NATIONAL INSTITUTE FOR LEARNING DEVELOPMENT

Course Syllabus

I. WORKSHOP DESCRIPTION

This is a lecture and laboratory workshop designed to train educators to provide mathematical intervention in a group setting. Rx 4 Discovery Math II is specifically intended for students in grades 6th-8th who would benefit from intensive, small-group instruction in mathematics with an emphasis on fostering self-regulated learning behaviors and beliefs, improving problem- solving skills, strengthening mathematical fluency, enhancing discourse and peer collaboration, building metacognitive skills, and improving non- cognitive factors affecting mathematical thinking and learning.

RX 4 Discovery Math II supports educators in establishing classroom contexts that develop students' self-regulated learning behaviors and beliefs. Students who are self-regulated apply knowledge, skills, and dispositions to engage in mathematics learning with confidence.

PURPOSE:

A. To provide weekly, small-group mathematical intervention that includes activities to strengthen mathematical reasoning, computational fluency, conceptual understanding, and self-regulation.

B. To create a learning environment where mediation and discovery are the means by which students grow in their understanding of mathematics and of themselves as competent learners.

C. To encourage a sense of belonging in each small group where cognitive functions are strengthened in a safe environment and collaborative academic struggle is embraced and seen as a way to strengthen thinking skills and increase individual confidence and competence.

II. WORKSHOP OBJECTIVES

A. ***General***: Successful completion of this workshop will enable the educator to facilitate deeper mathematical thinking for students by understanding how to strengthen students' conceptual understanding, computational fluency, and mathematical reasoning skills by developing self-regulation and cognitive functions through a safe mathematical community where productive disposition, self-efficacy, a sense of belonging and mathematical exploration is encouraged.

B. ***Specific***: Upon completion of this course, the participant will:

1. Acquire an understanding of rational numbers and mathematical fluency:
   - What are rational numbers?
   - Why is understanding them critical for mathematical fluency?
   - What are the other components of mathematical fluency?

2. Discover the cognitive processes necessary for mathematical thinking and gain skills to strengthen students' cognitive functioning and mathematical confidence through targeted intervention activities and specific questioning and feedback.

3. Demonstrate an ability to work with groups of 4-6 students in the teaching of basic mathematical problem-solving skills focusing on rational numbers and computational fluency.
4. Apply the theory of mediated learning while teaching students SRL in mathematics with an emphasis on rational numbers and deepening students' conceptual understanding of fractions, decimals, and percents.
5. Assess students' level of self-regulation and determine teaching practices that support students' SRL development
6. Design a plan for group implementation that would meet the learning needs of a specific groups of students

III. REQUIRED RESOURCES

A. RX 4 Math II *training manual* (provided by NILD)

B. *Developing Mathematical Fluency* by Grayson H. Wheatley & George E. Abshire Purchase this e-book at https://mathematicslearning.gumroad.com/

C. *Quick Draw: Developing Spatial Sense in Mathematics* by Grayson Wheatley. Purchase this e-book at https://mathematicslearning.gumroad.com/

D. *Decimals, Fractions, & Percents: Rx 4 Discovery Math II* -Supplemental Student Workbook from NILD's website (www.nild.org)

IV. WORKSHOP REQUIREMENTS

A. *Pre-Workshop Preparation*

1. Read assigned pages of *Developing Mathematical Fluency* and familiarize yourself with the math activities contained in the book.
2. Read 2 articles
3. Watch 5 asynchronous PowerPoint presentations:

B. *Workshop Workload*

1. Asynchronous learning – time required is approximately 6 hours
2. Synchronous learning – time required is 8 hours

V. COURSE EVALUATION

Participants will practice the mathematics and SRL teaching techniques with a small group and receive group feedback on their demonstrations.

CONTEXT/ CONTENT	METHOD	FOCUS
Environmental Conditions • Norms • Tasks • Discourse Productive Disposition **Developmental Activities (Tasks) Emphasize** • Problem Solving • Fractions • Decimals • Percent • Math Vocabulary	**Mediated Learning Experience (MLE)** • Intentionality • Reciprocity • Transcendence • Meaning • Competence • Shared Behavior **Problem Centered Learning** • Tasks • Collaboration • Presentation **Self-Regulated Phases** • Forethought • Performance Control • Self-regulation **Self-Regulated Levels** • Observation • Emulation • Self-control • Self-regulation	**Cognitive Abilities** • Conceptual understanding • Computational fluency • Mathematical reasoning • Self-regulation • Cognitive functions **Non-cognitive Skills/Disposition** • Self-efficacy • Growth mindset • Sense of belonging