

Learning Collaboratively and Individually Through the Use of an Intelligent Tutoring System

How can we support collaboration using intelligent tutoring systems?

What are the complementary strengths of collaborative and individual learning?

How does combining collaborative and individual learning compare to either alone?

Project Design

The students were supported in learning through intelligent tutoring systems.

- Standard intelligent tutoring system cognitive support
- Social support through embedded collaboration scripts

Lessons Learned

- It may be productive to combine collaborative and individual phases of learning within the classroom
- It is important to not just provide support for the students, but to also support teachers in orchestrating the learning activity

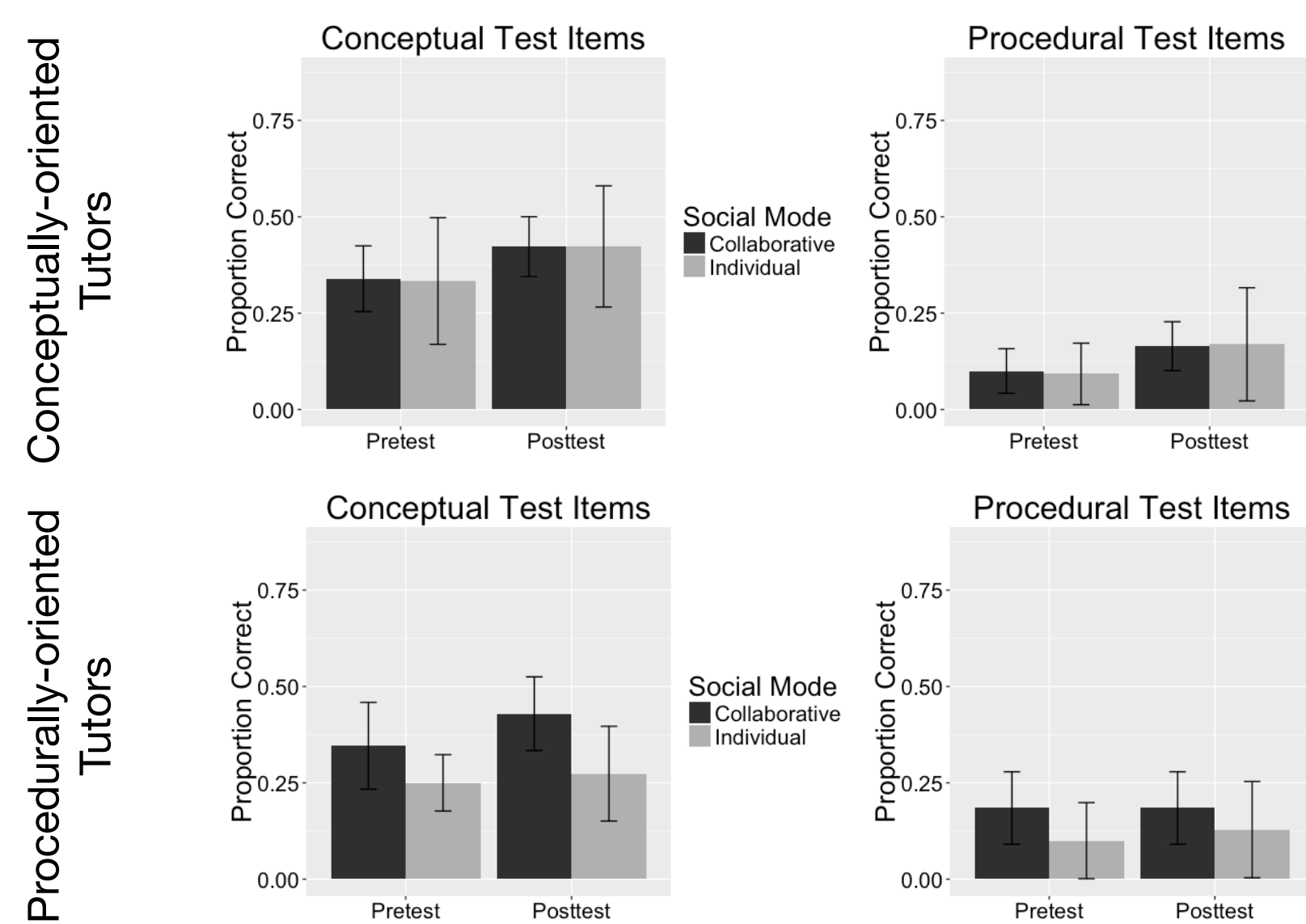
Example of a conceptually-oriented tutor. The students are asked to find the pattern in what makes an equivalent fraction.

Example of a procedurally-oriented tutor. The students are asked to make equivalent fractions by multiplying the numerators and denominators by the same number.

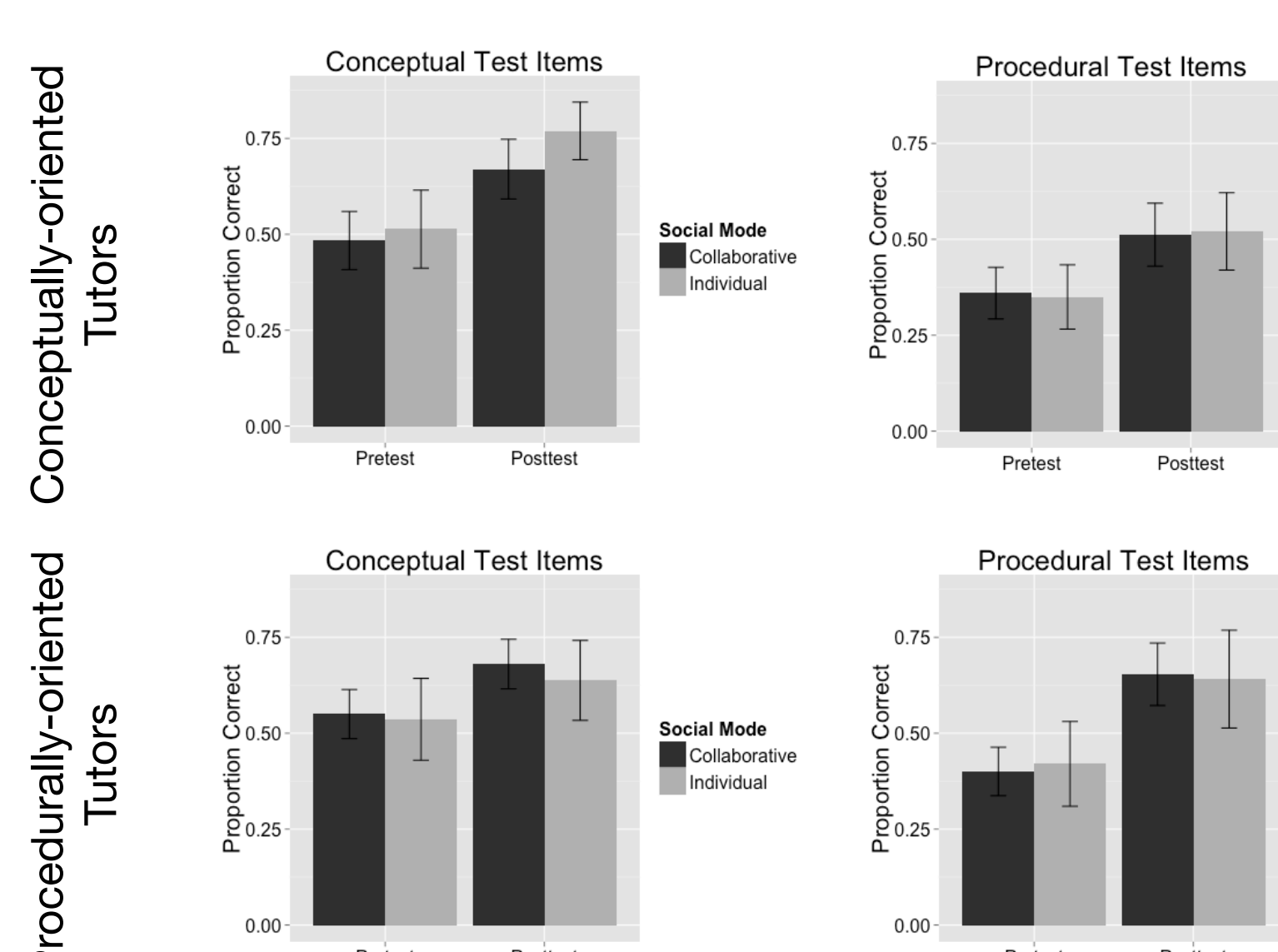
Example of an erroneous example. The students are asked to recognize the error the student in the problem made and to fix the error.

Project Evaluation

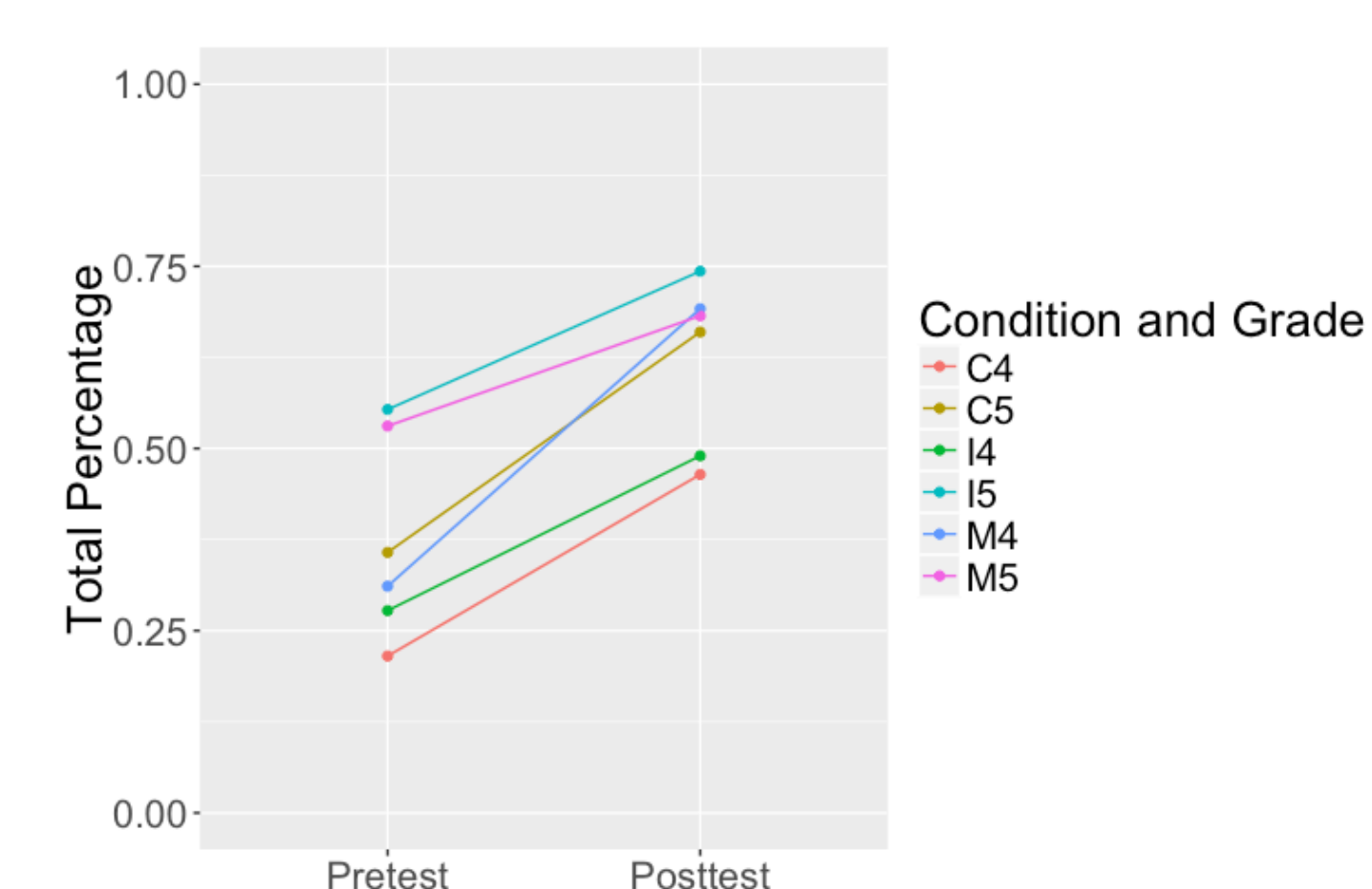
Although we found no complementary strengths for the collaborative and individual learning, we did find evidence that a combination may be more productive than either individual or collaborative learning alone. In addition, we found that we could successfully support both the individual and collaborative learning through the use of intelligent tutoring systems.



Experiment 1: 81 4th and 5th grade students worked in a pull-out design for 45 minutes with the tutor. The students either worked on the conceptually-oriented tutors or the procedurally-oriented tutors and either worked collaboratively or individually. Students working individually and collaboratively had the same learning gains from pretest to posttest.



Experiment 2: 189 4th and 5th grade students worked in an in-vivo design for three 45-minute sessions. The students worked on the conceptually-oriented tutors or the procedurally-oriented tutors and either worked collaboratively or individually. Students working individually and collaboratively had the same learning gains from pretest to posttest.



Experiment 3: 382 4th and 5th grade students worked in an in-vivo design for three 45-minute sessions. The students worked either collaboratively and individually (M), only collaboratively (C), or only individually (I). The students in 4th grade and in the mixed condition had significantly higher learning gains than other 4th grade students in the other conditions.