Excel spreadsheets into a math lesson plan that you will be teaching in the next two weeks. Note that the readings contain tutorials and resources to help you use these programs. To submit the prezi or Excel documents, attach them to your Workbook along with your lesson plan. Include in your plan:

- Description of classroom, students, grade level, and any other
relevant information;
- Goals and objectives of unit and lessons;
- Grouping of students;
- Materials;
- Procedures;
- Assessment of student understanding (informal or formal);
- Rationale for your choices, including knowledge from the readings; and
- Reflections on implementation of this lesson, including your successes and challenges using PowerPoint

(Note: If you are taking this course during the summer you are expected to make every effort to involve students in your assignments as noted. Accessing students in summer school programs, or working with those you know socially are acceptable alternatives to implementing assignments with your own class when that option is not available. If you cannot arrange access to students, the student feedback and reflection portions may be omitted at the instructor’s discretion).

Due at the end of this Session 5
Session 5
Using Technology to Support Limited English Proficient Learners and Special Needs Students

Case
The Real World

Readings
- Using Technology to Support Limited-English-Proficient (LEP) Students' Learning Experiences
- Reforming Mathematics Instruction for ESL Literacy Students
- Tech Solutions for Special Kids
- Inclusion in the 21st-century classroom: Differentiating with technology

Discussion
Describe the English language learner student population in your school and classroom. What resources are in place at your school to address the academic needs of limited English proficient (LEP) students? How is technology integrated into LEP mathematics instruction currently? Consider the degree to which Lena Pryzinski in this session’s case has integrated technology effectively in her classroom to promote the TESOL goals and learning expectations outlined in the “Using Technology” reading. What further actions would you recommend she take to address the issues she faces in the case?

Journal
Consider the students you work with who have special needs. Currently, how do you use technology to support their learning? Using knowledge from the readings, what actions might you take to further support your students’ mathematical knowledge, understanding, and growth? Explore the potential of technology to meet the needs of special needs students. In what ways might you integrate technology for limited English proficient students? What might be these students’ perspectives on the technology-integrated classroom?
Workbook

*Prezi or Excel Math Lesson Plan* due by the end of this session.
Session 6
Assessing Technology-Enhanced Lessons and Using Technology to Make Interdisciplinary Connections

Case
The Real World

Readings
- Assessment in Technology Education: What, Why, and How?
- Technology Assessment and Evaluation Resources
- Promoting Appropriate Uses of Technology in Mathematics Teacher Preparation
- Learning Environments and Rapidly Evolving Handheld Technologies
- Handheld Devices Make Inroads in the Classroom

Additional Resources
- Center for Technology and Teacher Education
- Pre-K-2 Students Play and Learn Online
- Technology in Math Education
- General Mathematics

Discussion
Review the five guidelines for appropriate use of technology in teaching mathematics from the “Promoting Appropriate Uses of Technology” reading. Then, consider Lena’s math lesson in this session’s case and the degree to which she meets these guidelines. What specific actions might you suggest she take to meet all five guidelines? What might be her students’ perspectives on your suggested changes? Based on knowledge from both readings, discuss how technology can serve as a unique vehicle for students to master math content.

Journal
Technology needs to be used to teach learners to make real world connections. Drawing from your own experience and/or using knowledge from the readings and the case, discuss how PDAs and other handheld devices can benefit both teachers and students. What would be the advantages to teachers and students of utilizing such technology, and how can it be used to make real world connections?
teachers can use technology to make real world connections. What **issues** do you and other teachers face in the process? What **actions** can you take to collaborate with your colleagues on technology-enhanced interdisciplinary lessons?

**Workbook**

Exploring Technology Resources: Lesson Plan Development and Implementation

Locate three technology-enhanced math activities appropriate for the grade level you teach. You may select from the resources provided or search elsewhere. For each of the three activities, include:

- a brief summary of the activity;
- a link to the activity;
- any relevant bibliographical information;
- objectives for using this activity; and
- how this activity meets which standards.

Then, focus on your district’s math standards and the guidelines for integrating technology in the math classroom, as presented in course readings. Develop a lesson using at least one of these resources that you can implement in the next two weeks that targets objectives from your math curriculum. Write a lesson plan, including the following information:

- Description of classroom, students, grade level, content, languages spoken, and any other relevant information;
- Goals and objectives, including local and state standards;
- Grouping of students;
- Materials, including relevant technology;
- Procedures, including specific research-based methods from course readings;
- Assessment (formative and/or summative);
- Reflections on your implementation of this lesson and ideas for its refinement.

(Note: If you are taking this course during the summer you are expected to make every effort to involve students in your assignments as noted. Accessing students in summer school programs, or working with those you know socially are acceptable alternatives to implementing assignments with your own class when that option is not available. If you cannot arrange access to students, the student feedback and reflection portions may be omitted at the instructor’s
discretion).

This assignment is due by the end of Session 7.

Session 7
Engaging Students through Technology

Case
Missing the Mark

Readings
- Why Use an Interactive Whiteboard? A Baker’s Dozen Reasons!
- Tools for Teaching: Motivating Students
- Integrating Technology into a Math Lesson
- Math Machine Archive: Math Games

Discussion

Consider the degree to which the students in the reading “Integrating Technology into a Math Lesson” presented in this case are motivated by the lesson. What **issues** arise throughout the lesson? Making reference to the readings, what **consequences** (both positive and negative) can educational technology have for student engagement? What **actions** from the article might Lucy take to incorporate technology to engage students?

Journal

Using the “Math Machine archive Math Games” site, take a closer look at 3 of the game links. What **actions** might you take to incorporate these games into your classroom. What would be the students **perspectives** on the use of these specific sites? Reflect on times when students are engaged in your classroom. What are the characteristics of these lessons or units? Consider a range of student **perspectives** on the use of technology in your classroom. What **actions** might you take to incorporate technology with the specific goal of increasing student excitement, interest, and engagement in learning
mathematics?

**Workbook**

*Exploring Technology Resources: Lesson Plan Development and Implementation* due by the end of this session
Session 8  
*Managing a Technology-Enhanced Classroom*

**Case**  
Missing the Mark

**Readings**
- Classroom Management Strategies for Computer Use (Click on “download now” to access this reading).
- Classroom Technology Management Strategies
- Teaching with Technology
- Classroom Management Strategies for Computer Use

**Optional Readings**
- Effects of technology on Classrooms and students  
- Math Resources for use in Classroom or at Home  

**Discussion**

Focus on Lucy Hamilton in the Missing the Mark case and discuss the classroom management and student engagement issues she faces. Making reference to the readings, suggest actions Lucy might take to set up a classroom that uses multiple forms of technology. How might she “use the internet to strengthen curriculum?” What consequences do you predict for her students and her classroom climate?

**Journal**

Consider issues you have faced using technology in your classroom. What actions have you taken in response? What additional actions are suggested by the readings? Does your school or district have an acceptable use policy? What are your students’ (and your own) perspective on this policy and other restrictions to access imposed by you or your school or district?

**Workbook**

Search online for lesson plans by various interactive whiteboard
vendors. Locate a lesson on a website or develop your own lesson that you could implement with your students in your classroom. Address all of these questions in a brief overview of your lesson:

- Description of the class (e.g. subject, grade level, demographics, achievement level)
- Topic of the Lesson
- State Standards addressed
- Objectives
- Rationale for the lesson
- Other materials needed
- Procedures: What will the teacher be doing? What will the students be doing?
- Assessment/Evaluation: How will you know the students have met the objectives?
- If you were able to teach the lesson, give feedback on the lesson. What worked, and what did not work?
- What were the students’ perspectives on the lesson and the technology used?

Due by the end of this session