

1106-L1-2876

Sepideh Stewart* (sstewart@math.ou.edu), **Clarissa Thompson** and **Noel Brady**. *From intuition to the formal world of mathematical thinking: A geometric topologist's teaching diaries and thought processes*. Preliminary report.

Developing an intuition for abstract mathematical concepts is a skill that takes considerable experience and practice. Definitions, theorems, and proofs are essential to mathematical representations, yet many mathematicians also rely on visualizing and maintaining key examples in mind. We investigated a mathematics professor's thought processes as he taught Algebraic Topology. His teaching diaries were discussed in weekly meetings with a mathematics educator and a cognitive psychologist. We examined his worked examples and the physical prompts used to evoke students' intuitions and formal mathematical thinking. He debated whether in-depth coverage used to promote visualization of concepts would come at the expense of a lack of breadth. Furthermore, we analyzed his ability to navigate the embodied, symbolic, and formal mathematics worlds as he encouraged students to push their algebraic insights and connect them to topology. Our data also included student interviews and daily journals, a questionnaire, and end-of-semester course evaluations. This research is part of an interdisciplinary study examining mathematicians, physicists, and engineers' visualization abilities. We will develop a model of expert visual thinking that may improve students' spatial representations. (Received September 16, 2014)