Supporting English Learners in a Middle School Math Classroom

Author's Name: Julienne Cruz **Coach Name: Michael Bautista**
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Abstract

English Language Learners (ELL) face a double curricular load in a math classroom. Deciphering a math text, while attempting to solve a difficult math concept can be frightening and frustrating. Consequently, many ELL students feel anxious and thus, become passive learners in a math classroom. In order to encourage ELL students to persevere and contribute in their math class, I will coach a new teacher to implement three evidence-based teaching strategies that will increase metacognitive skills and academic participation in two ELL students. Secondly, I will observe this teacher several times throughout the quarter to measure her learning growth and to assess students' academic performance and growth.

Focal Standard(s)

California Standards for the Teaching Profession
3.6 Addressing the needs of English learners and students with special needs to provide equitable access to the content

Grade 6: ELD Standards W.6.6; WHST.6.6; SL.6.2; L.6.3, 6: Interacting in meaningful ways
2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia

Measurable Objective(s)

Student Learning Objectives:

- By the end of the first quarter, English Language Learners (ELL) students will improve their metacognitive skills and increase their academic discussion in a math classroom through evidence-based teaching strategies such as Think Alouds, Participation Quizzes, and the Three-Read Strategy.

Teacher Learning Objective:

- By the end of the first quarter, the new teacher will learn two to three new teaching strategies (Think Alouds, Participation Quizzes, and the Three-Read Strategy) under her teacher toolkit. This will be measured by four to five peer-coach interviews, informal/formal observations, and her reflections of these strategies.

Context for learning (student): Students will enhance their learning experience on ratios and fractions through evidence-based strategies.

Prior Knowledge:

- Fractions
- Ratios
- Table charts

- Job roles
- Class rules

Formative Assessment(s)

Student:
- Exit ticket that describes two ways to improve communication skills in math

Teacher:
- Pre/post conferences with the new teacher to discuss areas of strength and growth

Summative Assessment

Student:
- Dr.Soto's English Learner Shadowing guide
- Participation Quiz

Teacher:
- Peer to Coach interviews/meetings
- Final reflection and conference on areas of growth throughout the 18-19 school year

21st Century Skills and Applications

Communication and Collaboration

Communicate Clearly
- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)

Reason Effectively
- Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Identify and ask significant questions that clarify various points of view and lead to better solutions

--Source: Partnership for 21st Century Skills

Fellowship Description

Digital Promise Global's (DPG) Learner Positioning Systems (LPS) initiative aims to lead the way in translating the latest research on learner variability to support the development of classroom practices and edtech products deeply rooted in learning sciences and designed to serve each learner. DPG presents in each of its Learner Models the critical variables that affect how we learn best--that is, the ways learners vary. We call these our Learner Factors or just Factors. We then provide research-based strategies that educators and developers can use to support the variability of all learners.

The goal of the project is to review current learning sciences research to create a bank of evidence-based teaching strategies for math in grades 3-9 that could be employed by a classroom educator or used to inspire better design in edtech products. As part of the project, the Learning Sciences Research Fellow will also work with a team member on assessing how a math edtech product uses research-based strategies to support the variability of all learne

Fellowship Connection to School/Classroom

For my Educational Transfer Plan (ETP), I will take two to three evidence-based strategies from the Digital Promise Global (DPG) strategy templates and implement these strategies in a new teacher's classroom. Through coaching, the new teacher and I will analyze the effectiveness of the strategies on her 6th grade class, specially her English Language Learners (ELL).

Instructional Plan

Meeting/Reflection Timeline with the New Teacher

First Week of Coaching:

1. On the first week of school, I will meet with the new teacher to go over her goals for the classroom.
    a. During this meeting, I will introduce three/four evidence based strategies from my fellowship at Digital Promise Global. With these strategies, I will also provide her references and readings she can refer to for her own research. Together, we will go over implementation ideas on these strategies.

Second Week:

2. I will observe this teacher using these strategies in her 6th grade classroom
    a. I will also observe two English Language Learners in her classroom

Third Week:

3. After this first observation, we will have a follow up meeting on my feedback/suggestions on her lessons. We will also discuss the two ELL students from this lesson.

Fourth Week/Fifth Week:

4. After this follow-up meeting, I will schedule two more observations to assess improvement in implementing these strategies and to assess the two ELL's improvement in math talk.

Sixth Week (End of the quarter):

5. I will schedule a post meeting at the end of the ratio unit to compare her teaching from my first observation vs. post observation. In this meeting, this teacher will reflect and discuss her thoughts on the effectiveness of these strategies on her students, specifically her English Language Learners.

Lesson Plan for Students

Engage (8 min)	Evaluate
1. Do Now on Ratios ● The teacher will teach the DO NOW lesson	I will observe the teacher and two English Language Learners during this lesson.

to her class	
Explain: Direct Instruction: Building Metacognitive Skills	
• Teacher will introduce a math problem to the class. As she introduces the math problem to the class, she will used the evidence based strategies, Three-Reads and a Think Alouds to help her English Language learners and overall class decipher difficult math vocabulary words. Three Read Strategy: • The teacher will read the math problem three times. First, she will read the problem. Secondly, she will have the students the read problem. Lastly, she and the students will read the problem and together, identify key words and numbers that are needed to solving the word problem. For this third read, she will use the Think Aloud strategy when identifying keywords and numbers. Think Alouds • When the teacher and students are identifying the key numbers and words together, the teacher will teach students how to use metacognitive skills when reading the problem. • By showing students steps in solving the problem, she is building their meta-awareness on problem solving. This strategy helps ELL students connect difficult math concepts to their existing schemas of the consent material.	• As a BTSA coach and English Language Coordinator, I will observe both the teacher and students. ○ First, I will observe the teacher ability to teach these strategies through the BTSA teacher observation document. ○ Secondly, I will observe two of the ELL students using Dr. Soto's shadowing guide.
Explore: Cooperative Learning	
• Prior to releasing students to their groups, the teacher will model reciprocal teaching and appropriate behavior so students understand their behavior expectations in a group setting. ○ She will go over the norms for active	• Every five minutes I will record my observations on the two ELL students. I will assess their academic language vs. utility language during the participation quiz using Dr. Soto's Guide. ○ Utility Language- Non-academic language. For example, "May I borrow a pencil?"

listening and key points to the participation quiz. ● After the teacher presents the math problem to the class using the three-read strategy and the think aloud strategy, students will then solve the math problem in groups. ● As a group, they are going to partake in a Participation Quiz, in which students are graded for their academic and non-academic contribution to the task (speaking, listening, reading, drawing, writing). They will also be assessed on their metacognitive skills during problem-solving. ● Each student in the group is expected to provide their thoughts on the problem and use the Think Aloud strategy that was taught to them prior to the lesson ● The teacher will record their conversation on the whiteboard to acknowledge each student voice.	○ Academic Language- Using math terms or terms that can help solve a math problem. ■ For example-"What do we know about ratios that can help us solve this problem?"
Elaborate (summative assessment of group) (continue into period next day, 5 min presentation per group)	
● After students complete their participation quiz, the teacher will read students' quotes during their group work. ● The teacher will call on four-five students to share their problem solving strategies. She will also call on the two ELL students I am observing during the lesson. ● After students share their problem-solving strategies, they will give out appreciates for a group member that helped them during the participation quiz.	After the lesson, the teacher and I will go over my observations on the ELL students and my observation on her lesson. First, I will use Dr.Soto's guide to give the teacher insight on the two ELL students math and metacognitive skills during problem solving. Secondly, I will give her positive critiques, deltas (changes), and advice on her lesson. I will also have her reflect the effectiveness of the problem-solving strategies (Think Alouds, Three Reads, and Reciprocal teaching) and overall lesson on her students, especially on her ELL students.

Supply List

Supplies:

Students

- Dr.Soto's observation guide (Dr.Soto's English Learner Shadowing guides)

- Markers/Pencils
- 6th grade CPM math textbook

Teacher

- BTSA observation documents
- BTSA reflections

Safety: Make sure students are obeying class rules.

References

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Keywords

English Language Learners, Metacognition, Ratios, Teacher Coach

Links to Files in this ETP

ELL Observation Tool:
Dr.Soto's Observation guide

Coaching Documents:
BTSA Documents:

Observation Record

Observation Document

Comprehension Strategies:

Strategy 1: Three-Reads
Three-Reads: Constructive Conversations: An infographic that provides examples of academic language and math talk around the three-read process

Strategy 2: Think Alouds

- **Interactive Think-Aloud: Procedure and classroom example of doing a think-aloud in the classroom**
- **LD Online Thinking Aloud in Math: Examples of evidence-based practices, technology resources, and implementation in the classroom**

Number Reasoning and Problem Solving Lesson: Math think-aloud lesson plan with prompt sheet for students

Strategy 3: Participation Quiz
Dan Meyer's blog post on the Participation Quiz Process. This document includes a guide and a lesson plan guide for implementation.

http://blog.mrmeyer.com/wp-content/uploads/OUSDMathInstructionalToolkit2013-14.pdf
(pg.31-36)

Participation Quiz Video:
A teacher's instructional video on Participation Quiz

Participation Quiz Template: A template guide on taking observation notes during a Participation Quiz

Exit Ticket:
Student Exit Ticket