The Impact of Community Learning on Academic Achievement for First-Year Engineering Students

Abigail Stephan, atsteph@g.clemson.edu

CLAD Lab
Child Learning & Development

CLEMSON
College of EDUCATION

Background
- A large number of first-year engineering students do not possess prerequisite math skills upon entry to the university, causing lower passing rates in introductory STEM courses (Robinson, 2003) and thus lower retention (Daempfle, 2003).
- Programs to support these students have been developed (Natishan et al., 2000; Pekdemir et al., 2006; Najdanovic-Visak, 2017) and often include active learning techniques or team-based problem solving.
- While the use of Communities of Practice (CoP) (Wenger, 1998) for nursing students as well as engineering professionals leads to successful outcomes, no program for first-year engineering students has been put in place that harnesses the power of working within communities.

Program Description
The General Engineering Learning Community (GELC) began in Fall 2017 after a pattern of high failure rates from the major and from the university for first-year engineering students with weak skills in mathematics was noticed. Partnering with members of the staff at the Academic Success Center, an optional program was developed and implemented to help improve the performance of these students.

Program Objectives:
- Increase pass rates in STEM courses
- Increase social competence &ability to create peer network
- Help students adopt effective learning strategies & habits

GELC participants enjoy the following resources:
- Accessible engineering instructors & advisors
- 2 credit hour study skills course
- Course support tutoring & PAL sessions
- Weekly collaborative community session facilitated by a trained peer learning coach

Method
This quantitative study compared deidentified MATH 1040 Exam 1 scores for all students (n=528) taking the course in Fall 2017. Scores were grouped by GELC affiliation, based on participation in GELC (n=108) and lack of participation in GELC (n=420).

Results

	Sample Size	Mean Score	Standard Deviation	Range
GELC	108	68.04	17.54	19-96
Non-GELC	420	62.80	18.46	15.5-98.5

Test Result	Meaning
p= .0068	Statistically Significant
d= .2351	Small to moderate effect size

Discussion
- GELC offers a number of benefits to its participants, with the most significant and unique being the collaborative community sessions. Because both GELC and non-GELC students have access to professor office hours and course support services, it is likely that the weekly community sessions are correlated with higher scores, although isolating the components of the GELC program to identify which were most significant was beyond the scope of this study.
- Limitations of this study include timing in the semester and a non-representative sample.

Future Plans
- The General Engineering Learning Community will continue to provide support to incoming first-year engineering students with weak skills in mathematics in the Fall 2018 semester.
- As data on final grades and other success indicators are analyzed, better predictors of success for first-year engineering students entering without the required skill levels in mathematics will be identified.