

Cohesiveness in Engineering Students Teams: Effect of Gender, Race, Year of Study, GPA, Previous Course Grade and Some Prerequisite Knowledge.

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Abstract

This research investigates the effect of gender, race, year of study, GPA, previous course grade and selected prerequisite knowledge on cohesiveness in first-year engineering students' teams. Background: Research shows that diversity hinders the development of cohesiveness, yet cohesiveness is positively associated with performance and satisfaction. Purpose/Hypothesis: Modeling cohesion can lead to better strategies for forming teams. In this study we are going to investigate the effect of gender, race, year of study, GPA, previous course grade and selected prerequisite knowledge on the cohesiveness of teams and the extent to which each student feels cohesion while working in teams.

Design/Method: Multiple regression analysis was used to model the effect of individual characteristics on a student's perception of cohesion in their team. ANOVA is used to find the effect of team composition on cohesiveness. Results: Hispanic/Latino students reported more cohesiveness in their teams, and students with selecting "Other" as their racial/ethnic identifier had significantly lower cohesion. Black students were observed to report a much higher cohesion, but the observation was not statistically significant. Since the population Black students was enough to prevent an underpowered analysis, the lack of significance is due to a high variability among Black student experiences.

Conclusions: The finding that underrepresented minorities perceive a higher level of cohesion than White students is intriguing and suggests future qualitative research. Keywords Cohesiveness, gender, race, teamwork

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Biographies

Behzad Beigpourian is a Ph.D. student and Research Assistant in Engineering Education at Purdue University. He earned his master's in Structural Engineering from Shahid Chamran University in Iran, and his bachelor's in Civil Technical Teacher from Shahid Rajaei Teacher Training University in Iran, Tehran. He has been official Technical Teacher at Ministry of Education in Iran from 2007 to 2018, and received many certificate in education such as Educational Planning, Developing Research Report, and Understanding School Culture. During these years, he has taught construction courses in several technical schools. Mr. Beigpourian currently works in the CATME project, which is NSF funding project, on optimizing teamwork skills and assessing the quality of Peer Evaluations.

Daniel M. Ferguson is CATME Managing Director and the recipient of several NSF awards for research in engineering education and a research associate at Purdue University. Prior to coming to Purdue he was Assistant Professor of Entrepreneurship at Ohio Northern University. Before assuming that position he was Associate Director of the Inter-Professional Studies Program [IPRO] and Senior Lecturer at Illinois Institute of Technology and involved in research in service learning, assessment processes and interventions aimed at improving learning objective attainment. Prior to his University assignments he was the

Founder and CEO of The EDI Group, Ltd. and The EDI Group Canada, Ltd, independent professional services companies specializing in B2B electronic commerce and electronic data interchange. The EDI Group companies conducted syndicated market research, offered educational seminars and conferences and published The Journal of Electronic Commerce. He was also a Vice President at the First National Bank of Chicago [now J.P. Morgan Chase], where he founded and managed the bank's market leading professional Cash Management Consulting Group, initiated the bank's non-credit service product management organization and profit center profitability programs and was instrumental in the breakthrough EDI/EFT payment system implemented by General Motors. Dr. Ferguson is a graduate of Notre Dame, Stanford and Purdue Universities, a special edition editor of the Journal of Engineering Entrepreneurship and a member of Tau Beta Pi.

Matthew W. Ohland is Professor of Engineering Education at Purdue University. He has degrees from Swarthmore College, Rensselaer Polytechnic Institute, and the University of Florida. His research on the longitudinal study of engineering students, team assignment, peer evaluation, and active and collaborative teaching methods has been supported by the National Science Foundation and the Sloan Foundation and his team received Best Paper awards from the Journal of Engineering Education in 2008 and 2011 and from the IEEE Transactions on Education in 2011 and 2015. Dr. Ohland is an ABET Program Evaluator for ASEE. He was the 2002–2006 President of Tau Beta Pi and is a Fellow of the ASEE, IEEE, and AAAS.

Siqing Wei received both bachelor's and master's degrees in electrical and Computer Engineering from Purdue University. He is currently pursuing Ph.D degree in Engineering Education at Purdue University. After years of experience of serving a peer teacher and a graduate teaching assistant in first year engineering courses, he is a research assistant at CATME research group studying the existence, causes and interventions on international engineering teamwork behaviors, the integration and implementation of team-based assignments and projects into STEM course designs and using mixed-method, especially natural language processing to student written research data, such as peer-to-peer comments. Siqing also works as the technical support manager at CATME research group.