

Traditional Co-Teaching

- Pre-service teacher/intern works with mentor teacher.
- Cross-disciplinary teachers work together to integrate subjects.
- Special education teacher works with general education teacher to facilitate inclusion of special needs students.
- Two teachers share responsibilities of teaching all students.

Two teachers share responsibilities of teaching ALL students.

“Co-teaching occurs when two or more professionals jointly deliver substantive instruction to a diverse, blended group of students in a single physical space.”

(Friend & Cook, 2007)

Reaching ALL Students

- Traditional curriculum has been developed for the average student around a one-size-fits-all mentality (typically printed text).
- Very few students actually could be described as this “mythical average student”.
- Consequently, the majority of our students face barriers to learning.

(Meyer, Rose, & Gordon, 2014)

Universal Design for Learning

To tear down barriers to learning, teachers must provide the following:

- **Multiple Means of Representation:** Learners perceive and comprehend information in different ways.
- **Multiple Means of Expression:** Learners navigate a learning environment and express what they know in different ways.
- **Multiple Means of Engagement:** Learners are engaged or motivated to learn in different ways.

In reality, with the diversity of learners that exists in classrooms, we would need multiple physical co-teachers.

Question: Could virtual resources serve as these co-teachers?

Our work in classrooms across multiple states tells us it can!

Multiple Means of Representation

Virtual co-teacher offers another presentation of material.

- **Algebra Nation - Instructional Videos**

- Five study experts present the material with different teaching styles. Some go more in-depth and others offer a quick review.
- Only available in some states (Florida, Mississippi, Michigan, Alabama, South Carolina, New York City)

- **Khan Academy**

- Available to anyone with device and internet

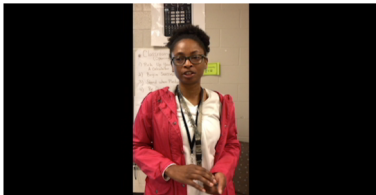
Multiple Means of Representation

Teachers use the videos whole group, as if a second teacher is in the room with them.

- Teacher **paused video** periodically and **interjected deeper explanations**. Students benefited from the **perspectives of two teachers**.
- Teacher **paused video** as video tutor began solving a problem and asked **students to work in groups to solve** before continuing video.
- Teacher **paused video** and asked students to **turn to neighbor and explain last concept/skill in own words**.
- Teacher used **time codes** from the video as **stop points to allow her to assess student understanding**.

Multiple Means of Representation

Teachers use the instructional videos to help remediate students in areas of deficiencies.



Hannah Curry Edwards Middle School Karma Points 0 / 7,000 / 11,700

Most times you read a graph like you do words, left to right. So a graph that is increasing is rising to the right, where a graph that is decreasing is going down to the right. Try to draw some

Like • Reply March 26th at 8:31pm ET (Post #63322)

Hannah Curry Edwards Middle School Karma Points 0 / 7,000 / 11,700 +206

SO the red one is decreasing, and the blue one is increasing

Like • Reply March 26th at 8:31pm ET (Post #63322)

Hannah Curry Edwards Middle School Karma Points 0 / 7,000 / 11,700

Oops...I have the colors backwards!







Like • Reply March 26th at 8:31pm ET (Post #63322)

[illegible]

The figure consists of two screenshots of the DESMOS interface. The left screenshot shows the desktop version with a top navigation bar containing 'DESMOS', 'Equation Editor', and 'Upload a file'. Below this is a large text input area labeled 'Write a reply...' with a 'POST' button to its right. At the bottom, there are icons for 'Drawing Tool', 'Special Characters', 'Calculator', and 'Upload a picture'. The right screenshot shows the mobile app version, featuring a 'Snap a picture with the phone' button at the top and a 'Special Characters' button below it. The bottom of the mobile app shows a standard QWERTY keyboard.

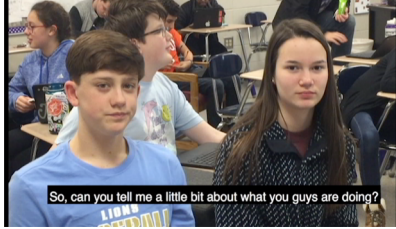
[illegible]

- Teachers can choose a graphic category.

Lines	Parabolas	Hexagons	Rational Functions	Basic Quadrilaterals	Advanced Quasiquadrilaterals
					

- Teachers can also create their own graphic category.
- Students work in pairs. One picks a graph from the category and the other asks questions to guess which graph the classmate picked.

Multiple Means of Expression/Engagement



So, can you tell me a little bit about what you guys are doing?

Multiple Means of Expression/Engagement

STUDENT	POINTE	QUESTION	ANSWER	STATUS
Camille Jordan	12 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Henri Lefebvre	11 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Charlotte Cardenas	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Louise Hay	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Mary Feltz	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Alan Potts	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
James Montoya Jr.	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Scott Williams	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Kelly Miller	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Courtney Gibbons	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Yveson Kinan	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Neysa Rice	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Debra Tammie	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12
Roberto Soto	10 of 12	Are the lines parallel?	Yes, only if a parameter is the in diagonal and the lines horizontal	12/12

Multiple Means of Expression/Engagement

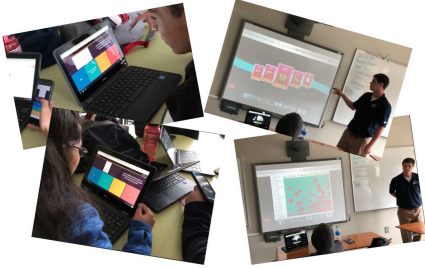
Reviews with Gamification

- o **Socrative** - teacher or student paced
- o **Quizizz** - student paced
- o **Kahoot!** - teacher paced

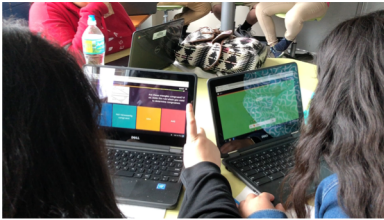


Multiple Means of Expression/Engagement

Quizizz



Multiple Means of Expression/Engagement



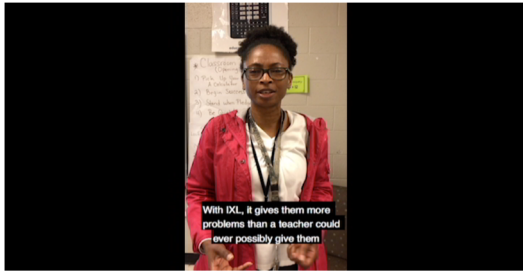
Multiple Means of Expression/Engagement

Other online assessment tools

- IXL
- Khan Academy
- Boom Cards



Multiple Means of Expression/Engagement



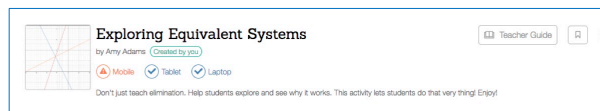
Multiple Means of Expression/Engagement

The technology with these games and interactive assessments can serve as a virtual co-teacher that is formatively assessing your students and gathering and analyzing data for you. At the same time, it is more engaging for students than traditional pencil and paper assessments.

Multiple Means of Engagement

Desmos Teacher - Activity Builder

- Easily create inquiry-based activities and have students use prior knowledge to build understanding of new concepts.
- Desmos Teacher Dashboard lets you watch as each student is guided through the lesson by their virtual co-teacher.



Multiple Means of Engagement

Exploring Equivalent Systems

- Prompt recall of prior knowledge

Let's explore systems

Describe what you know about the solution to a system of three equations.

Submit to Teacher

Let's explore systems

Describe what you know about the solution to a system of three equations.

How Consistent

a line over a line has many solutions

intersecting lines have 1 solution

What's missing

That they always end up in a straight line because linear means straight line, line infinite many solution

How Consistent

I'm not really sure

How few

?

Convin Gomez

when the lines are intersecting it has one solution

Daniela Schuchmayer

A solution can have many, none, or only one solution

Hopewell

Use a graph plotting lines to see how many solutions there is

Adrian Brown

It can be one solution, no solution, or infinitely many solutions.

Jacob Bernoulli

a solution is non out of ten is the answer to the problem

Noriko Yu

They can be parallel or intersecting on a graph

[illegible]

Multiple Means of Engagement

Exploring Equivalent Systems

- Building new knowledge - students given a system and asked to add the two lines together and graph on the same coordinate plane as the system.

system.

What do you discover about the solution to the system that now contains Equation C? Record your answer below.

Submit to Class

What do you discover about the solution to the system that now contains Equation C? Record your answer below.

First Decimals

all the lines were different but they all still intersected at a common point

Open-Intersect

It has one solution

How open?

It has one solution

Continue Page

All the lines intersect

How intersect?

all lines intersected

Kurt Glaser

Well I discovered that equation C made a line that intersected with equation A & B. There's One Solution

Garthel Leticia

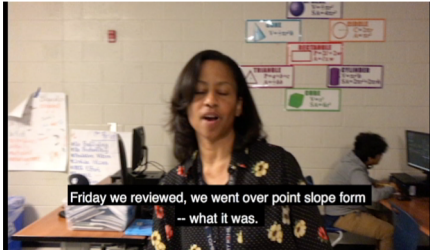
all intersect

[illegible]

Multiple Means of Engagement

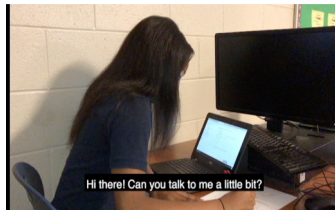


Virtual Resources Co-Teaching Example



Student Benefits

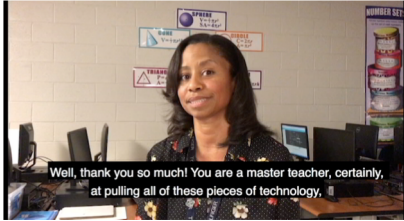
- More engaged in the learning process through giving them choice in their own learning
- Can work at their own level/pace



Limitations

- In many schools, the infrastructure was not sufficient.
- Students did not all have devices.
- Teachers are not able to see students' work and thought process.
 - The teacher who used IXL worked around this by giving students a sheet with 20 empty rectangles. The students had to show their work in the space provided and hand in to the teacher.

Too Much of a Good Thing?



Think-Pair-Share

- What online resources are available to you and your students?
- How could you use these resources as co-teachers.

For more information about
Algebra Nation, email
Amy@AlgebraNation.com
