1-1-2016

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Laurie Overman Cavey
Boise State University

Patrick R. Lowenthal
Boise State University

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Laurie Overman Cavey
Boise State University
lauriecavey@boisestate.edu

Patrick R. Lowenthal
Boise State University
patricklowenthal@boisestate.edu

Keywords: Mathematical Knowledge for Teaching, Algebra and Algebraic Thinking

We describe the first phase of a study aimed at developing video-based instructional modules for secondary mathematics teachers. We began by consulting the literature on figural pattern tasks (c.f. Rivera, 2010) and teachers' ability to interpret student work (c.f. El Mouhayar & Jurdak, 2012). Interpreting student work on figural pattern tasks requires awareness of different problem solving strategies, such as recursive and constructive, and how students might use them with tasks that require different levels of generalization (El Mouhayar & Jurdak, 2012).

We conducted one-on-one interviews with 17 high school calculus students to capture authentic student work and reasoning on a figural pattern task. As students worked through each task, we asked students to document their work on paper and to explain their thinking aloud. Two video cameras were set up to capture the written work and discussion. Student interview data were initially coded according to strategy type: constructive, deconstructive, or recursive. Additional coding resulted in four categories for teacher learning (CTL): 1) Deciphering students' cryptic notations; 2) Recognizing what is correct in a slightly flawed strategy, 3) Recognizing a strategy that is "close" to a more advanced strategy, and 4) Making connections between different strategies.

The CTLs are a first step in designing video-based modules grounded in authentic student work with explicit learning goals for developing teachers' capacity to work with student's ideas. For example, Student A's response presents an opportunity for teachers to attend to a correct constructive strategy that breaks down in the final calculations (CTL2), while Student B's response presents an opportunity for teachers to attend to a transitional phase in writing explicit functions based on recursively defined patterns (CTL3). Both responses involve interpreting somewhat cryptic notations (CTL1), and together, they afford opportunities to make connections between ideas such as where the recursive addition of 8 can be observed in a constructive approach (CTL4).

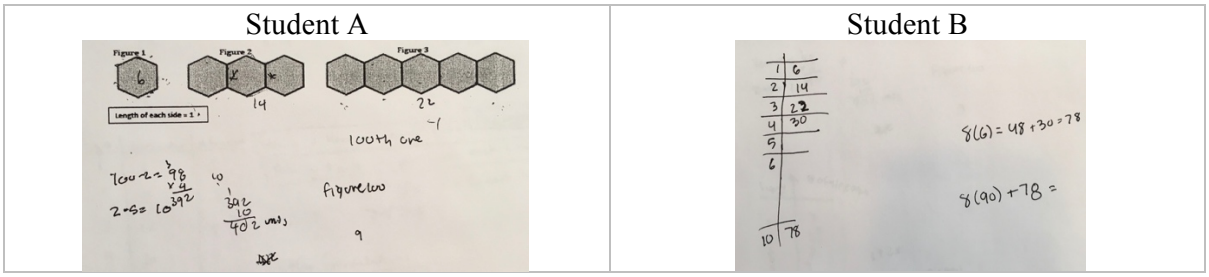

Figure 1. Work samples from Student A and Student B. Together they illustrate all four CTLs.

References

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