Promoting Equitable Teaching Practices Through TACTivities

Civics of Technology Conference
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What is a TACTivity?

- A tactile activity that encourages collaboration and engagement
  - Tactile (movable pieces)
- Actively engages students
- Can be used to help teach or review a concept
- Most are designed for groups of 2-4 students
- Often self-checking – students realize when they "got it"
- No moves are permanent
- Tactile learning activities were created with active learning in mind.
- TACTivities were originally made to be pieces of paper that you could move around in front of you on a table.
  - Can be moveable pieces on the computer screen
- Originally created for mathematics, although other subjects can be done

TACTivity – a Twist

- Some TACTivities are simple card sorts used to explain the concept.

- Our favorite TACTivity would have some kind of twist (mental trick, harder concept) that makes the students think a bit harder and have to communicate with each other to solve it.

Impetus

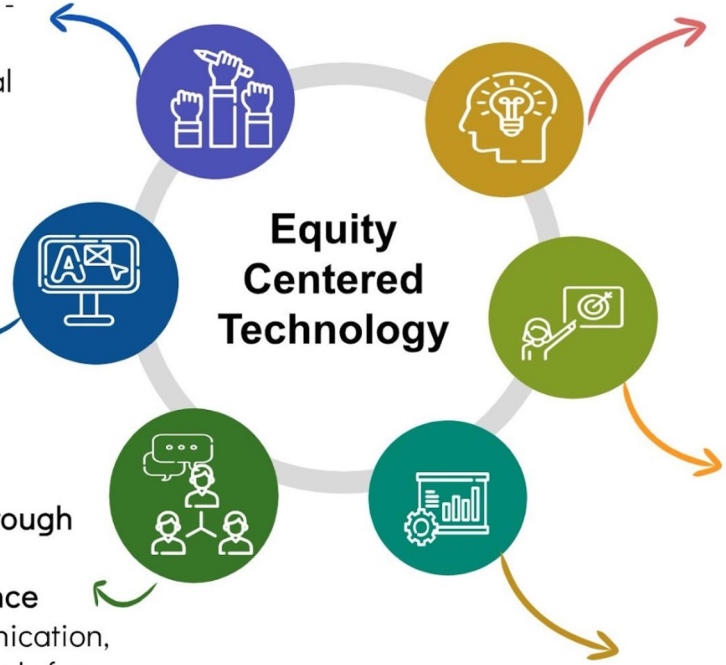
- Only had anecdotal data that TACTivities help deeper problem-solving/active learning
- Implemented a TACTivity and surveyed Preservice Mathematics Teachers to gather data
- Instructor also evaluated the TACTivities on the EqT-tech Lesson Analysis Tool

https://www.eqttech.org/

EqT-tech LAT

Created by: Suh, Roscioli, Wills, Morrow-Leong, and Tate

Research-based dimensions to support Equity-centered Technology



Dimension 6: Gain Insight Using Digital Tool on Social Justice Issues - Provide insights using data analysis and spatial information tools that reveal inequities and social justice issues (Rubel & Nicol, 2019)

Dimension 5: Amplify Mathematical and Cognitive Processes- Amplify math thinking processes with technology mediated features (Zbiek et al., 2007)

Dimension 4: Empower Students Through Collaboration, Communication and Collective Thinking though Conveyance Tools- Increase collaboration, communication, and connection through conveyance tools for social interaction & distribute authority by honoring all student ideas (Cohen & Lotan, 1995; 2014; Gresalfi et al., 2009)

Dimension 1: Access Inquiry-based Technology Learning- Provide access to dynamic tools to support inquiry, discovery, and deep mathematical sense-making (NCTM 2020; Dick & Hollebrands, 2011).

Dimension 2: Promote Math Identity through Authorship and Agency through Digital Tools- Promote equitable structures and participation using digital tools to affirm math identity (Aguirre et al., 2013, NCTM, 2020; Schoenfeld and the TRU Project, 2016; Wills 2020)

Dimension 3: Use Technology for Formative Assessment & Differentiation - Differentiate instruction with real-time feedback (Hackenberg et al., 2020) using teacher dashboards and/or ease of scanning for scaffolding

In a population of 10,000 people, 1% are infected with COVID-19. All 10,000 people are tested, using a test that has a 2% false positive rate (2% of those who are uninfected will test positive), and a 15% false negative rate. Complete the table, and the conclusion below. (Numbers in purple boxes; words in green boxes.)

Number of people	Infected	Uninfected	Total
Test positive			
Test negative			
Total	100	9900	10000

CONCLUSION: Even though the test is has a false positive rate of only 2%, out of all people who test positive for COVID-19, only

$$\frac{\square}{\square} \approx \square\,\%$$ are actually infected!

(true negative) (true positive)

(false negative)

(false positive)

(true false)

100 198

283 15

30 85 85

9717 9702 283

In a population of 10,000 people, 1% are infected with COVID-19. All 10,000 people are tested, using a test that has a 2% false positive rate (2% of those who are uninfected will test positive), and a 15% false negative rate. Complete the table, and the conclusion below. (Numbers in purple boxes; words in green boxes.)

Number of people	Infected	Uninfected	Total
Test positive	85 (true positive)	198 (false positive)	283
Test negative	15 (false negative)	9702 (true negative)	9717
Total	100	9900	10000

CONCLUSION: Even though the test is has a false positive rate of only 2%, out of all people who test positive for COVID-19, only

$$\frac{85}{283} \approx 30\ \%$$ are actually infected!

100

(true false)

Dimension	**Analysis**
Dimension 1: Access to Inquiry-based Learning	Learners make conjectures as they move the numbers and terms around in the TACTivity and make sense of the concepts. Learners collaborate and communicate with small groups throughout the activity. By working together, learners could be able to make sense of the mathematics because the activities are designed, so there is a challenge that needs to be discussed with others to better understand the material.
Dimension 2: Math Identity through Authorship and Agency	Through creating, solving, and sharing the TACTivity, each learner builds a positive mathematical identity. This is more than a student actively doing the mathematics, but rather the student *being* a mathematician. A singular TACTivity can have the flexibility to ensure equity. Learners can easily design their TACTivity.
Dimension 3: Formative Assessment & Differentiation	TACTivity provides a great formative or summative tool for assessing learners' mastery of CCSS practice and content standards. Instructors can monitor the work and provide real-time feedback because they can hear the discourse taking place during the TACTivity. Whole-group discussion can also provide alternative pathways to solutions (and sometimes alternate solutions when the TACTivity is an ill-structured problem).
Dimension 4: Empowerment Through Collective Thinking	Learners complete a TACTivity collaboratively by thinking aloud, building collective knowledge among their peers, providing opportunities to affirm multiple ideas, empowering learners' ideas, and having mathematical debates and mathematics discussions. They are justifying their thoughts to others, not just looking for affirmation.
Dimension 5: Amplification of Mathematical and Cognitive Processes	Moving the values and terms around in the TACTivity makes the concepts visible and amplifies learners' cognitive processes. Instructors can see all group work simultaneously and, when monitoring the room, can hear the discourse amongst learners, ensuring mathematical reasoning. Instructors have access to student thinking throughout the process, not only at the end (solution).
Dimension 6: Gain Insights Using Technology Tool on Social Justice Issues	Learners learn to model data related to an important social justice issue, the relationships between infection status and test results, and any inequities noted. Afterward, a whole-group discussion can take place to reveal any inequities noted.

Why we are bringing it to you (and this conference)

- What is the value of using a tool like the EqT-tech LAT BEFORE/AFTER using a technology in the classroom?

- What challenges do you see when using the EqT-tech LAT on a tool BEFORE/AFTER using a technology?

- Do all technologies/tools we use in classrooms need to fit all the categories of the EqT-tech LAT?

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