

Collaborative Learning in Mathematics

Educator: Maryann Firpo, Mathematics Faculty and Department Coordinator

Context: In-class; College Algebra

Keywords: mathematics, group activity

Student Activity Time: 1-2 hours

Students were assigned to specific roles in a team and were responsible for grading each other for their contribution and participation to the group project for the day.

Introducing the Reflection Activity

Teaching the pre-calculus mathematics series often provides an opportunity to teach more than just core mathematics skills. An educator used a collaborative learning approach in the college algebra course to support students' development of teamwork and collaboration skills while teaching college mathematics. The purpose of the activity was to support students' learning of mathematics through a team and peer grading course format.

For each class session, students were assigned to one of four roles for the class meeting. The four roles included: presenter, facilitator, monitor, and recorder. The facilitator was responsible for grading each group member on a scale of 1-4 for their participation and contribution to the day's activity. A rubric was also provided to the facilitator to clearly describe the responsibility for each role in the group. Roles were rotated among the group members each day of the week. On Fridays, students were allowed to pick their role and the groups were reassigned after every unit of course material.

The outcomes of this activity include enhanced preparation for and engagement in class, along with increased confidence in mathematics skills. Students also demonstrate greater accountability to the group for the content and role they are responsible for. The primary meaning that students derive from this activity is the value of peers in learning difficult and new material. The activity has the opportunity to support development in content knowledge and their approach to courses in the future.

Recreating the Reflection Activity

	Description
1	Explain the collaborative learning approach and role responsibilities at the beginning of the term.
2	Separate students into groups of four and assign roles.
3	Assign a homework reading and problem.
4	Begin the next class period with a brief introduction and distribute the assignment for the day.
5	Listen to students' conversation about the assignment and provide clarifying points if necessary.
6	Allow students enough time to complete the activity and provide concluding comments.
7	Rotate student positions in the next class session. Rotate groups at the end of the unit.

In the words of the Educator: Tips and Inspiration

Start on the first day. Trying things in the middle of the term is just the wrong time. If I want students to reflect on their work and how they are performing in their groups, I need to start doing that on the first day. This way, it's part of the norms we set up on the first day. When I implemented this in the middle of the term, every single person gave everyone they graded a perfect score. I would walk around and see that of course not everyone was really participating, but they were essentially watching each other's backs by giving these really high scores. That was when I decided to start the process on day one.

Repeat the activity. If I had not repeated the activity, and came back to it, I don't think they would have gotten anything out of it. Repeating it helps them to focus on coming in, doing their best in their role every day, and being prepared for every single class. Developing a sense of accountability to the group is what I hope they get out of the activity. By committing to the group's success, they are really committing to themselves.

What was the inspiration for the reflection activity? I had some training in collaborative learning, and I talked to a colleague who used it in a class that he taught last year. From his work, I had the chance to see how it developed and he shared all of his materials with me. For this class, I re-wrote the reading assignments and group work. My main focus was the loop between the reading assignments and the group work being a continuous cycle. Students had to come to class prepared, and that meant doing a short assignment including a reading and one math problem. In class we would then use the reading assignment in the group work for the day. Reiterating that and focusing on the cycle helped to make this a successful activity for my class.