

Warren J. Baker Endowment

for Excellence in Project-Based Learning

Robert D. Koob Endowment for Student Success



FINAL REPORT

Final reports will be published on the Cal Poly Digital Commons website(<http://digitalcommons.calpoly.edu>).

I. **Project Title:** Group Effectiveness and Questioning Processes in an IBL Math Classroom

II. **Project Completion Date:** Ongoing (data collection and analysis complete: 2018; writing: ongoing)

III. **Student(s), Department(s), and Major(s):** Joelle Saute, Mathematics

IV. **Faculty Advisor and Department:** Danielle Champney, Mathematics

V. **Cooperating Industry, Agency, Non-Profit, or University Organization(s):** none

VI. **Executive Summary:**

Incorporating conclusions from published literature, the effectiveness of each of four groups of 4-5 students was determined across multiple dimensions. To recognize the effectiveness of each group within each dimension, group profiles were compiled. One of the more noticeable components of effectiveness was communication structure. By looking into the question and response types within specific problems completed by the groups, more detailed evidence of these communication structures was obtained. Visuals were then created to illustrate the communication structures within each group.

Based on observations of the question and response visuals in conjunction with the effectiveness dimensions, multiple connections arose between the two. One of the most noticeable links occurred between group structure and the main type of question each group asked. Other connections included subgrouping dynamics and questioning structure as well as roles and questioning structure. Lastly, there were some correlations between spin off ideas and roles within each group.

VII. **Major Accomplishments**

(1) “Longitudinal” Data Collection on a variety of groupwork methods and strategies used by an entire class of students, across an entire quarter of Euclidean Geometry course – Represents a multi-use data set that can continue to be used for future projects that is larger in scale than typical projects of this type

(2) Analysis of data set that combines different branches of existing literature, which represents the first example (that we can find) of studying several of these groupwork theories in practice,

at the same time

- (3) Currently writing what will be a submittable article, of interest to inquiry-based learning journals in mathematics, as well as instructors at the K12 and college level who are interested in effective groupwork

VIII. Expenditure of Funds: Allocated funds were spent on equipment to make such a large scale of data collection possible. Remaining funds were set aside for travel for the student (Saute) to present work at the RUME Conference in February. However, it was announced that the conference would be held in Oklahoma, a CA banned travel state. Thus, the travel-related funds will not be used, as this travel is not allowed at this time. There was no suitable conference to substitute, for Saute to present her work, as she is graduating after Winter 2019 quarter.

IX. Impact on Student Learning:

Impact on Personal Learning

Through this research, I have gained crucial knowledge for how I plan to conduct my classroom when I become a teacher. As a student studying math education, group work has become a large component of my learning style. Understanding how group work affects student learning has provided me with information that has allowed me to become a more productive group member, as well as allow me to understand how to form effective groups in my future classrooms.

Impact on Education

In general, this research can aid Inquiry Based Learning (IBL) teachers hoping to conduct group work. By comparing the groups these teachers form with the groups within this study, it will allow them to better understand the groups' communication and questioning processes. By noting these connections, teachers can encourage either a similar questioning style to those within the study, or work to alter the process if the group is ineffective. There is also a lack of research on student questioning, allowing this study to provide more information to be known about this subject.