ASPDP

Learn Impact Grow Earn

Spring 2023 Semester

February 6, 2023 – May 26, 2023

Title of Course: Understanding and Combating Student's Math Anxiety	
Number of Sessions: 2	**Grade Levels: K-12**
Total Hours: 15	**Total Number of Credits: 1**
Course Start Date: February 6, 2023	**Course End Date:** May 26, 2023
Course Location: Online at CE Credits Online www.cecreditsonline.org	
Maximum Course Enrollment: 1000	
Instructor's Name: Dave Schroerlucke	**Instructor's Telephone:** 425-788-7275
Instructor's Email: support@cecreditsonline.org	
Education Partner Fee: $99	
Materials Fee if applicable: N/A	
Registration Deadline: April 17, 2023	

Course Information

Course Description

Math anxiety is a pervasive problem faced by STEM students and teachers, both nationally and globally. Two studies conducted by Rose Vukovic, NYU Steinhardt Professor of Teaching and Learning, revealed that math anxiety adversely impacts math performance in New York City schools as early as the primary grades. In addition to undermining student performance, math anxiety discourages students from pursuing math-related careers and reduces teaching self-efficacy among STEM teachers.

Due to ubiquitous math stereotypes related to gender and race, math anxiety has been shown to be most prevalent among females and Black and Brown students. Math anxiety, and resulting avoidance of math, thus disproportionally affects historically marginalized student groups and thereby serves to reproduce and maintain social stratification by limiting their access to higher educational opportunities.

Over the last decade, research in educational psychology has revealed important insights into the factors contributing to math anxiety as well as simple strategies that can help mitigate its effects. This course presents the current state of research on math anxiety and its consequences along with evidence-based psychological interventions that can be implemented immediately to reduce the negative impact of math anxiety on students.

The first half of the course (Module 1) provides a broad overview of the topic of math anxiety and addresses questions such as 'who suffers from it,' 'why does it develop,' 'how do we identify and

assess it,' and 'what are the real-world consequences?' This includes critically examining the role of culturally sanctioned beliefs and values in producing disproportionately higher levels of math anxiety among females and students from nondominant racial and cultural groups.

The second half of the course (Module 2) introduces psychological safety as a critical feature of classrooms in which students feel safe to engage without fear of ridicule or judgment and examines the role of the teacher in fostering such an environment. Participants are guided through the process of using self-reflection and peer-consultation to identify and challenge any unconscious biases. Several research-based interventions for combating math anxiety are presented including pre-assessment journaling and cognitive reframing of anxiety, along with downloadable templates to facilitate implementation. Participants will ultimately complete a final project in which they develop a multi-faceted action plan, with measurable objectives and timelines, aimed at fostering psychological safety and mitigating the effects of math anxiety using the concepts and strategies learned throughout the course.

Target Grade Levels

K-12

Integration of *Danielson Framework for Teaching* Components

Primary Standards

2a) Creating an Environment of Respect and Rapport

With the goal of fostering psychological safety, learners are advised to establish mutual respect as a classroom rule and emphasize it as a personal core value throughout the year. The learner is taught strategies for modeling respectful language and addressing disrespectful student behavior promptly to avoid tacitly condoning the behavior. The course summarizes some of the primary teacher qualities that contribute to a classroom culture of respect and rapport, and learners are asked to single out one such quality and devise a strategy for enhancing this quality.

Learners are encouraged to invite students to dialogue about their feelings and attitudes toward math with the aim of normalizing anxiety and negative attitudes. Learners are also urged to utilize self-reflection and peer-consultation to monitor and gain awareness around negative attitudes and covert behaviors that might be subtly undermining feelings of trust and safety in the classroom. The course emphasizes the importance of holding oneself accountable to these practices and translating insights gained into tangible changes in teaching practice.

3c) Engaging Students in Learning

All strategies for fostering psychological safety and interventions for reducing math anxiety are ultimately aimed at increasing student engagement and participation. Students are more likely to engage in class if they are not paralyzed by math anxiety and fear of failure. Students are more likely to engage if they believe that they can risk asking and answering questions in class without fear of judgment or ridicule from the teacher or classmates.

Participants will also be taught how to help students combat their self-limiting beliefs and help them establish a growth mindset (belief that math ability can be developed over time through effort) and mastery orientation (view of success as improvement over time rather than demonstrating superiority over peers or meeting an external standard). Students are more likely to engage in class if they feel that they have a high likelihood of success, which is largely determined by how they conceptualize success.

Additional Standards

Domain 1: Planning and Preparation

- 1b Demonstrating Knowledge of Students

Domain 2: Classroom Environment

- 2b Establishing a Culture for Learning

Domain 3: Instruction

- 3a Communicating with Students
- 3e Demonstrating Flexibility and Responsiveness

Domain 4: Professional Responsibilities

- 4a Reflecting on Teaching
- 4e Growing and Developing Professionally

Integration of Standards

NYS Next Generation Learning Standards

Math Practice Standards:

- productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).
- Make sense of problems and persevere in solving them.

International Society for Technology in Education Standards

- 1a) Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
- 4d) Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
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In support of the above standards, this course aims at helping students become patient and persistent problem-solvers, undaunted by the fear of failure that so frequently undermines math performance. Fear of failure is addressed through specific strategies for emphasizing process over outcome. Participants will learn how to cultivate intrinsic motivation in students by deemphasizing interpersonal competition and external standards of performance in favor of intrapersonal goals. Learners are taught to model appropriate responses to mistakes and errors that conveys an appreciation of failure as an indispensable part of the learning process.

Pedagogical Approach

This course consists of two Modules, each of which features andragogic strategies to meet the needs of diverse teacher learners in the NYC DOE. Each Module is comprised of research-based best practices, pedagogically focused reading assignments and videos, reflection/analysis questions, discussion boards (Appendix A), downloadable resources (Appendix D), a Classroom Practice Analysis (Appendix B), and a comprehensive Final Project (Appendix C).

The first module introduces the learner to the topic of math anxiety and justifies the course by explaining the extent and significance of the problem. The second module is focused on introducing specific strategies for combating math anxiety and fostering a psychologically safe classroom. As teacher learners move throughout the course, they are asked to envision and plan implementation of learned strategies and record their thoughts in a planning document that will ultimately serve as an outline for their final project, a multi-faceted action plan for combating math anxiety in the classroom.

Application to Instruction and Student Learning

Participants will be provided multiple strategies and resources that can be used immediately to impact classroom instruction including:

- Formal and informal assessment of student attitudes toward math using provided mathitude survey and behavioral observation
- Examination of pre-existing assumptions and biases through self-reflection and peer consultation
- Critical dialogue with students around math anxiety and prevailing math stereotypes
- Use of language to model and instill respect, empathy, and community as core classroom values for a foundation of psychological safety and trust
- Evidence-based psychological interventions (pre-assessment journaling and cognitive reframing) with downloadable resources to reduce the negative impact of math anxiety on students
- Motivational techniques and feedback strategies to reframe the notion of achievement and cultivate a growth mindset in students

Participants will have opportunities to reflect on these ideas and practices through regular discussion boards as well as required assignments including a Classroom Practice Analysis, in which they will implement one of the downloadable resources from the course and offer feedback regarding its effectiveness in the classroom, and a Final Project, which consists of a detailed action plan with timelines for implementation and ongoing assessment of strategies learned throughout the course.

Course Objectives

In this course, teacher learners will:

- Define math anxiety and specify the major contributing factors while drawing an important distinction between math anxiety and math incompetence
- Recognize and categorize the various ways that math anxiety can show up in the classroom, frequently under the guise of other attitudes and behaviors that are often culturally determined
- Evaluate the far-reaching consequences of math anxiety in an increasingly technological society, including the oppression of women and nondominant racial and cultural groups by limiting access to STEM education and careers
- Critically examine the ways that culturally sanctioned beliefs and stereotypes related to mathematics contribute to the production and maintenance of social inequities
- Reflect on the ways that one's own social identity, personal experiences, and internalized beliefs might lead to the unconscious transmission of negative attitudes and biases
- Cultivate a psychologically safe and multiculturally affirming classroom environment to promote student engagement and minimize the fear of failure and its associated social consequences that underpin math anxiety

Course Outcomes

By the end of the course, teacher learners will:

- Adopt an attitude of critical inquiry regarding the culturally sanctioned beliefs and assumptions inherent in traditional math teaching standards and practices
- Formulate a comprehensive, detailed plan for creating a classroom in which all students feel included and safe to engage and take academic risks
- Establish a self-reflective practice and peer-consultation group to monitor unconscious negative attitudes toward math or math students
- Employ evidence-based psychological interventions to reduce the negative impact of math anxiety on students and acquire downloadable resources that facilitate immediate implementation

- Implement and analyze one of the downloadable resources from this course to determine how the resource meets the needs of their students or colleagues.

Assessment

Participants receive formative feedback throughout presentations and in discussion boards. Participants are summatively assessed on Discussion Board participation (Appendix A), a Classroom Practice Analysis (Appendix B), and a Final Project (Appendix C) through rubric-based feedback from course facilitators. The Classroom Practice Analysis and Final Project feedback includes constructive feedback throughout the submission, a scored rubric, and a detailed summative comment in 1-7 days based on the type of activity (see the Feedback section for more detail).

Connection to Culturally Responsive-Sustaining Dispositions & Practices (CR-SDP)

This course provides content and resources that expose learners to the historical and present role of school mathematics in reproducing inequities along the lines of gender, race, and social class by serving as a "gatekeeper" to advanced STEM education and careers (and hence to power and privilege), with disproportionately higher levels of math anxiety among females and nondominant racial and cultural groups serving as an important moderator. Participants are prompted to establish a regular self-reflection practice and ongoing peer-consultation groups as a means of identifying and challenging any unconscious or implicit biases that may be inadvertently transmitting negative beliefs and attitudes to students. Cultivation of a psychologically safe and multiculturally affirming classroom environment through a language of mutual respect is presented as the central strategy for combating math anxiety and increasing student engagement. Participants are also introduced to current best practices associated with culturally responsive teaching, such as being a "warm demander" that holds all students to a high standard and creating "brave learning communities" in which marginalized students feel safe to expose and challenge cultural biases that contribute to harsh experiential realities and social injustices.

Major Assignment	Due Date
Classroom Practice Analysis	Self-paced. Due by May 26, 2023
Final Project	Self-paced. Due by May 26, 2023

Feedback

Participants receive formative feedback throughout presentations and in discussion boards. Participants are summatively assessed on Discussion Board participation (Appendix A), a Classroom Practice Analysis (Appendix B), and a Final Project (Appendix C) through rubric-based feedback from course facilitators. The Classroom Practice Analysis and Final Project feedback includes constructive feedback throughout the submission, a scored rubric, and a detailed summative comment.

Facilitators have received revised instructions and grading rubric and will now respond to every comment in each discussion board. Facilitators will inform each participant who has had a comment added to their post to return to the discussion board to continue the conversation and reply to their colleague's comment to their post.

Formative Feedback:

Participants receive formative feedback throughout the course as part of the design of the interactive presentations (e.g., feedback on reflection/analysis questions, etc.). Participants also receive consistent and targeted formative feedback from Facilitators in the Discussion Boards, as facilitators provide public comments/responses/additional questions to drive thinking, collaboration, and connection to practice.

Summative Feedback:

Participants receive rubric-driven summative feedback on their 12 Discussion Boards within 1-3 days of submission. For the Classroom Practice Analysis and Final Project, participants receive rubric driven feedback within one week of submission. Facilitators work with participants to support their successful completion of all tasks/Discussion Boards by providing opportunities for participants to resubmit work, based on targeted feedback, that falls below standards outlined in the course's rubrics.

Grades

Assignment(s)	**Percentage of final grade**
Classroom Practice Analysis	25%
Discussion Board Participation	25%
Final project	50%

Course Calendar

Module #1 Math Anxiety 101

Date: February 6, 2023 – May 26, 2023	Number of hours for this session: 6
Time: Self-paced	Assignments due today: May 26, 2023

Standards and Components Alignment:

Danielson *Framework for Teaching* Components

Domain 1: Planning and Preparation
- 1b Demonstrating Knowledge of Students

Domain 2: Classroom Environment
- 2a Creating an Environment of Respect and Rapport

Domain 3: Instruction
- 3a Communicating with Students
- 3e Demonstrating Flexibility and Responsiveness

Domain 4: Professional Responsibilities
- 4a Reflecting on Teaching
- 4e Growing and Developing Professionally

Objectives:

Participants will be able to:

- Define math anxiety and specify the major contributing factors while drawing an important distinction between math anxiety and math incompetence and debunking other common myths and misconceptions about the relationship between anxiety and "aptitude"
- Recognize and categorize the various ways that math anxiety can show up in the classroom based on individual and cultural differences
- Appreciate the role of gender and racial stereotypes in contributing to higher levels of math anxiety among females and nondominant racial and cultural groups
- Evaluate the far-reaching consequences of math anxiety in an increasingly technological society, including the oppression of women and racial minorities by limiting access to STEM education

After providing a brief overview of the course and introducing the problem of math anxiety by offering caricatures of some typical math-anxious students, this module operationalizes the concept of math anxiety by providing the definition and symptomatology as well as exploring the major contributing factors that distinguish the idea of being "math-anxious" from that of being "bad at math." The course is then motivated by developing an appreciation of the real-life consequences of math anxiety for students, teachers, and society.

Topics and Agenda:

The following activities will take place during this Module:

Course Introduction: Where applicable in this course, participants will be asked to align their tasks or projects to NYS's Next Generation Learning Standards for their grade level.

Creating a Brave Learning Space outlines the importance of a critical consciousness approach and provides a reading resource to Understanding Race and Privilege

Presentation 1 provides a course overview and outlines the major objectives and learning outcomes.

Presentation 2 introduces the topic of math anxiety by offering humorous caricatures of common student personality types, whose behaviors are then interpreted as strategies for fending off anxiety by avoiding engagement in math class. Learners are asked to reflect on their pre-existing beliefs about

math anxiety and discuss the relevance of the topic with colleagues through the Discussion Board: Introduction and Motivation.

Presentation 3 operationalizes the concept of math anxiety by providing definitions, describing the physiological and psychological symptoms, and examining the neurological and statistical evidence supporting the idea that math anxiety is distinct from poor math competence and other forms of anxiety. Learners are introduced to both formal and informal ways of assessing math anxiety and provided two age-differentiated "Mathitude Surveys" as a downloadable resource to be used for informal assessment. This presentation also first introduces the Planning Document that will be used as a template for the creation of the final project.

Presentation 4 investigates the bidirectional relationship between math anxiety and poor math performance and summarizes other known contributing factors to math anxiety such as negative influence of teachers, parents, and cultural messages and stereotypes. Learners are asked to reflect on selected readings (Mathematics in Popular Culture; Stereotypes Turn Up Pressure on Asian Students; How Does Race Affect a Student's Math Education?) and videos (Hollywood Hates Math; Women, Math, and Stereotype) that highlight the role of stereotype threat in producing disproportionately higher levels of math anxiety in females, African Americans, and Latinos. Students are asked to reflect on their own history with learning math and significant adult role models, and to discuss in the Discussion Board: Math History and Attitude how their experiences might have shaped their current attitudes toward math and math teaching.

Presentation 5 motivates the course by examining the real-world consequences in which math anxiety leads to math avoidance and math deficits that become a major obstacle to educational and career goals, stem literacy, and rational decision-making. As optional resources, the learner is provided the most recent meta-analysis of the last 6 decades of math anxiety research along with a comprehensive list of references conveniently organized by topic at the end of the module.

Connection to Critical Consciousness/CRSE:

Criteria from Rubric (the criteria marked by an asterisk (*) will be evaluated this year but providers may address other criteria):	***Activity:***
* Goals clearly connect to supporting teachers in developing more equitable practices for all students, in particular those who have been historically underserved and marginalized (including but not limited to students of color, students with disabilities, and multilingual learners) * Course integrates historical and contemporary resources and research that reflect and center the experiences and perspectives of non-dominant racial and cultural groups * Course builds participants' capacity to identify and question underlying personal and institutional beliefs, norms, practices, and assumptions that contribute to inequity	1. Creating a Brave Learning Space outlines the importance of a critical consciousness approach and provides a reading resource to Understanding Race and Privilege 2. The course goal of closing STEM opportunity gaps is pursued through efforts to create inclusive and equitable classroom environments that reduce the disparities in both the level and impact of math anxiety across gender and race. 3. Participants reflect on their assumptions regarding the relationship of math anxiety to math "aptitude" as well as the extent to which they have internalized math-related gender and ethnic stereotypes. Participants also learn to critically examine and challenge assumptions around the supposed "neutrality" of math, math textbooks, and math standards and explore the role of school mathematics as a tool for social stratification and

	"gatekeeper" for advanced education, and thus for power and privilege. 4. Participants learn that math anxiety can take many behavioral forms based on individual and cultural differences. Participants reflect on and discuss their own personal history with math and consider ways that these experiences might inform their teaching. 5. The course provides a downloadable mathitude survey and advocates giving students a platform to voice their feelings and concerns about math. Participants also explore the need to go beyond mere safety and encourage students to open up and have "courageous conversations" about the ways in which they might feel marginalized by traditional math instruction, standards, and stereotypes.

Application to Instruction and Student Learning:

Participants will apply their learning from this session by:

- Assessing student attitudes toward math using provided mathitude survey and behavioral observation
- Critically examining pre-existing assumptions and biases through self-reflection and peer discussion
- Opening up critical dialogue with students around math anxiety and math stereotypes
- Conveying to students an appreciation of the importance of STEM literacy for basic civic participation and access to advanced education and lucrative careers

Participants will hold themselves accountable for applying their learning through the development of an action plan with detailed timelines for implementation and ongoing assessment.

In this Module, learners will:

- Explore the meaning of math anxiety and the major contributing factors
- Recognize the various ways that math anxiety can show up in the classroom, frequently under the guise of other attitudes and behaviors
- Appreciate the far-reaching consequences of math anxiety in an increasingly technological society
- Reflect on personal experience with math and how it might impact current attitudes toward math and math education
- Download a resource that can be used to help conduct informal assessment of math attitudes and anxiety.

Assessment and Feedback:

For each Discussion Board description and rubric, click the links in the Topics and Agenda section. Participants will receive feedback on Discussion Board responses within 1-3 days of submission.

Module #2 Combating Math Anxiety	
Date: February 6, 2023 – May 26, 2023	Number of hours for this session: 9 (Including Final)
Time: Self-paced	Assignments due today: May 26, 2023

Standards and Components Alignment:

Danielson *Framework for Teaching* Components

Domain 1: Planning and Preparation
- 1b Demonstrating Knowledge of Students

Domain 2: Classroom Environment
- 2a Creating an Environment of Respect and Rapport
- 2b Establishing a Culture for Learning

Domain 3: Instruction
- 3a Communicating with Students
- 3c Engaging Students in Learning
- 3e Demonstrating Flexibility and Responsiveness

Domain 4: Professional Responsibilities
- 4a Reflecting on Teaching
- 4e Growing and Developing Professionally

NYS Next Generation Learning Standards

Math Practice Standards:
- "productive disposition"-habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy. (adopted from National Research Council's Strands of Mathematical Proficiency)
- Make sense of problems and persevere in solving them.

International Society for Technology in Education Standards

- 1a) Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
- 4d) Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

Objectives:

Participants will be able to:
- Appreciate the central role of psychological safety in creating a culture of equity, active participation, and learning
- Instill and model respect, empathy, and community as core values that set the stage for psychological safety and increase student engagement
- Identify and challenge unconscious negative attitudes toward math and math students
- Provide theoretical and empirical support for proposed psychological interventions by identifying the underlying mechanisms by which anxiety negatively impacts student performance
- Employ evidence-based interventions (pre-assessment journaling and cognitive reframing) to reduce the immediate impact of math anxiety on students
- Enhance students' motivation and mindset by reframing the meaning of success and failure

After introducing the concept of psychological safety as central to fostering a classroom environment that is characterized by feelings of trust, collaboration, and mutual support, the module examines the role of the teacher in combating math anxiety - both in terms of modeling appropriate qualities and attitudes as well as implementing specific evidence-based interventions. The module highlights the importance of regular practice of self-reflection and peer-consultation to monitor unconscious biases and covert behaviors that might subtly communicate negative attitudes. Throughout the module, learners are asked to incorporate new knowledge and strategies by revisiting and revising their planning document, which will culminate in a comprehensive and detailed action plan designed to reduce the impact of math anxiety on students.

Topics and Agenda:

The following activities will take place in this module:

Throughout the module, teacher learners are repeatedly asked to return to their Planning Document, begun in Module 1, to contribute reflections and notes on various topics that will ultimately serve as an outline for completion of the final project.

Presentation 1 gives an overview of the module and introduces the concept of psychological safety as being critical to cultivating a classroom culture in which students feel less anxious about taking risks such as asking or answering questions in class. Learners are then asked to craft their own detailed vision of a psychologically safe classroom that will serve as a guide for the construction of their action plan to combat math anxiety. A sample classroom vision is provided for inspiration and guidance.

Presentation 2 examines the attitudes and values that foster the sort of trust and connection that undergird psychological safety while emphasizing the role of The Teacher as Warm Demander in maintaining high standards of engagement and performance for all students. Readings are assigned that focus on Achieving Mutual Respect in the Classroom, particularly through strategies for modeling Language of Respect. Readings also highlight the need for Moving from Safe to Brave Classrooms in which authenticity and inclusiveness take precedence over emotional comfort. Can I be a Multicultural Educator in Math? Addresses the misconception that math is a neutral subject and has nothing to do with culture. The article asks the reader to reflect on questions such as "Do certain students more than others avoid math or feel disconnected from the subject?" It then discusses how math can be facilitated through culture, equity and justice. The video, Algebra Project/YPP Miami provides insight into the PYY approach to math, which centers the learning on students and develops their agency as learners. The module then discusses the importance of normalizing negative attitudes and anxiety about math by inviting students into dialogue and responding with appropriate empathy. Learners are asked to read an article (The Heart of Teaching) and watch videos (Kindness, Empathy, and Connection ; Short Videos on Empathy) about positive teaching qualities and reflect on the content both individually and in the Discussion Board: Trust and Connection.

Presentation 3 considers The Role of Teachers in Creating Math Anxiety by looking at various ways that teachers frequently convey subtle negative attitudes through unconscious or covert behaviors. Learners are assigned readings that provide Strategies to Build and Nurture Intrinsic Motivation In Students. Learners also are urged to establish regular self-reflection and peer-consultation practices to monitor such attitudes and behaviors, thereby reducing the chances of inadvertently communicating harmful messages. These strategies aimed at gaining self-awareness are a major component of the plan to combat math anxiety.

Presentation 4 proposes disruption of working memory, The Neurological Scratchpad, as the primary mechanism by which anxiety harms performance and introduces a pre-assessment expressive writing exercise aimed at minimizing this effect. A Sample Writing Prompt is provided to facilitate implementation of this strategy. Near the end of this presentation, students are assigned a Classroom Practice Analysis, which asks them to implement one of the downloadable resources from the course and offer feedback regarding its effectiveness in the classroom.

Presentation 5 suggests that, because the mental side of anxiety (i.e. worry) is more disruptive to performance than physical arousal, a reasonable strategy to reduce the impact of anxiety is to teach students how to reinterpret anxiety as excitement and view math as an energizing challenge rather than a debilitating threat. Support for the surprising effectiveness of this simple intervention is presented through a series of videos (How to Make Stress Your Friend) and articles (Anxiety Appraisal Can Lead to Success; I Literally Can Even). The presentation then goes on to explore two other thought-related concepts, growth mindset (Videos: Intro to Growth Mindset; Helping Struggling Students Build a Growth Mindset) and mastery orientation, and offers strategies designed to attenuate anxiety by changing the way students think about the potential for improvement and the meaning of achievement and failure.

Presentation 6 walks learners through the process of consolidating notes from their planning document into a comprehensive and detailed action plan for cultivating psychological safety and

combating math anxiety. Learners are asked to post to the last Discussion Board: Final Thoughts and Takeaways to give their parting thoughts and reflect on major takeaways from the course. Finally, participants complete the Classroom Practice Analysis.

Connection to Critical Consciousness/CRSE:

Criteria from Rubric (the criteria marked by an asterisk (*) will be evaluated this year but providers may address other criteria):	***Activity:***
* Goals clearly connect to supporting teachers in developing more equitable practices for all students, in particular those who have been historically underserved and marginalized (including but not limited to students of color, students with disabilities, and multilingual learners) * Course integrates historical and contemporary resources and research that reflect and center the experiences and perspectives of non-dominant racial and cultural groups * Course builds participants' capacity to identify and question underlying personal and institutional beliefs, norms, practices, and assumptions that contribute to inequity	1. Participants are equipped with a range of strategies to help create an inclusive, multi-culturally affirming classroom environment. This includes exuding interpersonal warmth, insisting upon mutual respect in communication, holding all students to high standards (Warm Demander), getting to know students and their families outside of the classroom, and contextualizing mathematics in ways that connect to student's lived experience and interests. Reading: Can I be a Multicultural Educator in Math? Video: Algebra Project/YPP Miami 2. Participants critically examine common well-intended responses to students' math struggles (empathy, extrinsic motivation, lowered expectations) to uncover the implicit messages that serve to undermine student self-belief and motivation. 3. Participants are asked to establish and maintain both a self-reflective journaling practice and a peer consultation group with the intention of vigilantly monitoring and modifying any implicit biases or covert behaviors that might be negatively impacting students. 4 . Participants develop guidelines for establishing a brave classroom that includes and goes beyond psychological safety to include the freedom to express challenging and uncomfortable perspectives. Moving from Safe Classrooms to Brave Classrooms

Application to Instruction and Student Learning:

Participants will apply their learning from this session by:

- Monitoring and challenging unconscious negative attitudes toward math or math students through self-reflection and peer consultation
- Using language to instill and model respect, empathy, and community as core values in the classroom
- Employing evidence-based psychological interventions (pre-assessment journaling and cognitive reframing) to reduce the negative impact of math anxiety on students

- Utilizing motivational and feedback strategies to reframe the notion of achievement and cultivate a growth mindset in students
- Implementing one of the downloadable resources from the course and offering feedback regarding its effectiveness in the classroom

Participants will be held accountable for applying their learning and assessing its impact on students through the development of a detailed action plan with timelines for implementation and ongoing assessment.

In this Module, learners will:

- Establish a self-reflective practice and a peer-consultation group to monitor unconscious negative attitudes toward math or math students
- Acquire a collection of simple, evidence-based interventions to reduce the impact of math anxiety on your students
- Formulate a comprehensive, detailed plan for creating a classroom in which students feel safe to risk being wrong or making mistakes
- Understand the central role of psychological safety in creating a culture of active participation and learning.
- Appreciate the importance of self-reflection and peer-consultation in monitoring implicit negative attitudes and covert behaviors.
- Identify the underlying mechanisms for how math anxiety impacts performance as a theoretical foundation for proposed interventions.
- Learn three evidence-based interventions for reducing the level and impact of math anxiety on students.
- Formulate a comprehensive plan with timelines for putting all strategies into practice in the classroom.

Assessment and Feedback:

For each Discussion Board, Classroom Practice Analysis, and Final Project description and rubric, click the links in the Topics and Agenda section.

Participants will receive feedback on Discussion Board responses within 1-3 days of submission. Participants will receive rubric driven feedback on the Classroom Practice Analysis and Final Project within one week of submission and be provided opportunities to resubmit if work falls below standards outlined in the appropriate rubrics.

Appendix A
Discussion Boards and Rubrics

Discussion Board Assignments

Module	Title	Text
1	Introduction and Motivation	On the discussion forum, please: 1. Introduce yourself to your colleagues. Include your name, title, location, and number of years in education, and what you hope to learn or take away from this course. 2. Describe any impact that math anxiety has had on you personally as a student, as a teacher, or both. 3. Finally, respond to one of your colleagues' posts by sharing a connection, reaction, or reflection. (Your response should be meaningful, with a goal to push each other's thinking rather than offering a superficial exchange. **Please see rubric**)
1	Math History and Attitude	Reflect on your personal history with math. Post to the discussion board answering the following questions: 1. Was your experience learning math mostly positive or negative? Do any experiences, good or bad, stand out as being particularly memorable? 2. Who were your most important adult role models in math? What was their attitude toward math? 3. How have your past experiences shaped your current attitude toward teaching math? 4. Have you internalized any of the cultural messages with respect to math being difficult, only for brainiacs, or more for boys? 5. Respond to one of your colleagues' posts by offering a connection, reaction, or reflection. (Your response should be meaningful, with a goal to push each other's thinking rather than offering a superficial exchange. **Please see rubric**)
2	Trust and Connection	Reflect on the following quote: **"Students don't care how much you know until they know how much you care."** - John C. Maxwell Post to the discussion board answering the following: 1. Does this statement resonate with you? Why or why not? 2. Do you feel comfortable inviting students to talk about their feelings, either as a class or one-on-one? 3. If not, how might you overcome that discomfort? 4. Share one experience in which you have witnessed a transformation in a student's level of engagement after showing them that you truly cared. 5. Do you already take any conscious steps to ensure that your classroom is a psychologically safe environment? What are they? 6. Respond to one of your colleagues by sharing a connection, reaction, or suggestion. (Your response should be meaningful, with a goal to push each other's thinking rather than offering a superficial exchange. **Please see rubric**)

2	Final Thoughts and Takeaways	Reflect on the various concepts and strategies learned throughout this course. Post to the discussion board one final time answering the following questions: 1. Write a brief summary of what a psychologically safe and brave learning community means to you. Did your vision change as you progressed through the course? If so, how? 2. What principles, strategies, and/or mindsets do you feel are most important to successfully combating math anxiety? Explain why each is so vital. 3. What are you planning to change in the future about how you teach as a result of taking this course? Why? 4. What questions do you still have or challenge do you still foresee that you would like your colleagues' input or advice? Try to be specific. 5. Respond to at least one of your colleagues with a reflection, connection, or suggestion to their post. (Your response should be meaningful, with a goal to push each other's thinking rather than offering a superficial exchange. **Please see rubric**)

Discussion Board Rubric

1: Does Not Meet Expectations	2: Partially Meets Expectations	3: Meets Expectations	4: Exceeds Expectations
Participant rarely shares thoughtful reflections or responds to colleagues in a respectful and engaging way. Participant provides a low level of detail in entries. Participant typically does not include informative examples or foster discussions. Participant's responses are unclear or poorly written. Participant does not respond to colleague. Participant includes no self-reflection or	Participant partially shares thoughtful reflections and responds to colleagues in a respectful and engaging way. Participant provides some level of detail in entries. Examples are somewhat helpful and informative and occasionally foster discussions. Participant's responses are somewhat clear and well written. Participant responds to a colleague	Participant satisfactorily shares thoughtful reflections and responds to colleagues in a respectful and engaging way. Participant provides an adequate level of detail in entries. Examples are satisfactorily helpful and informative and foster discussions. Participant's responses are clear and well written. Participant responds to a colleague in a meaningful way and provides useful and relevant information.	Participant frequently shares thoughtful reflections and responds to and collaborates with colleagues in a respectful and engaging way. Participant provides a high level of detail in entries. Examples are very helpful and informative and almost always foster discussions. Participant's responses are exceedingly clear and well written. Participant responds to colleagues in a meaningful way and provides useful and relevant information while demonstrating understanding of the topic being discussed.

consideration of issues related to critical consciousness.	providing basic information. Participant includes little self-reflection or consideration of issues related to critical consciousness.	Participant engages in self-reflection and consideration of issues related to critical consciousness.	Participant engages in meaningful and extensive self-reflection and consideration of issues related to critical consciousness and advances the group discussion of these issues.
Participants will not be provided a grade within the discussion boards without having provided a comment to a fellow colleague. Participants will be informed when a fellow colleague has commented on their board post and encouraged to continue the conversation. Facilitators will offer comments and guidance on every discussion board submission. Facilitators will inform participants where and in what way their response was insufficient.			

Appendix B
Classroom Practice Analysis and Rubric

Classroom Practice Analysis

For this activity, you will choose one of the downloadable resources from the course to implement in your practice. If you are in the classroom currently, you will answer the first set of questions. If you are on break or not currently teaching, you will answer the second set of questions.

In the Classroom:

- What is the name of the resource?
- Why did you pick this resource to implement? Please be specific.
- Before implementing the resource, what were your expectations on how it would impact your practice?
- During implementation did you alter the resource in any way?
    - If so, how? And why?
    - If not, why?
- How did students/colleagues respond during/after the resource? Do you think it positively impacted your audience? Why or why not?
- How did the resource impact your practice? Please be specific.
- No resource is neutral, from a critical consciousness perspective. What is the viewpoint/background of the author/creator of this resource? How might that viewpoint/background affect the way you use this resource, or make it more or less effective at working with your students?
- How do you plan on improving the resource for the future?

Out of the classroom:

- What is the name of the resource?
- Why did you pick this resource? Please be specific.
- No resource is neutral, from a critical consciousness perspective. What is the viewpoint/background of the author/creator of this resource? How might that viewpoint/background affect the way you use this resource, or make it more or less effective at working with students from varying backgrounds?
- How do you plan on using this resource?
- What specific modifications will you make to the resource to ensure its effectiveness in the classroom/with peers?
- How do you think this resource will impact your classroom/peers?
- How will you measure the success of this resource (e.g., assessment, data collection, etc.)?

Classroom Practice Analysis Rubric

Criteria	4-Exceeds Expectations	3-Meets Expectations	2-Approaching Expectations	1-Does Not Meet Expectations
Resource Choice	Learner provides the name of a relevant downloadable resource with a clearly articulated rationale for why the resource was selected.	Learner provides the name of a downloadable resource with a rationale for why the resource was selected.	Learner provides the name of a resource with a vague rationale for why the resource was selected.	Learner does not define a downloadable resource and/or fails to provide a description of why the resource was selected.
Planning	Learner includes an explicit plan, outlining how the resource will be implemented with fidelity, including a thorough overview of the expected impact on peers and modifications to ensure effectiveness.	Learner includes a plan, outlining how the resource will be implemented with an overview of the expected impact on peers and modifications to ensure effectiveness.	Learner includes an underdeveloped plan, outlining vaguely how the resource will be implemented with an overview of some of the expected impacts on peers.	Learner does not provide a plan that outlines how the resource will be implemented or the expected impact on peers.

Analysis	Learner provides a thoughtful reflection on how the resource did/will impact their classroom, peers, and/or practice, while indicating various expert ways to evaluate and modify the resource to ensure that it is effective. Learner deeply engages with the resource on issues related to author/creator perspective and critical consciousness.	Learner provides a reflection on how the resource did/will impact their classroom, peers, and/or practice, while indicating various ways to evaluate and modify the resource to ensure that it is effective. Learner engages with the resource on issues related to author/creator perspective and critical consciousness.	Learner provides a vague reflection on how the resource did/will impact their classroom, peers, and/or practice, while indicating one way to evaluate the resource to ensure that it is effective. Learner minimally engages with the resource on issues related to author/creator perspective and critical consciousness.	Learner provides no reflection on how the resource did/will impact their classroom, peers, and/or practice, while failing to outline how they will evaluate the resource to ensure that it is effective. Learner does not engage with the resource on issues related to author/creator perspective and critical consciousness.
Writing	Learner's writing is clear and concise with articulate language, thoughtful expression, and a careful attention to mechanics.	Learner's writing is clear with concise language, good expression, and a few mechanical errors.	Learner's writing is underdeveloped, contains few details, has little expression, and includes multiple mechanical errors.	Learner's writing is vague, lacks details, and contains multiple mechanical errors.

Appendix C
Final Project and Rubric

Combating Math Anxiety Planning Document

Section 1: Anxiety Assessment (Module 1, Presentation 3)

- How will you introduce the Mathitude Survey to your students? Try to come up with precise age-appropriate language that communicates the importance of the issue without terrifying them.

- For students who do not self-report anxiety, what behaviors will you look for as a possible indication that students might be quietly struggling with math anxiety? How will you probe further to see if math anxiety might be an issue?

- How will you respond to students who express, whether through self-report or more indirectly, that they are negatively impacted by math anxiety?

- How frequently will you revisit this issue to re-assess levels of anxiety and track student progress?

Section 2: Classroom Vision (Module 2, Presentation 1)

Describe in your own words your vision of a psychologically safe classroom.

Be as detailed as possible and be sure to address each of the following:

- How will you know that you have achieved your vision?
- What are students doing?
- What are you, the teacher, doing?
- What kind of thinking and learning is taking place, and how?
- How are students interacting with one another?
- How do you approach and interact with students?
- How do you think the psychological safety you foster will translate to positive learning outcomes?

Section 3: Building Trust (Module 2, Presentation 2)

- Of the 11 categories of respectful language, are there any that you could model more effectively? In making this a goal for yourself, describe how you are going to measure and track your progress.

- Which of the basic positive psychological qualities described in this section (kindness, respect, enthusiasm, and connection) do you embody most? Which of these qualities could you strive to embody more? Describe at least two concrete strategies for developing this quality within yourself.

- Explain how enhancing these qualities and fostering respectful dialogue will translate to greater psychological safety and trust.

- Explain how you will invite students to talk about their history with and feelings toward math.

- How will you respond if one or more students share some traumatic experiences or significant fears related to math?

- How will you reward students who have the courage to share their uncomfortable feelings and ensure that they do not become withdrawn or estranged as a result?

Section 4: Self-Awareness (Module 2, Presentation 3)

Self-Reflection

- Of the various covert behaviors described in this section (or others that you can think of), which are you most likely to engage in? Explain how this behavior might undermine psychological safety.

- Which of the strategies for building intrinsic motivation can you see yourself implementing in your classroom? Describe the steps that would be necessary for implementing at least two of them.

- How frequently will you spend time devoted solely to reflecting on your teaching and for how long? How will you set aside a time and place for this? Try to carve out at least 1 hour per week.

- Describe the method you will use to document your reflections and store them in one place.

- How will you establish a system for holding yourself accountable to ensure that you actually follow through with this practice?

Peer-Consultation

- List at least three colleagues with whom you feel you could have an honest, respectful peer-consultation relationship and the personal qualities that make each of them ideal for this role.

- How do you envision the consultation group operating? How frequently will you meet? Will there be a regularly scheduled meeting time or will the group meet "as needed"?

- Using precise language, explain how will you present this proposal to your colleagues? What rationale will you provide to justify the investment of time and energy? How will you respond if they are initially reluctant to commit?

- Explain how you plan to translate the personal insights gained through self-reflection and peer consultation into tangible changes in your teaching.

Section 5: Interventions

Expressive Writing (Module 2, Presentation 4)

- How will you sell your students on the idea of journaling prior to assessments? Be specific in your language. What exactly will you say?
- How will you respond to students who ridicule the practice or do not buy into it? Do you foresee any other potential obstacles in implementing this practice? How will you address those obstacles?
- How will you track and monitor the extent to which this practice actually reduces anxiety and improves student performance?

Anxiety Reappraisal (Module 2, Presentation 5)

- How will you explain to your students, in precise age-appropriate language, why stress or anxiety can be considered a good thing?
- When are you going to present this to your students? How often will you revisit the topic?
- How will you monitor the extent to which this strategy is helping students perform better?

Growth Mindset (Module 2, Presentation 5)

- Identify and describe at least 3 practical strategies that you can see yourself implementing in your classroom to encourage students to adopt a growth-mindset.

Mastery Orientation (Module 2, Presentation 5)

- How will you teach students to focus on improvement over time rather than comparing themselves to others or to an external standard? Be specific, citing at least two concrete strategies.

- How will you teach students through your words and actions that failure is something to be celebrated rather than avoided? Be specific, citing at least two concrete strategies.

Section 6: Action Plan (Module 2, Presentation 6)

Create an action plan with clear steps and target dates outlining when and how you will implement your Combating Math Anxiety Plan. You may use the template provided below or create your own. Include answers to the following questions:

- What aspects of your plan are “must dos” (essential to implementation) and what aspects are “may dos” (not a top priority, but would be ideal to fulfill)?
- When would you ideally like to have each aspect implemented by? When do you feel each aspect must be implemented by?
- When and how will you revisit, reflect on, and revise your Action Plan?
  Consider dedicating a solid few hours of time at least once a month. Also consider, who, if anyone, you will collaborate with when revisiting.

Action Step	Must Do or May Do	Ideal Due Date	Absolute Due Date

FINAL PROJECT RUBRIC

Criterion	4 - Exceeds Expectations	3 - Meets Expectations	2 - Approaching Expectations	1- Does Not Meet Expectations
Classroom Vision	A clear vision of a psychologically safe classroom including a	A clear vision of a psychologically safe classroom including a	An unclear or vaguely described vision of a	No attempt at describing a vision of a psychologically

	detailed description of the types of behaviors and interactions that will serve as an indication that psychological safety is present. A meaningful connection is drawn between psychological safety and the expectation of positive student learning outcomes.	detailed description of the types of behaviors and interactions that will serve as an indication that psychological safety is present.	psychologically safe classroom with little to no description of the types of behaviors and interactions that will serve as an indication that psychological safety is present.	safe classroom. Little to no description of the types of behaviors and interactions that will serve as an indication that psychological safety is present.
Anxiety Assessment	Age-appropriate, and detailed language that introduces students to the role of feelings and attitudes in math performance. Identification of at least two behavioral indicators of math anxiety and a well-developed plan for how to identify math anxiety in students, respond initially, and follow up over time to reassess.	Age-appropriate, and detailed language that introduces students to the role of feelings and attitudes in math performance. Identification of at least two behavioral indicators of math anxiety, but plan for identifying and responding to math anxiety is vague or lacks specificity.	Phrasing of student introduction to role of feelings and attitudes toward math is present but either lacking detail or not age-appropriate. Less than two behavioral indicators of math anxiety cited and plan for addressing and reassessing anxiety as it arises is vague or lacks specificity.	Phrasing of student introduction to role of feelings and attitudes toward math is absent or neither detailed nor age-appropriate. Missing behavioral indicators of anxiety or lacking any clear plan for assessing and addressing math anxiety as it arises.
Building Trust	A clear plan for inviting dialogue about anxiety and normalizing negative feelings	A clear plan for inviting dialogue about anxiety and normalizing negative feelings	A vague or unclear plan for inviting dialogue and normalizing negative feelings	No plan or vague plan for inviting dialogue and normalizing negative feelings

	about math. Identification of at least one positive teaching quality to be developed with clear description of at least two concrete strategies for developing it. A connection is drawn between modeling positive qualities and the goal of fostering psychological safety.	about math. Identification of at least one positive teaching quality to be developed with clear description of at least two concrete strategies for developing it.	about math. Identification of at least one positive teaching quality to be developed but lacking concrete strategies for developing it.	about math. No positive teaching quality is singled out for personal development.
Self-Awareness	A detailed plan for incorporating regular self-reflection and peer-consultation along with a list of potential consultation group members and specific language to motivate participation. Clear plan for how learner will hold his or her self-accountable and how insights will be translated into tangible changes in teaching. A connection is drawn between self-awareness and the learner's vision for psychological safety.	A detailed plan for incorporating regular self-reflection and peer-consultation along with a list of potential consultation group members and specific language to motivate participation. Clear plan for how learner will hold his or her self-accountable and how insights will be translated into tangible changes in teaching.	A vague or unclear plan for incorporating regular self-reflection and peer-consultation that fails to specify potential consultation group members or language to motivate participation. Vague or unclear plan for how insights will be translated into tangible changes in teaching.	No plans for incorporating regular self-reflection and peer-consultation, and no plans for translating insights into tangible changes in teaching.

Expressive Writing	Age-appropriate language for introducing and motivating the expressive writing exercise along with identification of at least one obstacle to implementation and a plan for addressing it. Includes a clear plan for monitoring impact of strategy on student anxiety and performance.	Age-appropriate language for introducing and motivating the expressive writing exercise along with identification of at least one obstacle to implementation and a plan for addressing it.	Vague or age-inappropriate language for introducing and motivating the expressive writing exercise. No obstacles to implementation identified.	No original age-appropriate introduction to expressive writing exercise offered.
Anxiety Reappraisal	Detailed, but age-appropriate, explanation of the performance enhancing benefits of anxiety. Includes discussion of intended timing of this intervention **and** provides a clear plan for monitoring impact on anxiety levels and performance.	Detailed, but age-appropriate, explanation of the performance enhancing benefits of anxiety. Includes discussion of intended timing of this intervention **or** provides a clear plan for monitoring impact on anxiety levels and performance.	Vague explanation of the performance enhancing benefits of anxiety is present but lacks detail or is not appropriate to age-group.	No explanation of the performance enhancing benefits of anxiety provided.
Growth Mindset/ Mastery Orientation	A clear description of how the learner will encourage students to adopt a growth mindset and mastery orientation, citing at least two concrete strategies for each. Learner	A clear description of how the learner will encourage students to adopt a growth mindset and mastery orientation, citing at least two concrete strategies for	A vague or unclear description of how the learner will encourage students to adopt a growth mindset and mastery orientation, but plan lacks specific, concrete	Brief or no description of how the learner will encourage students to adopt a growth mindset and mastery orientation.

	provides a plausible explanation of how changing the way students view achievement and failure can translate into reduced anxiety and enhanced psychological safety.	each.	strategies.	
Action Plan	An organized and thorough action plan identifying critical features of plan and ideal timelines for implementation. Clear plan for revisiting and refining action plan over time.	An organized and thorough action plan identifying critical features of plan and ideal timelines for implementation.	Action plan is present but lacks organization or fails to identify critical features and implementation timelines.	Action plan is not completed or lacks enough detail to be useful.
Overall Cohesiveness	Overall, the learner's Plan for Combating Math Anxiety portrays a clear vision for a psychologically safe classroom and presents a cohesive and detailed plan for how to achieve that vision.	Overall, the learner's Plan for Combating Math Anxiety portrays a clear vision for a psychologically safe classroom, but plan for achieving the vision lacks cohesiveness or detail.	Overall, the learner's Plan for Combating Math Anxiety is vague or unclear, and the plan for achieving the vision lacks cohesiveness or detail.	Overall, the learner's Plan for Combating Math Anxiety does not explain what a psychologically safe classroom is nor how to effectively reduce anxiety in students.

Appendix D
Downloadable Resources

Mathitude Surveys (Two different versions for Grades K-5 and Grades 6-12)

Assessment Instrument to be used at the beginning of the school year to learn about students' attitudes and feelings toward math. For primary school students, these questions can be asked whole-group and recorded via a checklist, audio recorder, or through handwritten or typed notes. They could also be asked in a one-on-one setting or during parent-teacher conferences.

Expressive Writing Prompt

Tool to be used to introduce the pre-assessment journaling exercise aimed at reducing the impact of math anxiety on performance.