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Recommended Citation

Jetter, Madeleine, "Madeleine Jetter TSSA Winter 2014" (2014). *Teaching Skills Study Awards (TSSA) Reports*. 37.

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TSSA Conference Report
Madeleine Jetter
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Conference Attended

Joint Mathematics Meetings, January 15-18, 2014, in Baltimore, MD.

Teaching Strategy Studied: Teaching productive failure

At the MAA Session on Mathematics and Effective Thinking, Ed Burger of Southwestern University presented the following method for developing students' capacity for *productive failure* (the ability to recognize that errors and struggle are inherent to the learning process rather than embarrassments to hide).

- In the course grading policy, specify that 5% of a student's grade is determined by the student's *quality of failure*.
- Students are required to write an essay reflecting on their false starts and failed attempts, then grade their own quality of failure.

Impact on Current Teaching

Fall 2014: I implemented the "quality of failure" grade in Math 599 (Senior Seminar for Future Educators). Because this is a capstone course for prospective secondary teachers, I asked students to not only reflect on their own productive failures, but also to discuss their plans to support their students in failing productively. This assignment elicited several profound reflections from students.

..."what I learned through these difficulties is that when we spend time on a problem, we begin to understand the deep structure of it. [...] I feel this allows us to transfer our insight to other problems more easily."

..."An A meant nothing if I did not understand how to apply my knowledge in context."

..."I will support students in failing productively by [...] encouraging multiple solutions and critiquing in class discussions without giving correct answers. This will tie in with standard for mathematical practice 3 since they must find the flaws in the reasoning of themselves and others."

Spring 2015: I am implementing a similar project in Math 329 (Transformation Geometry). In the project, students are asked to create a collection of 6 of their written proofs, with an analysis of their failed attempts and a reflection on their mathematical growth over time.