
Utilizing Student Work Artifacts to Develop both Subject Matter and Pedagogical Content Knowledge

Stephanie Casey, Eastern Michigan University, scasey1@emich.edu

Andrew Ross, Eastern Michigan University, aross15@emich.edu

The MODULE(S²) project's teacher education curriculum materials aim to develop PSMTs' mathematical knowledge for teaching in their upper-level content courses. As authors of the statistics curriculum materials for this project, we have intentionally tried to develop PSMTs' knowledge of statistics simultaneously with their pedagogical knowledge for teaching statistics. We have found that activities centered on student work artifacts (including written student work and videos of students) have been effective at developing both aspects of teacher knowledge. In this session, you will be able to engage in and analyze a sample of these activities and learn about results from implementation of the materials regarding their effectiveness at developing both subject matter and pedagogical content knowledge.

Watch the presentation: <https://www.youtube.com/watch?v=KDloQILPeVk>

Discussion questions:

Set 1:

- 1a. Drawing from Jared's circling of a portion of the graph and his written answer for part (A), how can a box plot be visually confusing for a beginner?
- 1b. In part (B), Jared says that "I also think Test 4 was too hard because the highest grade was an outlier." Assess the validity of Jared's claim that the highest grade on Test 4 was an outlier.
- 1c. What subject matter knowledge did you draw upon when completing this activity?
- 1d. What pedagogical content knowledge did you draw upon when completing this activity?

Set 2:

- 2a. What was her approach for placing the line?
- 2b. Potential reasons/sources for approach
- 2c. Is the approach generalizable (i.e., would the approach work for other data sets with a linear trend)? If not, draw/describe at least one counter example (a scatterplot and/or trend line that will produce a poor line of best fit using the student's approach along with the line).
- 2d. Describe in detail your response to Maggie as her teacher. Be specific when describing this, writing exactly what you would say and/or draw in your response.
- 2e. What subject matter knowledge did you draw upon when completing this activity?
- 2f. What pedagogical content knowledge did you draw upon when completing this activity?

Set 3:

What has worked for you in using student work artifacts in mathematics teacher preparation? We invite suggestions for the authors as well as other conference attendees.