

STLF: Wes Maciejewski

Period: 15/01/2014-18/03/2014

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Specific activities performed by STLF

1) Piazza project

- In all, 9 instructors and ~250 students participated in a survey on the use of Piazza.
- I am currently conducting a review of the literature on discussion boards in post secondary. Part of the literature I am reviewing develops methods for analyzing the *quality* of discussion board posts. No analysis of my data has yet taken place.
- A short article on our department's experience in using the discussion board may be feasible for the journal *Problems, Resources, and Instruction in Undergraduate Mathematics Study*.

2) Students' Approaches to Study project

- I plan on surveying the students and instructors in a selection of undergraduate mathematics courses to gauge the instructors' approaches to instruction and students' approaches to study. I conjecture that some courses reinforce a student's impoverished approaches to study, especially in the first year. A project proposal is attached.
- The project is currently undergoing BREB review.

3) Math 340

- Some of the feedback I've received on my midterm survey for the course I am currently teaching, Math 340, concerned the general lack of organization and expectations in the course. Indeed, I had only the previous instructor's (the current instructor of the other section) handwritten notes to guide my preparation for the course. I've taken it upon myself to create learning goals for the course and organize it with the aid of the Math Wiki. This is an on-going project (some of the applications in the course are to-be-decided), which can be viewed here (most of what has been developed is in the "Course Calendar"):
https://wiki.math.ubc.ca/mathbook/M340/Main_Page

Research Proposal, Version Date: 13/03/2014

Title: Students' Approaches to Study in Undergraduate Mathematics

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Introduction

It is well established in the literature (see Prosser and Trigwell, 1999, for a review) that students adopt learning strategies in response to their perceived learning environment that result in varying levels of depth of understanding. Students who adopt deep approaches tend to have a richer conceptual understanding of the studied subject matter while those who take a more superficial approach tend to have poor academic outcomes. The process of adopting a study strategy is informed by the student's perception of the subject, their learning environment, and their relation to their learning environment. In turn, the learning environment is shaped by the instructor's perceptions of their students and their intentions for the course. Therefore, if an instructor's goal is to promote deep learning in their students, they must first understand how their students perceive their learning environment and how this is reflected in their adoption of a study strategy.

Proposal

Previous research has shown that deep approaches to learning correlate with more favourable academic outcomes, measured as deeper conceptual understanding of the subject matter, but do not strongly correlate with course grade (Trigwell and Prosser, 1991). However, this work has been performed only on first-year university students in courses involving subjective assessment. I propose to replicate and extend this research by assessing what approaches to study are adopted by students in a selection of first, second, and third-year mathematics courses and evaluating if these approaches correlate with the grade received by the student in the respective course. I contend that some courses, first-year service courses in particular, are conducive to a superficial approach to study and reinforce this approach by awarding good grades to students who adopt this approach. I suspect that this is not the case in subsequent courses. Second and third-year mathematics courses require a deep approach to learning and reward students who adopt such an approach. Students who arrive to these courses with reinforced, impoverished approaches to study are unprepared for the demand for deep learning.

Method

There are many instruments present in the literature designed to measure students' approaches to learning. I plan on using instruments previously employed in similar studies to create continuity between previous results and the results of the current study. They are, for the students: 1) the Revised Two-factor Study Process Questionnaire (SPQ) (Biggs, Kember, and Leung, 2001), and 2) the Conceptions of Mathematics Questionnaire (CMQ) (Crawford, et. al, 1998). For the instructors: 1) the Conceptions of Mathematics Questionnaire, and the 2) Approaches to Teaching Inventory (Trigwell and Prosser, 2004). These surveys will be offered as follows:

First, second, and third-year courses will be selected with the intention of getting a broad representation of topics and types of courses. Upon approval of the course instructor, every student in each course will be contacted by email and invited to participate in the study. They will complete a letter of consent and the SPQ and CMQ online. Once these surveys are complete, the students will not be required to perform any more tasks. Upon the completion of the term the students' grades will be retrieved by the investigator in conjunction with the principal investigator.

The instructors of the courses will be asked to complete the CMQ as they feel their archetypal student would and to complete the ATI normally. The results of these instructor surveys will aid in understanding the instructors' intentions for the course and how these intentions are enacted. I believe that instructors design learning tasks based on their perceptions of their students' orientations towards the subject and so it is important to explore these perceptions. In addition, intentions are carried out in different ways and the ATI will help qualify the type of learning expected of the students (i.e. are the teaching approaches emphasizing a deep or superficial approach to learning?).

Expected outcome

I expect to find that approach to studying does not strongly correlate with course grade for first-year courses. This situation should be different in subsequent years where a deeper approach to learning is expected.

Impact of this study

The promotion of a deeper approach to learning in university students may entail an early emphasis on deep approaches to learning. This will need to be reflected in an instructor's intentions for a course and how these intentions are enacted (i.e. *the course structure must emphasize deep learning*).

References

- Biggs, J., Kember, D., & Leung, D. Y. P. (2001). *The Revised Two-factor Study Process Questionnaire*. *British Journal of Educational Psychology*, 71(1), pp. 133-149.
- Crawford, K., Gordon, S., Nicholas, J., and Prosser, M. (1998). University Mathematics Students' Conceptions of Mathematics. *Studies in Higher Education*, 23, pp. 87-94.
- Prosser, M. And Trigwell, K. (1999). *Understanding Learning and Teaching: The Experience in Higher Education*. SRHE and Open University Press, Buckingham.
- Trigwell, K. And Prosser, M. (1991). Relating Approaches to Study and Quality of Learning Outcomes at the Course Level. *British Journal of Educational Psychology*, 61, pp. 265-275.
- Trigwell, K. And Prosser, M. (2004). Development and Use of the Approaches to Teaching Inventory. *Educational Psychology Review*, 16, pp. 409-424.