

## STLF Report to CWSEI and Mathematics Department

**STLF:** Sandra Merchant

**Period:** 15/09/14 – 17/11/14

**Submitted:** 17/11/14

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### Specific activities performed by STLF

#### 1) Professional development

- Attended the weekly STLF meetings. Also facilitated the recent meeting on C-LASS style attitude surveys (Nov 13)
- Completed the Coursera Course “An Introduction to Evidence-Based Undergraduate STEM Teaching,” hosted by Derek Bruff, Henry (Rique) Campa, Trina McMahon and Bennett Goldberg
- Participated in the weekly Data Analysis Working Group (DAWG), run by Warren Code

#### 2) MATH SEI general meetings/activity

- Met with the MATH-SEI group weekly to review the status of our projects and plan future work.
- Attended our Lunch series on Teaching and Learning (Oct 28), where Wes Maciejewski gave his talk “Do we know how students view mathematics and how they study it?”
- Met with Warren Code, Sarah Gilbert and the MATH-SEI team to review and discuss our projects and progress (Sept 16)
- Attended the CWSEI Working Group meeting (Sept 15)
- Met with Mike Bennett (Department Head), Mark MacLean (Undergrad. Curriculum chair) and Director Costanza Piccolo to plan for MATH-SEI work over the next year. (Nov 3 & Nov 14)

#### 3) Course-specific meetings/activities

### Tracking Proof Skills Project (MATH 220 – Mathematical Proof and subsequent courses)

1. The Basic Proof Skills Test (BPST) was administered on the first day of class in both sections of Math 220. It was scored and performance was very similar to previous years. The results were summarized and a short report was given to the instructors. I am currently arranging with the instructors for the administration of the test at the end of the term, either in class or as a final homework.
2. Three of the questions on the BPST have not yet been validated, since they were created and added after the most recent set of student interviews. Two of these questions in fact have poor statistics in my item analysis. Specifically, they have low pre-to-post gain and low discriminatory power. At a recent Mathematics Education reading group, I asked members of the group to complete the test questions and then we discussed them. One of the problems has proven to be too difficult even among these experts. The other problem may have some language that is ambiguous, although all members of the expert group interpreted it correctly. The next step is to interview students, and so I have advertised for volunteers for another round of think aloud interviews on the BPST. I have 5 volunteers so far, and hope to interview 10 in total.

3. All term long I have been attending Math 220 lectures and recording observations, including rough student engagement levels, using COPUS. I have been particularly focusing on tracking student questions and instructor responses so that I can identify topics and exercises that would benefit the most if we convert them to in-class activities next term.
4. In term 2 of winter 2013 we administered our pilot version of the Proof Concept Test (PCT) in Math 342. The test was mostly open-ended, and it was determined that we still needed more student responses before being able to convert the problems to an easy-to-score format. We were able to put one of the questions also on the final exam, to accumulate more student responses. I now need to code the student responses and determine the most common misconceptions. We also need to plan how to collect more student responses for the other problems next term.

### **Math Attitudes and Perceptions Survey (MAPS) – joint work with Warren Code and Wes Maciejewski**

1. We are working towards finalizing the Math Attitudes and Perceptions Survey and writing the manuscript about its development. In the past month we have been verifying the timeline of the development and confirming the factor analysis results.

### **Current Project Status (material was prepared by either STLF or other members of the MATH SEI group)**

MATH 220:

**Learning Goals:** Learning goals have previously been created for this course.

**Assessments:** The basic proof diagnostic test (pre and post) will be used this term.

**New Methods/Materials:** A proof concept test is under development to assess higher-level proof skills.

### **Plan for immediate future work**

MATH 220:

1. Make preparations for administering the BPST post-test in both sections of Math 220.
2. Continue working on our paper about the basic proof skills diagnostic.
3. Perform student validation on the BPST.
4. Continue to observe the Math 220 class.
5. Summarize and analyze the COPUS data, including engagement observations. Send a summary to the instructor.

### **Higher-Level Proof Courses**

1. Code student responses to the PCT problem that was placed on the final exam for Math 342 in 2013 Winter Term 2. Pool this with the responses from my student think-aloud interviews and determine the most common misconceptions and errors. Convert the problem to an easy-to-score form.
2. Make plans for collecting more student responses to the other PCT problems next term.