

What did we learn from Fall 2020? Encouraging Collaboration

Lisa Warner

William Paterson University

Department of Teacher Education: PreK-12

Choice of virtual manipulatives:

- <https://nrich.maths.org/4348>

or

- http://pbs.panda-prod.cdn.s3.amazonaws.com/media/assets/wgbh/rttt12/rttt12_int_cuisenaire/index.html

Fraction development with cuisenaire rods

- Which rod is $\frac{1}{2}$ the length of the brown rod?
- Which rod is $\frac{3}{4}$ the length of the brown rod?
- Model how you would solve each problem using the virtual cuisenaire rods.

Jamboard

- https://jamboard.google.com/d/1OyQRcxskX50Fa61xzHCeHWwmUMr95S3G07T1hp_XFoE/edit?usp=sharing
 - Breakout room 1 shares solution on the group 1 page;
 - Breakout room 2 shares solution on the group 2 page;
 - Breakout room 3 shares solution on the group 3 page;
 - Breakout room 4 shares solution on the group 4 page;
 - Breakout room 5 shares solution on the group 5 page;
 - Breakout room 6 shares solution on the group 6 page;
 - Breakout room 7 shares solution on the group 7 page;
 - Breakout room 8 shares solution on the group 8 page.

Some jamboard examples

CIED 2140 001 and CIED 2140 060: Developing Pedagogical Content Knowledge in K-6 Mathematics:

<https://jamboard.google.com/d/1Aeo2vhPQD5jEN77L4AKDeyuq5dleSfjy8eizW1k-V6Y/edit?usp=sharing>

<https://jamboard.google.com/d/1UzJNzOmR8aPt0CvZpfNQrKSglhIIzwbpgYUhl5u3WFs/edit?usp=sharing>

<https://jamboard.google.com/d/10JBhO86tvvYCc5OW2emKnlpCQ4HD9fA5AGO0pgJM8OE/edit?usp=sharing>

https://jamboard.google.com/d/1TslKxa0PI5g8b8EF7tnLh_jlTzA5TL8Jpb7jBsLvRg4/edit?usp=sharing

https://jamboard.google.com/d/1hrjcdw66RuWozgTECHXvrn63jzUjnF6u-znCHEz_j9E/edit?usp=sharing

CIEE 3290: Mathematics Methods and Assessments for Teaching K-6:

<https://jamboard.google.com/d/1vV3V-eSQm23rkmMceNEJyZqa1Cak7qMkZ54iuxQfuXo/edit?usp=sharing>

CMAT 5330: Mathematics in Elementary Classrooms: Methods:

<https://jamboard.google.com/d/1zNv38N7r5ufuEQ809tzQFpEmsyvyYck8ssaix6l8W8A/edit?usp=sharing>

Some quotes from CIED 2140 students in Fall 2020:

- **“Over time it got very easy and I wouldn’t struggle anymore. What has mainly helped me in this course was the amazing group of girls who were so helpful and kind whenever one of us was stuck with a problem.”**
- “I am generally a person who would rather work alone than in a group for assignments but this course changed my perspective. Having the opportunities to work in breakout rooms with my peers has been such a tremendous help.”
- “Class activities have also been helpful...working together to see how others may view a problem too and how teamwork plays a major role when it comes to math.”
- **“Each week I became more comfortable with using the online tools and felt confident when solving new math problems.”**

Some quotes from CIED 2140 students in Fall 2020 (continued):

- “I couldn’t pinpoint why or how I was able to solve the same types of problems I had always struggled with in the past. **I can now say, that viewing and listening to my colleagues’ thought processes allowed me to come to quicker solutions. This entire course was very much a team building exercise through and through.** “
- “ I really liked how we were broken into breakout rooms. I felt like I was able to understand the forums more when I heard the different views and opinions... I thought it was interesting to see the different ways my peers thought about each problem. I also found it interesting to see how my views on the problems were sometimes different than their views. Over the course of this semester **I found myself participating more in our group discussions and not being as shy as I was in the beginning. I found myself to be more confident when speaking about my work.**”
- “ I no longer feel inadequate in math like I did. I feel that I have made solid and substantial contributions to my groups and the class.”

Some quotes from CIED 2140 students in Fall 2020 (continued):

- **“Although, this semester was on zoom, I feel as if my public speaking greatly improved. I can firmly say, that I have stayed quiet for every past course I have taken. Not participating, often led me to feel even more unconfident in my own academic abilities. This course effectively benefited my public speaking skills.** Throughout the semester, I found myself presenting my work in a math forum and getting stuck not knowing which words to use. ...In these times, I found myself not wanting to ever explain a concept again. As dramatic as that may sound, this is the feeling I would feel in the past while public speaking. ...**During our class discussions I found myself wanting to explain my own way of viewing the problem and coming to its solution...I actually found myself more determined to help others understand. I wanted to do more and explain in different ways just so they would understand my own process. This led me to better understand the material myself.... ”**

Some quotes from CIED 2140 students in Fall 2020 (continued):

- “I really liked how collaborative these assignments were because I feel as though I work best with other peers. For example, I would often remotely work on the forums with my peers after class, **this gave me a sense of camaraderie because I knew that if I didn’t understand something, I can always turn to my peers who may be experiencing the same issues so we can resolve it together.**”
- “The jamboards also helped a lot because you get to work in a group to try to get to a solution and then you get to see what other groups came up with.”

Some quotes from CIED 2140 students in Fall 2020 (continued):

- “After seeing my first initial discussion post and reading my peers agree and disagree comments was my first “Aha” moment. I realized how differently their solutions were compared to mine and saw that there is more than one way to get the same answer. Another “Aha” moment for me was during the class breakout rooms(in groups) and working on our jamboards. This is what had given me a **sudden relief because we all worked in groups and got mixed around to brainstorm with others** while finding out solutions to the math forums assigned. Working together was helpful way of learning as it brought new ideas and strategies to mind.”

Some quotes from CIED 2140 students in Fall 2020 (continued):

- “It was helpful for me to go back into the forums and see other solutions and compare them to my own along with the feedback given... **I really think that this course design has made learning so much easier. The ability to go in and flip through other groups to see what their solutions are and going over them together as a class while presenting each was brilliant.**”
- “I really enjoyed the breakout rooms for it gave me a chance to talk to my peers in a smaller setting... After working in the breakout rooms and then everyone presenting their explanations I saw the connections...because of our zoom discussions I was able to complete Forum 1 and really explain my reasoning behind it... **Working in smaller groups helped me get out of my comfort zone and connect with my peers to ask questions I may have been worried to say in front of a larger setting...** As the semester continued I improved my arguments and critiques and have seen growth when constructing a strong statement. _”

Some quotes from CIED 2140 students in Fall 2020 (continued):

- “It was helpful that we always started the doing math forum during class and in breakout rooms. Personally, I have always worked and learned best through group work. Everyone has something unique to bring to the table that is valuable. For example, when I was in a breakout room with 3 classmates, at first none of us really knew how to get started. We had an idea of what to do but were all drawing a blank. Then one of us said something that in turn made another group member think of something else, and so on. **We continued to bounce ideas back and forth and it was as if our ideas were building on each other. The thing one person said would help another solve a different problem. It really showed me how beneficial working in groups can be.** If I was doing it alone, I may have stayed stumped for an exceedingly long time. I also found the math discussion forums to be helpful. I liked how we could read what other people wrote after we submitted ours. It helped me see what I may have done wrong, so I was able to correct it. It also gave me other ways to solve a problem that I did not think of.””

Some quotes from CIEE 3290 students in Fall 2020:

- “Doing those zoom sessions allowed me to become more confident in my mathematics skill and the way I can probe questions rather than just hint towards the answer... It helped me work on the questions I was going to ask and get a good idea of the process behind my student’s thinking...I feel more confident in my abilities now. ”
- “I have learned that having students discuss strategies amongst each other is very effective and encouraged in the classroom. Partner talk gives the students a chance to verbalize and refine their ideas before sharing with the whole class...We must encourage productive struggle and continue to ask questions to deepen students’ reasoning and understanding...I found myself in every zoom session with the students asking whether they agree or disagree and why or how I believe I have improved the most in being able to facilitate meaningful mathematical discourse and pose purposeful questions. ”

Some quotes from CIEE 3290 students in Fall 2020 (continued):

- “I thought I would have struggled more than I did this semester...My favorite part was being able to observe the students when they were in the main meeting room and then being able to work with [them in breakout rooms in] small groups to see their mathematical thinking and productive struggle... now I agree that I am comfortable teaching math. Being able to get the experience with the third graders is what helped me...This class and this semester has allowed math to grow on me. ”

Some quotes from CMAT 5330 students in Fall 2020:

- “The class activities and discussions were very helpful because they allowed us to collaborate as a class on the assignments and have meaningful discussions about our experiences with math.”
- “After taking this class, I feel more prepared to be a teacher of mathematics, and I feel like if I can reason through it and see the benefit, it will be so positive for my students to participate in that productive struggle and high cognitive demand task that will push their mathematical learning and understanding...I feel that I have been exposed to many different tools and manipulatives, that towards the end of the semester, I really mastered and understood what works best for me, and what works best for certain types of problems to be able to strategically choose tools that will best model the answer to a problem that you are trying to show... I now use specific math talk and talk moves with my own students to engage in productive struggle and get them thinking and being challenged. It’s great to see my high math students being challenged!... Through this semester and through participating in the doing math problems and teaching math lessons, I began to develop my confidence in teaching.”
- “It was like a full circle moment for me being the teacher and asking the questions that I was being asked in a breakout room a couple of weeks ago...This semester changed me as a teacher completely. I started it off thinking that math was just right or wrong and this semester showed me that there’s so much more to it...children can really get their brains going in classroom discussions during math if you allow them to. ”