The 21st Century Mathematics Classroom (9-12)
Online Participant Syllabus

Course Description

This course is designed to provide teachers with relevant teaching strategies to make teaching and learning mathematics enjoyable. By the time students reach high school, many have been unsuccessful in learning math or find math to be tedious. Learning math can be positive when students can connect mathematics to their experiences. Students can be given the tools for discovering and constructing knowledge and for deriving meaning for themselves. In turn, they can develop life-long skills and transform into successful, confident problem-solvers. In this course, teachers will learn methods and skills to facilitate this development process. This curriculum is designed to address current math standards, particularly the emerging Common Core State Standards and will include the incorporation of technology in the mathematics classroom.

Course Prerequisites

This course is recommended for 9-12 math educators or related personnel who desire to improve their instructional abilities in mathematics to improve learning for all students. Participants must hold a baccalaureate degree.

System Requirements

- Computer with word processing software
- Internet access connection

Text Books/Supplemental Reading

Will be provided within 1-3 days of class start date.

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 explain and employ the Common Core State Standards in mathematics (NBPTS 2, 3, 5; ISTE 1, 5)
2. To explain and employ specific teaching strategies to the universal strands of algebra, geometry, and probability and statistics in high school (NBPTS 2, 4, 5; ISTE 5; InTASC 4, 5, 7, 8)
3. To analyze and employ the skills of constructivism so that students can derive meaning from mathematical experiences for themselves (NBPTS 1, 2, 3, 4, 5; ISTE 1, 5; InTASC 1, 3, 4, 5, 7, 8)

4. To demonstrate the use of technology in the mathematics classroom to improve teaching and learning (NBPTS 1, 2, 4, 5; ISTE 1, 2, 3, 4, 5; InTASC 1, 5, 7, 8)
5. To describe the roles of formative and summative assessments in the mathematics classroom and how they impact teaching and learning (NBPTS 3, 5; ISTE 5; InTASC 1, 6, 7, 8)
6. To value the influence of learner equity within the mathematics classroom (NBPTS 1, 3, 4, 5; ISTE 1, 5; InTASC 1, 2, 3, 7, 8)
7. To employ other educational professionals to improve student learning (NBPTS 5; ISTE 5; InTASC 9, 10)

Instructional Objectives

By the conclusion of the course, each participant should be able to do the following:

1. Examine approaches used in the standards-based mathematics classroom
    - 1.1 Examine the Common Core Standards in mathematics
    - 1.2 Appraise conventional vs. standards-based curricula
    - 1.3 Describe student conceptual understandings and how they impact student learning
2. Appraise strategies for building proportional reasoning and problem solving over time
    - 2.1 Recognize the foundational aspects of proportional reasoning and problem solving over students' mathematical experiences
    - 2.2 Classify different levels of proportional reasoning and problem solving
    - 2.3 Evaluate the importance of focusing instruction on concepts
3. Identify and employ teaching strategies within the core courses of algebra, geometry, and probability and statistics
    - 3.1 Identify student misconceptions in all three major math course areas
    - 3.2 Describe constructivism and how to employ it within the mathematics classroom
    - 3.3 Recognize the time-intensive nature of the development of skills within the major math course areas
    - 3.4 Create lessons that incorporate research-based, pedagogical strategies
4. Describe and evaluate the use of technology to improve student learning in the classroom
    - 4.1 Evaluate the various available technology tools and related resources
    - 4.2 Describe how students interpret and reason from various technological representations
5. Describe and employ classroom practices and value qualities of an effective math teacher

5.1 Appraise and employ classroom practices and beliefs within personal math teaching philosophy
5.2 Value creating a classroom environment that promotes mathematical instruction equity
5.3 Employ feedback that moves learners forward and elicit evidence of learning that directly impacts instruction

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.

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 instructor at the beginning of the first 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 polices 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.