



Teaching Algebra with Technology Online Participant Syllabus

Course Description

This course is designed for 6-12 educators who are interested in enhancing their repertoire of technology to create dynamic algebraic lessons. Participants will explore useful techniques to create more effective technology lessons, software packages, web resources, graphing calculators, and instructional materials used to integrate technology into algebra instruction.

Course Prerequisites

No prerequisites for this course are required.

System Requirements

- Computer with word processing software
- Internet access connection
- Online video viewing capabilities/Adobe flash player
- Software capable of reading PDF files

NOTE: Additional software will be used, but will either be free and open-source or trial versions, and will be based on the individual needs of each teacher's needs. The instructor will work closely with each teacher to assist in determining the appropriate software.

Text Books/Supplemental Reading

No textbook is required for this course. Critical reading of assigned articles and text is embedded throughout the course.

Global Goals of the Course

To deepen and/or apply the content and skills of the teacher's existing professional knowledge base by meeting the following global goals of this course:

1. To develop a sound comprehension/understanding of technology tools to facilitate student learning in Algebra (NBPTS 1, 2, 3, 4; ISTE 1, 3; InTASC 1-8)
2. To synthesize lesson plans, activities, and quizzes/tests that integrates technology and Algebra concepts (NBPTS 1, 2, 3, 4; ISTE 1, 2, 3, 4; InTASC 1-8)

3. To synthesize an extensive project that covers several Algebra concepts and use technology to collect, analyze, and display data (NBPTS 1, 2, 3, 4; ISTE 1, 2, 3, 4; InTASC 1-8)
4. To internalize and apply effective motivation strategies when using technology in the classroom (NBPTS 1, 3, 4; ISTE 1, 2, 3, 4; InTASC 1-8)
5. To understand and integrate dimensions of ISTE standards into the classroom instruction (NBPTS 1; ISTE 1, 2, 3, 4, 5; InTASC 1-8)
6. To examine techniques to explore, assess, and customize technology to fit classroom needs (NBPTS 1, 2, 3, 4; ISTE 1, 2, 3, 4, 5; InTASC 1-9)

Instructional Objectives

By the conclusion of the course, each teacher will:

1. Demonstrate familiarity with ISTE National Educational Technology Standards.
 - 1.1 Examine/understand the ISTE Standards.
 - 1.2 Understand the ISTE standards and how they apply to the classroom.
 - 1.3 Construct and evaluate lesson plans that are related to the ISTE standards.
 - 1.4 Customize lesson plans to specific strands of the ISTE standards.
2. Explore techniques for motivating students with technology.
 - 2.1 Examine proven motivation strategies.
 - 2.2 Understand and evaluate which strategies are effective for the classroom with technology.
 - 2.3 Examine and create theoretical foundations for using technology in the classroom.
 - 2.4 Analyze which theoretical foundations are important to classroom success.
3. Explore technology with the concepts of Order of Operations, Real Numbers, and the Coordinate Plane.
 - 3.1 Explore/discuss appropriate use of the calculator in Order of Operations.
 - 3.2 Assess supplemental websites that improve instruction of Real Numbers and the coordinate plane.
 - 3.3 Creation of a classroom presentation on Order of Operations or the Coordinate Plane with websites.
4. Investigate Ratio and Proportions and technology to effectively enhance instruction.
 - 4.1 Explore websites that apply to the topic of Ratio and Proportions.
 - 4.2 Construct/create a worksheet that uses a website that demonstrates Ratios and Proportions.
 - 4.3 Customize a worksheet that is related to the ISTE standards and Ratios.
5. Review Systems of Equations and common teaching methods.

- 5.1 Reflect on past methods of teaching systems and how technology can improve on the concerns of the past.
- 5.2 Explore/create real world problems using systems and the difficulties students have with them.
- 5.3 Use/evaluate online resources to develop quizzes and tests for Systems of Equations.
- 5.4 Use/evaluate online resources to create review materials for Systems of Equations.
6. Developing Relationships between Data and Drawing Conclusions using technology.
 - 6.1 Review/analyze Algebraic strategies for reasoning.
 - 6.2 Review various representations: Table, Algebraic, Graphical, Numerical data.
 - 6.3 Create a multimedia presentation on Data and Drawing Conclusions.
7. Applying examples of entertainment to explain probability to students.
 - 7.1 Discuss/analyze Theoretical and experimental probability.
 - 7.2 Understand how to connect probability and algebra.
 - 7.3 Explore/evaluate/create games in the classroom.
 - 7.4 Construct a presentation that teaches probability.
8. Developing Applications of Trigonometry and Quadratics in Algebra.
 - 8.1 Discuss/understand why to teach Quadratics and Trigonometry in Algebra.
 - 8.2 Explore/evaluate web resources on Quadratics and Trigonometry.
 - 8.3 Construct quizzes and tests on Quadratics and Trigonometry using technology.
 - 8.4 Apply/understand the role of the Graphing calculator in quadratics application.
9. Connecting "Real World" mathematics to the classroom.
 - 9.1 Explore real world mathematics and technologies that you can bring into your classroom.
 - 9.2 Address financial concerns of these technologies.
 - 9.3 Create several activities that demonstrate real world mathematics and applies technology that you can be obtained for any classroom.

Teaching Methodology and Delivery Model

Teaching methodologies used in this course are specifically designed to maximize learning in a graduate-level, online distance-learning model. Each course facilitator is trained and/or experienced in facilitating graduate-level online courses as well as the specific content and skills of this course.

1. Online methodologies include instructor/expert presentations, directed skill practice, Forum and Assessment completion, as well as the synthesis of new knowledge and skills in designing educational applications.

2. The course is taught in a supportive learning environment with teacher-participant interaction and feedback.
3. Content focuses on the presentation of advanced concepts linked to instructional strategies which accommodate learning needs of a diverse student population.
4. Course content, activities, and assignments are organized into Milestones that participants complete during the 12-week span of the course. Course content is intended to cover material equal to 45 seat hours of instructional time.
5. Class participants actively construct their own learning and make it personally relevant by acquiring and applying course knowledge/skills to their own teaching situation.

Learning Assessment

Formative assessment of learning objectives for this course is conducted informally throughout the course via discussion, critiques, self-evaluations, instructor feedback, and activities requiring participants to make sense of new knowledge and/or skills within their realm of teaching. Additionally, three formative assessments are embedded within the course. Summative assessment for the course occurs in the form of a final project which requires each participant to synthesize class content and apply it within the teacher's specific teaching environment.

Compliance with National Board of Professional Teaching Standards

The National Board of Professional Teaching Standards represents the highest level of professional achievement in the continuum of teacher professional development. There are five core principles (standards) which cover five aspects of professional educational practice: (1) commitment to students and their learning, (2) knowledge of subject matter and instructional strategies, (3) management and monitoring of student learning, (4) systematic reflection about the teaching profession to learn and grow from experience, and (5) collaborative participation in the educational learning community.

Compliance with Interstate Teacher Assessment and Support Consortium (InTASC) Standards

The Interstate Teacher Assessment and Support Consortium's work is guided by one basic premise: An effective teacher must be able to integrate content knowledge with the specific strengths and needs of students to assure that all students learn and perform at high levels. All teachers should meet the following standards: (1) learner development, (2) learning differences, (3) learning environments, (4) content knowledge, (5) application of content, (6) assessment, (7) planning for instruction, (8) instructional strategies, (9) professional learning and ethical practices, and (10) leadership and collaboration.

Compliance with ISTE Standards for Technology in Education

Effective teachers model and apply the National Educational Technology Standards for Students as they design, implement, and assess learning experiences to engage

students and improve learning; enrich professional practice; and provide positive models for students, colleagues, and the community. All teachers should meet the following standards: (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.

Compliance with National Council of Teachers of Mathematics (NCTM)

The course content focuses on helping teachers to acquire and apply knowledge and skills for use in the teaching profession, and these uses are documented with the NCTM principles for mathematics instruction which explain specific principles outlining the instruction of mathematics.

Final Projects

Participants taking courses for professional development unit (not-for-credit) must follow the same Participation Expectations as posted in the course syllabus. Participants complete readings and tasks as outlined in the Task List. Forum Post Reflections are also required. However, participants will be exempt from completing the Formative and Summative Assessments unless otherwise noted. Proof of seat hours will be presented to the participants after completing the state required course evaluation located on the student portal.

In keeping with best instructional and assessment practices, this course requires participants to demonstrate synthesis and application of course knowledge in an applied final project linked to the instructional objectives of this course. Assessment of the project should not be limited to the quantity of work submitted but should carefully consider the quality and intellectual value of the work.

Final projects are due and will be submitted to the instructor within 12 weeks of the allotted class time. Unless the instructor states otherwise, all papers are expected to be properly formatted electronically.

Assessments and Grading

Throughout the course, participants will engage in both formal and informal formative and summative assessments. Points are assigned based on a four-point criterion rubric specifically delineated for each assessment that can be further defined as follows:

Distinguished: The assessment is highly imaginative; demonstrates critical thought; is unique; shows substantial application to one's own teaching or professional position; *goes above and beyond requirements*; is creative; demonstrates both breadth and depth of knowledge of transition-related subject matter; shows individual's personality; is professional in presentation and appearance; and demonstrates considerable effort. The assessment is exceptionally completed and demonstrates clear understanding of the tasks, gives explanations, and shows how the assessment applies to a

teaching/learning situation. The assessment meets the specific criteria delineated in “Distinguished” on the course rubric.

Proficient: The assessment is well-organized and complete; is effectively and clearly presented; demonstrates clear understandings; applies what has been learned to the author’s own classroom situation; clearly shows connections; is detailed; and is thoughtful and supported with ideas. A thoroughly completed assessment demonstrates that the participant shows awareness of the tasks, gives explanations, and shows how the assessment applies to a teaching/learning situation. The assessment meets the specific criteria delineated in “Proficient” on the course rubric.

Basic: This is the lowest passing grade. The assessment meets minimum requirements; includes general information but lacks descriptive detail; shows limited application to teaching/learning; and lacks originality. This denotes work that does not meet **all** aspects of standards for academic performance in a graduate-level course. The assessment meets the specific criteria delineated in “Basic” on the course rubric.

Unsatisfactory: The assessment is missing evidence or information; is sloppy and poorly organized; demonstrates only surface understandings; shows no evidence of application to the author’s own teaching situation; is poorly written; and does not meet minimum standards for academic performance in a graduate-level course. The assessment meets the specific criteria delineated in “Unsatisfactory” on the course rubric.

The assessments for this course are weighted as follows:

Participation and Reflection	30%
Formative Assessments	30%
Summative Assessments	40%

Academic Honesty and Integrity

All participants are expected to maintain academic honesty and integrity by doing their own work to the best of their ability. Academic dishonesty (cheating, fabrication, plagiarism, etc.) will result in the participant receiving a zero for that assignment or paper.

Americans with Disabilities Act Compliance

In compliance with Section 504 of the Rehabilitation Act and The Americans with Disabilities Act, participants who have any condition, either permanent or temporary, which might affect their ability to perform in this class, are encouraged to inform the Director of Academic Affairs prior to the first class session. Reasonable academic accommodations, aids, and adjustments may be made as needed to provide for equitable participation.

Attendance

Participants will have 12 weeks from the time of their first date of login to complete the course. They will need to contact their instructor and The Connecting Link at (888) 550-5465 should they not be able to complete the online class in the time given. Failure to complete all work in the 12 week time frame may result in an **incomplete** or a grade of **F** for the work, depending on the reason for the delay.

University Compliance

Course content and instruction are bound by policies associated with the university granting academic credit for the course. Such policies include, but are not limited to: academic integrity and honor codes, institutional objectives and grade grievance procedures. These policies are located within the official academic catalogs which can be accessed through the university's official website.