

STLF Report to CWSEI and Mathematics Department

STLF: Wes Maciejewski

Period: 01/09/2013-17/09/2013

Submitted: 17/09/2013

Specific activities performed by STLF

1) Professional Development.

- I have begun organizing a departmental math education reading group

2) Department meetings/activity

- Met with Sandra on 08/09/2013 to discuss my initial duties as an STLF.

3) Course-specific meetings/activities

MATH 102 – Differential Calculus for Life Sciences

The instructor in charge, Eric, and Costanza have identified two components of the course they would like to see more well developed; Learning Goals and Instructor Guidelines. Also, a survey polling the students on the efficacy of the spreadsheet components of the WeBWorK assignments is to be designed.

- Learning Goals. I have begun compiling learning goals for this course. A couple of the instructors are creating them independently which has helped augment those that I create.
- Instructor Guidelines. Eric is interested in creating these. I will assist him with this.
- Survey. This is in the planning stage.

Plan for immediate future work

Research topic related to Math 102.

Eric and I had discussed what component of the course I should assess. We did not come up with anything in particular. I am inclined to begin work on a research question of interest beyond Math 102. I have two ideas in mind.

- 1) Assess how deep the student's procedures are. Much of the research in mathematics education focuses on the acquisition and development of conceptual knowledge. Yet instructors, especially those teaching service courses or receiving students from service courses, often expect their students to demonstrate their knowledge by executing procedures. How "deep" are these procedures? Star (2005) identifies two aspects of deep procedures: flexibility and innovation. Are Math 102 students able to apply a procedure flexibly? Are they able to innovate within a given procedure to produce a more efficient solution? This would be a significant expansion upon previous work (Maciejewski and Mamolo, 2010).
- 2) Determine if "the derivative", for example, exists as two separate entities, one as procedure and one as concept, in the students' minds. This would involve designing an assessment on both the conceptual and procedural aspects of differentiation. This may be a bit more difficult than the first question and may require input from a psychologist.

References

Star, J. (2005). Reconceptualizing Procedural Knowledge. *Journal for Research in Mathematics Education*, 36, pp. 404-411.

Maciejewski, W., Mamolo, A. (2010). [Beyond the Superficial: Procedural Knowledge in University](#). In Liljedahl, P. (Ed.) Proceedings of the 2010 Canadian Mathematics Education Study Group, Vancouver, British Columbia.