



UNIVERSITY of NEW HAMPSHIRE

Graduate School Dissertation Year Fellowship Application Cover Page

Posted Friday, October 12, 2012

<u>Applicant Information</u>			
Name:		UNH ID (not SSN):	
Street:			
City:		State:	Zip Code:
Phone:			
Current Program of study:			
Have you reached candidacy? (If no, indicate when)			
Dissertation Title:			

SAMPLE

<u>Referee Information</u>	
<i>Referee 1</i>	
Name:	
Email:	
Title:	<input type="checkbox"/> Graduate Program Coordinator <input type="checkbox"/> Dissertation Chair <input type="checkbox"/> Dissertation Committee Member*
<i>Referee 2</i>	
Name:	
Email:	
Title:	<input type="checkbox"/> Graduate Program Coordinator <input type="checkbox"/> Dissertation Chair <input type="checkbox"/> Dissertation Committee Member*

***PLEASE NOTE:** A dissertation committee member can only provide a letter of reference IF the Graduate Program Coordinator (GPC) and your Dissertation Chair are the SAME PERSON. If not, letters from both the GPC and Dissertation Chair are **REQUIRED**.

Statement of significance

An implicit assumption of many undergraduate mathematics classes is that students will spend a large amount of time outside the classroom refining their understanding of the material.

However, little is known about what students do to fulfill this didactical contract with their instructors. This study seeks to provide a detailed description of what students do while studying mathematics in self-created groups outside of the classroom setting. In particular, this study will determine what materials students utilize while studying together, how the students make use of these resources, and what roles students assume while interacting with each other as a group.

SAMPLE

Proposal

Mathematics can be challenging for many students, especially the required mathematics courses students take during their first year of college. Courses such as precalculus, calculus, and beyond are often faulted with acting as filters that contribute to the retention problems experienced at universities (Ferrini-Mundy & Graham, 1991). Uri Treisman (1985) noticed this phenomenon in the calculus classrooms in UC Berkeley. In particular, he observed that the disparity in student performance in the calculus courses seemed to grow larger between students of different race. As Treisman further investigated the disparity he found that there was more to the issue than race. It turned out that the students that were doing poorly often studied alone and were too proud to ask for assistance whereas the students that were doing well participated in study groups.

Most anecdotal evidence seems to suggest that students develop better understanding when working with peers than studying in solitary. Many instructors seem to advise working and studying with a group of peers if the student seems to be struggling while working alone. These suggestions are also in line with the recommendations of mathematics study guides available to students (Greenman, 1995; Swain, 1970). However, this advice is rarely followed up with specific directions on how the students should spend their time studying together outside of class or what form this studying should take. Even study guides such as Greenman's *Math Power: Next Generation Strategies and Information, for "Success" in the Study of Mathematics* (1993) and Swain's *How to Study Mathematics* (1970) include very few ideas on what the activities a study group should engage in beyond working on extra problems. Treisman's work (1985) is also sparse on descriptions of what exactly transpired within the study groups he observed.

Not knowing what the students do in their study groups is especially problematic when one

considers the amount of conceptual learning left to the students to be done independently. Often instructors may infer the existence of an implicit contract with their students in which the students are provided an outline of the material they need to know and it is up to them to learn that material (Wu, 1999). Wu elaborates on this assumption by stipulating that “in order to learn what is taught in class, students must be willing to spend two to three times the amount of time by themselves” studying the material (1995, p. 269). As instructors primarily lecture for the duration of the class time, allowing students little time to do anything more than take notes and listen (Pemberton, et. al., 2004), it remains up to the students to put in the time and effort to develop a mastery of the material outside of the classroom. Thus before we can assess whether studying in a group is more beneficial than individual studying we need to know what actually occurs when students study in groups outside of the classroom.

The research that is currently available on student interaction in groups, and the roles that arise in these groups, assesses group work done while in a classroom setting (Parsons, Tran, & Gomillion, 2008; Shinjoe & Aldrich, 2010; Strom & Strom, 2002). Far less has been reported about how students conduct themselves when they work together outside of the classroom. Furthermore, when students work together in the classroom, they are doing so with a specific goal or task in mind, often one provided by the instructor who is also present and able to provide immediate feedback or correction as needed. It is unknown whether students form study groups to go over specific tasks, or whether the overarching goal that guides them is just the belief that they need to study and practice to improve. Thus, there are gaps in our knowledge concerning how students actually work together outside of the classroom and their utilization of materials while studying.

My dissertation aims to help the mathematics education community start filling these gaps. I

have designed a study that allows me to observe students working outside of the classroom, both alone and in groups of two or more. Based on students' tendencies to utilize the study lounges made available in the academic buildings, I set aside a location equipped with everything needed to mimic one of the study lounges: internet access, tables and chairs, and a white erase board. Students who studied in this space were video-taped and asked to complete a brief journal entry detailing what they worked on during that time, identifying their study partners, and giving an overall rating of the usefulness of the study session.

A representative subgroup of the observed students was asked to participate in two follow-up interviews. During the interviews the students were asked to elaborate on some of their journal entry responses and invited to talk about their studying purposes in general.

Transcriptions of the observed study sessions, supplemented by students' journal entries and their responses to interview questions, will enable me to create a description of what student studying behaviors look like outside of the classroom. I will create a catalog of observed behaviors and tasks performed by the students. I will then assess the frequency with which each student demonstrates these behaviors and microtasks. This will allow me to create a portrait of the role a student may assume during a group interaction.

Knowledge of these roles will allow me to describe configurations assumed by students while working together. This also provides a basis for future studies to develop measures of group efficacy and determine what may make some study groups more productive than others. Knowledge of how students are preparing themselves outside of the classroom can also inform instructors and impact the types of assignments and review materials made available to students.

Although the first semester of data collection has been completed, there is still much work for me to accomplish. Over the next few months I will be transcribing the video recordings of

student study sessions and performing a preliminary analysis of that data. I will be presenting a short preliminary report based on these analyses at the Special Interest Group of the Mathematical Association of America (SIGMAA) on Research in Undergraduate Mathematics Education (RUME) in February 2012. This preliminary report presentation is intended to spark conversation within the community and help me better think about my data and analysis. Based on the feedback I received at the conference, I will prepare and submit a long paper based on this preliminary report to the peer-reviewed conference proceedings by the end of March 2012.

The remainder of the Spring 2012 semester will be dedicated to finishing transcriptions of the video recordings, developing a coding scheme, and implementing the coding scheme. Based on the qualitative nature of the data, the transcribing and coding may continue into the Summer 2012 semester while I simultaneously work on finalizing the first three chapters of my dissertation. These chapters will provide the introduction and motivation for my study, a comprehensive literature review, and lay out my plan for data collection and analysis.

Writing the remaining chapters of my dissertation and reading at least two articles for publication will be my primary focus during the 2012-2013 academic year. In the fall I will write up my findings from the spring and summer data analysis and a discussion of these findings for the fourth and fifth chapters of my dissertation. A contributed report based on these findings will also be prepared during the Fall 2012 semester for submission to the SIGMAA on RUME Conference in February 2013. During the Spring 2013 semester I will write the last chapter of my dissertation, tentatively titled "Conclusions and Implications for Future Research," and finish at least 2 papers for publication. One paper will discuss the methodology I used for conducting my research and the other paper will disseminate the results of my study. By the end of the Spring 2013 semester I will defend my thesis.

References

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Schedule

[REDACTED] Department of Mathematics and Statistics

My work plan for the academic year 2012-2013 is developed based on the structure of my dissertation entitled “What do Students do in Self-formed Mathematics Study Groups? A Look at the Role Students Assume While Working Together and the Resources They Utilize.”

<p>January – May 2012</p>	<p>January: Preliminary analysis of data collected during the Fall semester and preparation of a preliminary report based on this analysis to be presented at the SIGMAA at RUME conference</p> <p>February: Present preliminary findings at RUME in Portland, OR Feb. 23-25, 2012. Finishes transcribing all video data collected during Fall semester and prepare transcriptions for analysis and coding.</p> <p>March – May: Conduct several follow-up interviews. If need arises based on respondent answers, collect additional data to test revised hypotheses. Code remaining video transcripts</p>
<p>June – August 2012</p>	<p>Analyze coding of video transcripts for general patterns and create. Solidify Chapters 1 – 3 of the dissertation. Start outlining paper for publication on method.</p>
<p>September – November 2012</p>	<p>Revise data analysis as necessary. Write up the middle chapters of the dissertation detailing the data collected and its subsequent analysis. Start outlining paper for publication on results.</p>
<p>December 2012 – February 2013</p>	<p>Write up final chapters of dissertation: Conclusions, and Implications for Future Research. Prepare a presentation for job interviews and RUME in February 2013 based on the findings.</p>
<p>March – May 2013</p>	<p>March: Finish final draft of dissertation paper and create presentation for dissertation defense.</p> <p>April: Schedule and defend dissertation.</p> <p>May: Make any necessary final revisions to dissertation paper.</p>