

# Reflections on Using a Digital Collaborative Classroom to Teach Mathematics to Adults

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## Introduction

When I first saw one of the new “collaboration classrooms” in our university’s new building two years ago, I immediately knew that I wanted to try using them. I did not realize then what an impact that would have on how I teach and even what I teach. Could these types of rooms be the future of mathematics education, particularly for adult learners? This presentation includes benefits and lessons learned and cautions for future use.

## Method

First, here is a description of the rooms. They are designed for collaboration among students which is facilitated through the use of digital technology. The rooms have a number of “pods” around the outside of the room that each seat up to six students. Each pod has tables and chairs, a large white board, and a monitor. Students can plug in a laptop or mobile phone to their monitor (or, as is the case with one of the rooms, connect wirelessly through a mobile phone app). There is no front of the room but there is an instructor station in one corner through which PowerPoints or websites can be broadcast to all of the students’ monitors. It is also possible to broadcast one pod’s screen display to the other pods. The rooms have wireless internet access

The course I taught was Quantitative Reasoning which is a required mathematics course for non-STEM students, all of whom are adults with most in their early to mid twenties with a typical age range from 18 to 45 years old.

## Findings

I have been greatly encouraged by what I have seen. Student reviews were very positive about the rooms and how working with classmates helped them considerably. I found myself thinking differently about my role as a teacher and the students’ role as learners.

Here are positive aspects of the room design:

1. To take advantage of the room, I had to approach teaching with the following in mind: lecturing needs to be minimized; class time should center around group projects; students would be asked to help each other learn the course objectives; students would be

encouraged to develop and share methods of solutions; and real, authentic problems should be used.

2. For students to take advantage of the room, they need to: be willing ask for help when they have questions and provide help when they see that someone needs help; have a device to access the internet (although not required); and engage in the learning activities (I put the responsibility for their learning on them).
3. The configuration of furniture in the room which allows students to see and communicate with each other helps to establish a learning community in the classroom.
4. Each pod of students can share their work with other pods through the whiteboards or their screen displays. It is easy as a teacher to stand in the center and point out different assumptions, approaches, etc. of the pods.
5. Because virtually all students have a smart phone, tablet, or laptop with them; I can have them search for the information themselves, as they would on their own in real life, and not provide them everything they need. This has pushed me to provide authentic problems. I also teach internet search techniques.
6. Traditional mathematics instruction in the United States seems to involve a lot of doing problems by hand. But in this non-traditional room, I stress the value of using mobile apps and various calculators and how to interpret the results they see.
7. With no front of the room, I had to put my content on PowerPoint slides. These are posted in the learning management system so that students have access to them. Some students use their tablets to take notes on the slides. Busy adult learners who occasionally miss class can still view the slides.
8. Younger students whose high school mathematics is more recent frequently help older students but in some authentic problems the older students have the advantage due to their life experience and can help the younger students (for example, mortgages).
9. Productive persistence by students in problem solving is seen as an important quality in learning. Some students persist longer in this classroom because they have the support of their pod-mates.

Here are some cautions:

- Some students have learned to survive math classes by taking a lot of notes and memorizing steps. This collaborative approach makes some students uncomfortable, at least at first.
- The rooms have their share of technical problems so rapid support is needed.

- While more and more learners have access to the internet, there can still be a digital divide.
- Students with anxiety issues may have trouble in a room and teaching philosophy that requires this level of collaboration.