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Peer Learning in Introductory Engineering

Kimberly Luthi
Embry-Riddle Aeronautical University, kimberly.luthi@erau.edu

Mohua Kar
Valencia College

Lisa Macon
Valencia College

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Peer Learning in Introductory Engineering

Mohua Kar, Ph.D., Department of Engineering, Valencia College
Kimberly Luthi, Ph.D., Department of Undergraduate Studies, Embry-Riddle Aeronautical University
Lisa Macon, Ph.D., Department of Computer Science, Valencia College

Background

- Observed characteristics of non-traditional student populations: low retention, low grades, low participation, low confidence in mathematical and problem-solving abilities.
- Research question: Does participation in peer-led team-learning (PLTL) activities support underrepresented and female students' performance in introductory engineering courses and retention in engineering pathways?

Design

- A peer-led recitation hour is added to introductory engineering course each week.
- Peer Leaders are successful former students.
- Peer leaders and faculty complete training in active learning and academic leadership.
- PLTL activities are designed in collaboration with the faculty teaching the course.
- Peer leaders implement PLTL activities to build real-life connections to course content.

Research Methods

- Data was collected from focus groups and roundtable discussions held in May and October 2019.
- Along with focus groups, quantitative data were collected and analyzed to address the research question from students who completed the STEM experiences questionnaire and pre- and post-survey data.
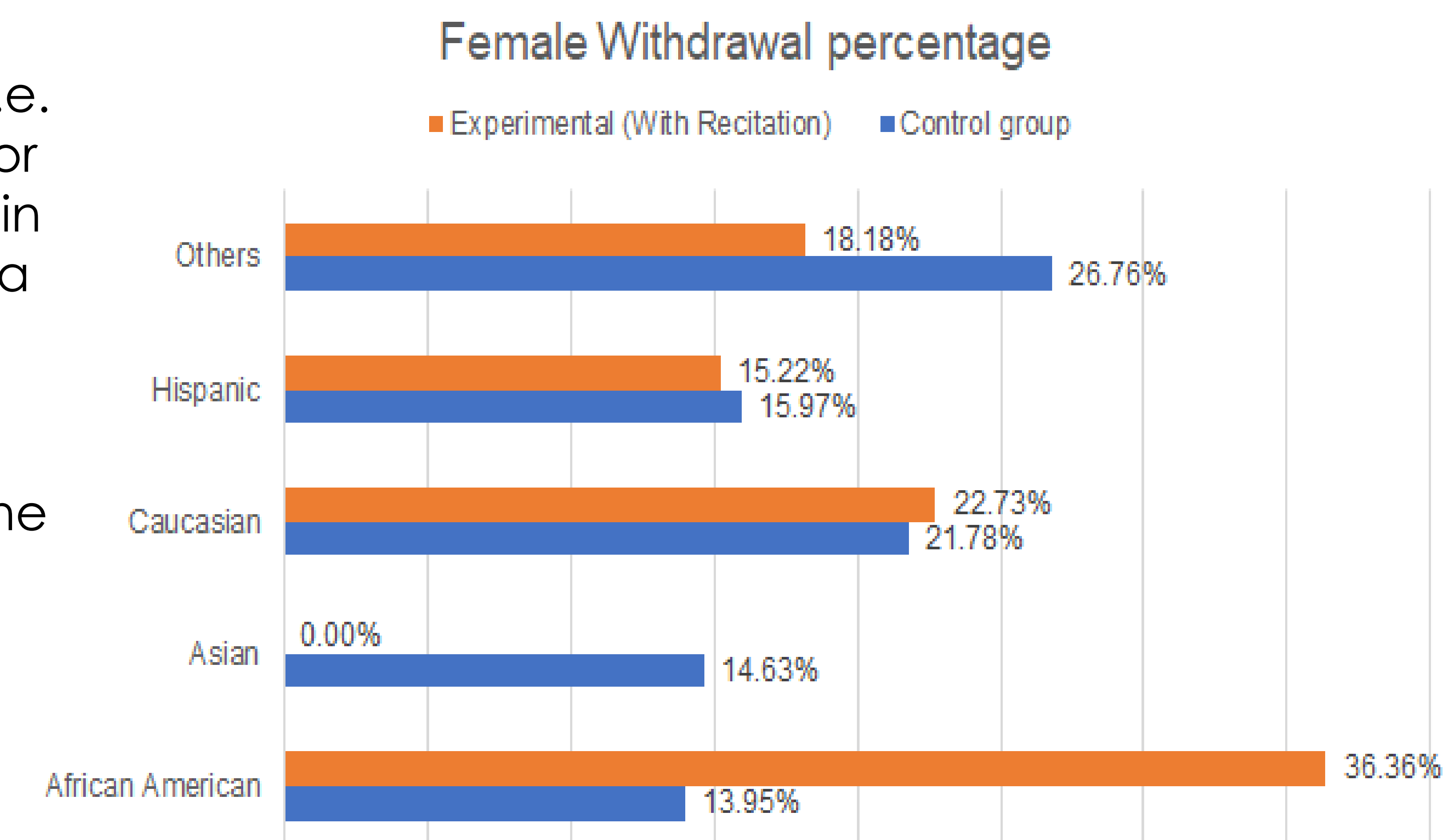
Results

- Female students who participated in the May 2019 focus groups shared perceptions of feeling intimidated, primarily from being in courses with significantly more men than females. They recommended strategies that could better support females towards success in engineering.

- These strategies included inviting female engineers to present and improving faculty interactions inside and outside the classroom.

- The five most often reported experiences were: (a) feel comfortable using the tools needed for studies; (b) staff/faculty members making connections-course content and real-world (i.e. community); (c) access to the tools needed for studies; (d) learned steps necessary for safety in the class or in labs; (e) learned ways to make a difference through a career in STEM.

- Almost all of these items showed a positive increase in the students who participated in the PLTL activities compared to the students who did not participate in the study. Items (b) "real-world connections" and (e) "making difference through STEM" showed a notable increase.

Summary

1. As a result of participation in PLTL, 80% of students were more comfortable applying mathematical and physical concepts to real-world problems.
2. 96% of the students felt their analytical and critical thinking skills had improved.
3. Female students in this study believe their experiences in STEM activities such as PLTL activities offer further connections to peers and to real-life scenarios that align with their future careers in engineering.

Female Withdrawal percentage

■ Experimental (With Recitation)   ■ Control group

	Experimental (With Recitation)	Control group
Others	18.18%	26.76%
Hispanic	15.22%	15.97%
Caucasian	22.73%	21.78%
Asian	0.00%	14.63%
African American	36.36%	13.95%

Acknowledgements & References