

Teacher Education Model Program (TEMP)  
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After the initial TEMP meeting held at my school (Northern Elementary) with interested teachers and the TEMP steering committee, I felt that the goals of the TEMP project were to provide teachers with knowledge and support in areas where growth was needed. After looking at our school data review report (see Appendix 1), we noticed that there was a gap between our students' performance on the multiple choice and open response sections of the KCCT. Seventy-five percent of our students were proficient on the multiple choice questions, while only twenty-five percent were proficient on the open response. From these results, we determined that our students understand the math concepts, but struggle with expressing these concepts through writing. Therefore, we decided that our area of growth was math instruction, with a focus on writing as a means to apply mathematical concepts. Thus, improving students' ability to express mathematical concepts through writing became the goal of our TEMP project.

At first, we were at a loss for how to accomplish these goals, so we began to hold a series of discussions to brainstorm ideas. With the help of our principal and one of the mathematics professors from UK, we agreed that students needed to be exposed to meaningful math experiences and be provided with opportunities to discuss their thinking before transferring their thoughts to writing.

From this point, I began to analyze my current mathematics instruction to see how it could be improved to meet this goal. I had been using the Everyday Mathematics

Program, which I determined did provide students with meaningful math experiences, but lacked opportunities for dialog and writing.

To add in more dialog, I incorporated more deliberate questions into my multiplication unit to encourage the students to “think aloud” (see Appendix 2 for lesson plans). For example, when they would solve a problem, rather than just ask for the answer, I would ask them how they got their answer. We would also hold regular discussions on why we solved problems the way that we did and what other methods for solving the same problem could be. For a while, we worked on having these discussions as a whole class until the students were comfortable with this type of discourse. Then they began discussing their thinking in small groups with the students who sat at their tables.

Once the students were able to hold these dialogs with ease, it was time to start transferring their thinking onto paper. Since open responses provide students with authentic application experiences, we began working on expressing our thinking through writing them.

The first open response required that the students apply their knowledge of multiplication and number sentences using parenthesis to solve a problem (see Appendix 3). The problem had several steps and required that the students explain their answers. In analyzing the student responses (see Appendix 4), it became apparent that they were not ready for an open response question this complex. Sixty two percent of the students scored a novice and none scored a distinguished. Most of them did understand the math, they just had difficulty completing the actual open response task. It had too many steps

and required them to explain their thinking before they were ready. Therefore, I decided that I needed to simplify the next open response and focus on modeling and describing what “explain” meant to scaffold them for more complex open response questions.

For the next unit on fractions (see Appendix 5), I continued to nurture class discussions and small group discussions to get students to express and explain their thinking. Through these discussions, the students greatly improved in their ability to describe what they did to solve a problem and to explain why they did so.

At the end of this unit, we did another open response question (see Appendix 6). This question was much simpler than the first. It still involved several steps, but each step was designated A, B, and C. Step A and B asked the students to complete tasks, while step C asked them to explain their thinking. I modeled how to do each step of the open response and then gave the students time to complete it on their own.

After collecting and analyzing the student work (see Appendix 7), it was evident that the students ability to complete open ended responses was much stronger with fifty percent of the class distinguished and 37.5% proficient. However, some students were still struggling with following directions and explaining their thinking. Therefore, I devised a set of steps that I was going to follow to improve the students’ performance (see Appendix 7, number 6). These steps involved setting up a series of steps with the students that they would follow to solve word problems, the last of which would require them to explain their answer. I would then model following these steps focusing on following directions and explaining my thinking in writing. I would then let the students practice this in small groups until they reached independence.

This plan was implemented in the lesson on making change observed by Gwen. After watching this lesson, I was very pleased to see that the steps we devised were clear and that I modeled all that I wanted to. Some of the students struggled with following the steps at first, but while they were working in their groups, I was able to direct them through the process.

Although I did not get to meet with Gwen to reflect on this lesson, I was observed by another teacher in my school that I met with afterwards to reflect. My observer recorded the different types of questions that I asked. She noted that I asked questions to encourage the children to explain their thinking by asking them to tell how and explain why. She supported and encouraged this type of questioning to scaffold my children to expressing their thoughts through writing.

I was also able to observe another teacher in my building to see how she was using classroom discussion to urge her students to tell how and explain why using Everyday Math. From her, I learned how important it is to be deliberate in your teaching. She made it very clear to the students why they were doing what they were doing. She was also very deliberate in questioning her students to get them to tell about what they did and why they did it through many, various dialogues with the whole class, small groups, and individual students.

Through implementing instruction, analyzing student work, reflecting on my own teaching, and observing others, I feel that my mathematics instruction and my students ability to express their thoughts in writing has improved. Through all of these things, I learned how important it is to let students have talk time to verbalize and modify their

thinking. Metacognition is a vital part of learning and requires that students think about how they are thinking. What better way to guide them to this than allowing them to discuss with others as they learn.

This experience also reiterated the strength of the connection between speaking and writing. After talking their ideas out, the students were better able to transfer their thoughts to paper.

Discussions with other teachers and professors also taught me the importance of teaching math conceptually, rather than procedurally. By understanding what they are doing and why they are doing it, the students grasp the concept behind the math. Knowing these concepts, the students will be able to apply a variety of problem solving strategies that fit their learning styles, as opposed to learning a set of steps that they must carry out without understanding to solve a problem.

I will change my teaching by always ensuring that I am teaching mathematics concepts, not procedures. I will also focus on having discussions about the what, why, and how of problem solving to guide students in metacognition, which aids learning and transfer.

Participation in the TEMP project has encouraged me to seek research on what instructional methods are effective for teaching mathematics. I am very curious about how children best learn math and what teaching practices help best in nurturing independent problem solving skills and the transfer of those skills to novel situations.

I have really enjoyed my experience with the TEMP project because I feel that it helped me to focus my energy on improving an area that really needed it in a deliberate

fashion. I felt well supported in my efforts by the TEMP steering committee and the other teachers that I worked with. It was so nice to actually have time set aside to look at student work and have discussions with other teachers about what they were doing, what I was doing, and what we could all do to improve our teaching to help students succeed.