Title

Enabling Students with Special Needs to Succeed in Math Class (Grades 4-8)

Target Audience

This course is designed for teachers or specialists who serve classroom students with special needs, grades 4-8.

Course Description

This course focuses on how to promote equity in mathematics education for students with disabilities. The “Individuals with Disabilities Education Act of 1997” mandates that, whenever possible, students with disabilities be educated in the same classrooms and with the same curricula as their peers. Learners will discover how to adapt their own curricula and collaborate with special needs teachers to help students succeed in the classroom. Learners will develop new instructional strategies for making mathematics more accessible for students with disabilities. As a final task, learners will develop a plan to incorporate accessibility strategies into their daily teachings.

Instructor/Facilitator

See the instructor/facilitator sheet

Credits

To be determined by the sponsoring college or university

Goals

Learners will:

- Learn to identify students' strengths and weaknesses and understand how these strengths and weaknesses impact performances in mathematics;
- Use a process for identifying potential barriers in mathematics lessons and for planning strategies to meet the students' needs;
- Expand repertoire of instructional strategies for making mathematics more accessible for students with disabilities;
- Explore different ways that mathematics teachers and special educators can collaborate to better meet the needs of students with disabilities;
- Develop a plan for incorporating accessibility strategies into your mathematics curricula and daily teaching practices.

Outline of Content and Assignments

After previewing the course introductory information, learners will complete each of the six sections sequentially. Throughout the course, learners are encouraged to reflect on their ideas and experiences in their Learning Logs. Weekly discussions are designed to foster the sharing of ideas and strategies. Learners will develop an accessibility plan from familiar mathematics curricula which can be applied to their classrooms.

Part 1: Orientation

Learners will:

Test their computers
- Run “The Wizard”
- Install all required plug-ins to run PBS TeacherLine courses

Become familiar with the course website
- Select different sections of the course.
- Watch "Launch Video," a short, informative video about preparing to think like a student as well as a teacher for this course.
- Run the “Launch Interactive” program.
- Download a copy of the Learning Log, used to describe how the math problems presented in this course were solved.
- Open the Learning Log to get acquainted with the kinds of questions that participants will answer throughout the course.
- Print out the Digital Drop Box instructions for later use in Sessions 3 and 6 (used to post Learning Log to the facilitator).

Read
- “Goals and Challenges in Mathematics Education for Students with Disabilities”
  This document describes the goal of equity in mathematics education for students with disabilities and the types of challenges educators face as they strive to achieve this goal.
- “The Equity Principle”
  NCTM's *Principles and Standards for School Mathematics (PSSM 2000)* describes the goals for promoting equity in mathematics education.

Collaborate
- Introduce themselves on the Discussion Board.
- Learn how to communicate by posting messages on the Board.
- Discuss: “In what ways has the mathematics education of students with disabilities changed since you were in middle school or junior high?”

Part 2: Identifying Student Difficulties in Mathematics

Learners will:

- Learn about the types of difficulties students with disabilities have in learning mathematics;
- Experience what it might be like to have a learning disability;
- Explore how a student's strengths and needs in eight learning areas affect his or her performance in mathematics.

Read
- “Difficulties with Mathematics”
  This reading describes different problems students may have in learning mathematics and lists some signs of math difficulties.
- “A Lens for Identifying Students' Strengths and Needs in Mathematics”
  This article describes eight learning areas that impact student performance in mathematics. These areas can be used as a lens for identifying a student's strengths and needs and potential barriers in curricula.
- “Mathematical Disabilities: What We Know and Don't Know”
  This article provides an overview of the current research on math disabilities. Although the focus of the article is on elementary mathematics, it has implications for the middle school level.

Interact

- Arithmetic Activity
- Spatial Activity
- Sequence Activity
- Auditory Activity
- “Dr. Math” problem

Write in Learning Log

Analyze the example student work from a range of students, including students with disabilities for the "Dr. Math" problem. Respond to specific questions.

Participate in an Online Discussion

By reading and posting responses on the Discussion Board regarding which student difficulties can arise in the eight learning areas are the most challenging to address in the teaching of middle school mathematics and why.

Extensions

Activity extensions and additional readings are provided as optional experiences to extend the participants’ knowledge in identifying students’ difficulties in learning mathematics.

Part 3: Planning Accessibility Strategies for Lessons

Learners will:

- View math lessons through an accessibility lens and identify potential barriers;
- Discover different kinds of accessibility strategies including instructional practices, curricular adaptations, and short-term interventions;
- Plan accessibility strategies for a lesson to meet some students' needs while maintaining the integrity of the mathematics content.

Read

- “A Process for Planning Accessible Lessons”
  This article provides a process and some guiding questions to help teachers plan accessibility strategies for mathematics lessons.
- “Accessibility Strategies for Mathematics”
  This resource provides an organized list of accessibility strategies for teachers to consider, in order to meet their students' needs in each of the eight learning areas. Select the areas that you would like to find out more about.

Activities

- View two short video clips to find out about some different strategies used by math and special education teachers.
- Solve the math problems in the "Box of Chocolates" lesson. Take notes on the math concepts, skills, and processes you used to solve the problems in preparation for planning accessibility strategies.
- View another short video clip of classroom strategies to find out how a mathematics teacher incorporated accessibility strategies into the “Box of Chocolates” lesson.

Write in Learning Log

Using the given example students, identify the kinds of difficulties, which prevent students from reaching certain mathematical goals, and write about possible accessibility strategies for addressing those difficulties.

Participate in an Online Discussion

By reading and posting responses on the Discussion Board, the learner describes how accessibility strategies both meet the students' needs and maintain the integrity of the mathematics and high standards.

Extensions

Activity extensions are provided as optional experiences to extend the participants' knowledge in identifying and planning strategies for potential barriers to the learning of mathematics.

Part 4: Implementing Strategies in the Classroom

Learners will:

- Identify various ways to incorporate accessibility strategies into the physical classroom environment;
- Make an implementation plan to describe how to use the strategies in the classroom;
- Make an evaluation plan to determine if strategies are effective.

Read

- "A Process for Planning Accessible Lessons"
  Although you read this article in the previous session, it is important that you reread the sections on Implementation and on Evaluation in order to participate in this session.
- "Ask an Author: What's Required for Accessible Classroom Discussions?"
  This article provides helpful strategies for engaging all students in classroom discussions.

Activities

- Watch a short video to see how a mathematics teacher incorporates accessibility strategies into her classroom environment for all students.
- After watching the video, take a tour of your own classroom or of another teacher's classroom and note, which, if any, accessibility strategies are in place in the classroom environment.
- Watch two addition videos focusing on addressing the needs of students with memory difficulties and on building students' confidence in their abilities to do mathematics, and the importance of having high expectations for students with disabilities and in being cautious in planning adaptations.

Write in Learning Log

From the given information learned in the course so far, participants complete the Accessibility Planner, Part 2 by planning how they would implement and evaluate the accessibility strategies identified in Session 3.

Participate in an Online Discussion

By reading a teacher scenario, participants post their thoughts on the Discussion Board regarding how they would respond to the teacher's dilemma.

Extensions

Activity extension provides an opportunity to put some of the issues from this session into practice with colleagues.

Part 5: Building Collaborative Teaching Practices

Learners will:

- Find out about different approaches to collaboration between mathematics and special education teachers;
- Identify factors that are needed to build strong collaborative relationships;

- Identify the school structures that are needed to support collaboration.

Read

- "Co-Teaching"
  This chapter provides a rationale for co-teaching and describes six different co-teaching approaches that you can implement in classrooms.
- "Time for Planning"
  This excerpt discusses the importance of having time for regular education and special education teachers to plan, issues that can get in the way of this time, and suggestions for creating shared planning time.

Activities

- View three short videos on teacher collaboration between math classroom and special education teachers.
- View two additional short videos reflecting on common planning time and supportive school structures.
- Read classroom vignettes and reflect upon obstacles to collaboration, successful strategies and supportive school structures that enhance collaboration.

Participate in an online discussion

By reading and posting responses on the Discussion Board, learners share their views on factors needed to build strong collaborative relationships between mathematics and special education teachers and effective strategies for responding to tensions and school-wide barriers to collaboration.

Part 6: Bringing It All Together

Learners will:

- Synthesize the ideas in the course and apply what they have learned to their classroom practice;
- Design accessibility strategies for a specific lesson from their mathematics curriculum;
- Plan how they will implement the strategies to fit their classroom situation.

Read

- "Adapting a Problem-Solving Approach to Teaching Mathematics to Students with Mild Disabilities"
  This article describes strategies for using a problem-solving approach to teach mathematics to students with disabilities.

Participate in an Online Discussion

By reading and posting responses on the Discussion Board, the learner reflects on the next steps needed to integrate accessibility strategies into their teaching of mathematics.

Activities

Learners will apply their knowledge from the prior sessions, readings, and discussions to create a final project of between 6-8 pages in length.

<u>Final Project</u>

Prepare an Accessibility Plan for a lesson or lessons in the participant's mathematics curriculum. The plan will be organized around five parts including Participant Profiles, Lesson Profile, Accessibility Planner, Implementation and Evaluation Plan, and Rationale. Included in the course are templates for each part to assist with the organization of the full plan

Criteria for the project are:

Participant Profile:

Participant provides clear description of the strengths and needs for three students and shows an understanding of the eight learning areas.

Lesson Profile:

Participant provides a clear description that outlines the flow of activities and what students will do. Participant lists the mathematical goals and describes some strengths and concerns of the lesson in terms of accessibility.

Accessibility Planner:

Participant offers a complete Accessibility Planner that focuses on four learning areas and provides information on the types of tasks in the lesson, the kinds of difficulties students might have, and possible accessibility strategies.

Implementation and Evaluation Planner:

Participant offers a complete Implementation and Evaluation Planner that includes a lesson plan with accessibility strategies and implementation notes. The participant provides a plan for evaluating the effectiveness of the strategies by gathering evidence of students understanding.

Writing in the Learning Log:

Participants will respond to the following question: "What one or two ideas do you take away from this course that you believe will be of the most use for you in your classroom, and why?" When finished, the Learning Log is sent to the course facilitator.

Schedule

This course is scheduled to take approximately 15-20 hours to complete readings, activities, video, assignments, reflections and a final project.

Requirements

Learners are expected to:

- Complete all assignments
- Maintain an online journal
- Participate regularly in discussion boards

Evaluation

Pass/fail upon satisfactory completion of assignments and discussion board participation

Materials (hardware, software, plug-ins)

Technical Requirements

- Word processor
- Internet service provider
- E-mail

Academic Dishonesty Policy

To be inserted by the university institution only