

MTED 5318
Current Topics in Math Education:
Technology in Math Classroom
Fall 2018 – Syllabus

University of Texas at El Paso
 College of Education, Department of Teacher Education

| | | | |
|---|--|---------------------|---|
| Instructor | Dr. Song An | E-mail | saan@utep.edu |
| Phone | 915- 747-7616 (office) | Office Hours | M & T 10:00 am– 12:15 am Other time by appointment |
| Office/Lab | College of Education, EDUC 808 and EDUC 201 | | |
| Class Time | Saturday 8:30am – 11:15 pm Education Building 405 On-line discussions throughout the semester | | |
| This syllabus is subject to change as needed. Any changes to the syllabus will be announced in class. | | | |

Course Description

Students enrolled in this course will be exposed to different theories about using technology (in various forms) to teach mathematics. Basing their ideas on research and practitioner literature as well as theories of learning mathematics, students will participate in discourse on the use of technology in the mathematics classroom. Students will determine appropriate roles for technology in teaching key concepts within specified mathematical domains (e.g. algebra, geometry, and statistics) through their own inquiry-based experiences. Additionally, the management and assessment of online learning environments and the Flipped Class model will be discussed.

Course Objectives/Student Learning Outcomes

| |
|---|
| <i>Students enrolled in this section will have multiple academic goals to achieve:</i> |
| 1. To study current research trends and issues in the use of technology for teaching and learning of mathematics |
| 2. To become familiar with and adept at using various types of interactive software and devices (e.g. graphing calculators, Geogebra, TinkerPlots) |
| 3. To identify and discuss problems associated with the use of technology for teaching and learning mathematics |
| 4. To incorporate technology, including web-based resources and open source materials, into classroom practice (i.e. curriculum planning and lesson planning) |
| 5. To define areas of technology education research most applicable to advancing the teaching and learning of mathematics |

Required Reading Materials

(1) *Teaching Children Mathematics*, (2) *Mathematics Teaching in the Middle School*, (3) *Mathematics Teacher* (All three journals are accessible through the **UTEP library website**)

Attendance, Participation and Professionalism

Attendance of individuals in the class is required and unexcused absences will result in a grade reduction. University rules regarding absences will be followed for the required class meetings. There will be a student sign-in sheet at the beginning of each class. If a student misses a session, it is the responsibility of the student for knowing and completing all work required. Each attendance will count towards the final grade. Two tardies (including early leaves) will count as one absence. More than two absences may result in a student earning one-letter grade lower in the course.

Students are expected that students will attend all classes and actively participate in working on projects and class discussions. Students are expected to prepare for each class session. Lateness to class is strongly discouraged. With the emphasis on collegiality it is important that all group members be in class to contribute to the group's effort in developing an understanding of what it means to teach mathematics effectively.

All students are expected to demonstrate the ethical and professional values associated with K-12 Level Education. It is critical teaching candidates adopt and exhibit a professional demeanor at each point in their teacher preparation. Evidence of professional dedication will be expected through all work during classes and practicum, seminar, internship, and clinical experiences. Credit for participation and professionalism will be part of the evaluation. *Wireless phone usage is strictly prohibited in class.*

Assignment Format and Late Assignments

All assignments must be submitted electronically unless specified. It is highly recommended you save all your work electronically and possibly a hardcopy for your records before turning it in. The following format is **required** for every assignment submitted. Deviating from the format may result in reduced points, returned paper, or rejection of the assignment completely. All assignments should be single spaced and typed with 12-point font; page numbers should be included if more than one pages. **You must label your assignment as you save it containing your name and the assignment name.** Only assignments submitted complete and on time will be considered for full credit. Without evidence that you were unavailable (sick) for the entire range of days, the assignment will be given a zero. Any assignments turned more than one week late (or the range of dates for submission) will receive zero points.

Policy on Academic Dishonesty

The University of Texas at El Paso prides itself on its standards of academic excellence. In all matters of intellectual pursuit, UTEP faculty and students must strive to achieve based on the quality of work produced by their individual. In the classroom and in all other academic activities, students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. It is imperative, therefore, that all faculty, insist on adherence to these standards.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the

attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

Students with Special Needs

The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protections for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides a reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please notify your instructor and contact Disabled Student Services (DSSO) at 747- 5148 or at dss@utep.edu or come by Room 106 Union East Building.

Inclusiveness and Equity

Learning happens only when we feel respected as a whole human being. My top priority in our classroom is to cultivate relationships of trust and respect and a sense that we see each other as whole, complex human beings. That you experience this in our classroom is important for the sake of your learning in our course *and* for the sake of your future students' learning, so that you feel able to cultivate such relationships with them. To that end, I want you to know that all of you is welcome in our classroom space—all the parts of you as a person are welcome in our discussions, our activities, our assignments, and in our assessments. We are all complex people with a variety of perspectives, experiences, challenges, assets, and resources—our gender identities, our sexual orientations, our religions, our races, our ethnicities, our economic statuses, our immigration statuses, our parenthoods, our veteran statuses, our ages, our languages, our abilities and disabilities. All the parts of you are welcome in our learning community to the extent that you feel comfortable bringing them in. I strive to show respect for the variety and wholeness in each of you, and I expect that each of you shows respect for each other as well. If you feel marginalized in our class, and you feel comfortable discussing it, I would like to know so that I can support you, protect you, and make changes that feel more inclusive and equitable. You can also talk with our Department Chair and/or you can report a complaint of discrimination to the University's Equal Opportunity Office, Kelly Hall, Third Floor, 915-747-5662 or coaa@utep.edu.

Course Requirement

Attendance and Class Participation

Your active participation in each class session is vital to your learning as well as to the learning of other students in the class. I expect you to attend all class meetings prepared for active, collaborative, participation during the session, whether it is whole group discussion, small group activity, or individual reflection. Preparation for class involves completion of assigned readings and tasks. Active participation includes, but is not limited to, the following: asking probing question about the reading assignments, making comments during class discussions, bringing relevant handouts, or journal articles to class for distribution to classmates, making recommendations for further reading on a topic under discussion, suggesting activities to enhance the investigation of a philosophical issue, and being prepared to answer questions about assigned topics. If you are unable

to attend a particular class session, please let me know beforehand. You are responsible for contacting someone in the class to find out what transpired in your absence.

Activity Demonstration

You will teach two lessons based on different educational technology for different mathematics topics on a specified date in class. The demonstration should be about **45 minutes** in length. In the lesson demonstration, you will provide interactive activities to the class. Your role in the activity demonstration is to be a "peer leader", that is while other students work in small groups, you will be providing content activities, and will help to maintain and encourage student interest and focus on conceptual understanding through interactions.

- You will demonstrate the first lesson in week 7 or 8 based on non-digital technology
- You will demonstrate the second lesson in week 11 or 12 based on digital technology

Additional resources:

- National Council of Teachers of Mathematics/Illuminations: <http://illuminations.nctm.org/>
- National Library of Virtual Manipulatives: <http://nlvm.usu.edu/>
- Science NetLinks: <http://www.sciencenetlinks.com/>
- Statistics Education Research Group: <http://www.srri.umass.edu/serg>

Article Review

During week 2-12, each week you will write a comprehensive critique report (no less than 400 words) for the assigned article. Not to just summarize or synthesize the article contents, the key task is for you to **EVALUATE** the texts. A critique does not necessarily have to criticize the piece in a negative sense. Your reaction to the text may be largely positive, negative, or a combination of the two. Here are some tips for you to prepare your critique reports.

The critique is a rigorous critical reading of a text (e.g., article, chapter, passage). As such, it picks up where the objective summary leaves off. In fact, a critique often includes a brief summary so that its readers will be able to quickly grasp the main ideas and proofs of the text under examination. Critiques come in all shapes and sizes, but a good way to writing critically is to plan along the following lines. First, read the passage thoroughly. Make plenty of notes, ask lots of questions, and highlight or underline anything you may wish to quote in your paper. Spend some time on this step. It is impossible to adequately critique something if you don't fully understand it.

Next, write a summary. Identify the author's main point (thesis) and list the types of proofs he or she employs to persuade the reader to believe or accept the thesis. For example, does the author use historical perspectives, quote noted authorities, provide statistical evidence, or appeal to a reader's common sense? You should also try to figure out why the author is writing, and to whom.

Online Discussion

During week 2-12, in each week, you will prepare answers to our weekly discussion questions. Throughout the semester you will participate a series online discussion about strategies and issues in educational research process. You should post answers to each discussion questions (no less than 200 words), the answer should be brief, meaningful, well thought-out, and articulate. Post your first response by the due days and post your follow up responses in the following two days. Read all the postings of your peers, and interact with your peers in a positive manner. You will reply at least three of your classmates' posts in a meaningful way.

Final Project

As the course final project, this assignment requires you to identify the trend of educational technology research in the field of mathematics education by exploring research articles from one of the top-tier research journals in the field of educational technology and/or mathematics education (the journal list can be found in the Blackboard). Specifically, you will select at least 30 articles published in the past 5 years—**YOU DON’T NEED TO READ THE WHOLE ARTICLE**, instead, you need to read the **TITLE, KEYWORDS, AND ABSTRACT** of each of your selected articles. Explore the patterns across these studies from the perspective of coherence in research topic and methodology. You will write a report (free essay format, at least 1000 words) to demonstrate the trend of education technology that you identified.

General Calendar

Changes may be made in this syllabus when judged appropriate by the instructor

| Date & Location | Class Topics/Activities | Assignments <i>Due on Sunday Midnight</i> |
|----------------------------|---|--|
| Week 1 Sep 1 | Defining educational technology Face to Face Meeting | |
| Week 2 Sep 8 | Adaptation to educational technology Face to Face Meeting | Article Review Online Discussion |
| Week 3 Sep 15 | Resistance to educational technology Virtual Meeting | Article Review Online Discussion |
| Week 4 Sep 22 | Educational materials I Virtual Meeting | Article Review Online Discussion |
| Week 5 Sep 29 | Educational materials II Virtual Meeting | Article Review Online Discussion |
| Week 6 Oct 6 | Educational devices I Virtual Meeting | Article Review Online Discussion |
| Week 7 Oct 13 | Educational devices II Face to Face Meeting | Article Review Online Discussion |
| Week 8 Oct 20 | Learning management systems Face to Face Meeting | Article Review Online Discussion |
| Week 9 Oct 27 | Computers in education Virtual Meeting | Article Review Online Discussion |
| Week 10 Nov 3 | Mobile devices in education I Virtual Meeting | Article Review Online Discussion |
| Week 11 Nov 10 | Mobile devices in education II Face to Face Meeting | Article Review Online Discussion |
| Week 12 Nov 17 | Social networks and educational websites Face to Face Meeting | Article Review Online Discussion |
| Week 13 Nov 24 | Thanksgiving Break | |
| Week 14 Dec 1 | Virtual reality and virtual classroom Virtual Meeting-Final Project A | Final Project |
| Week 15 Dec 8 | Educational video games Virtual Meeting-Final Project B | |