



Peer Ratings and Intentions to Change: Adopting the CATME to Explore Outcomes of Peer Ratings

Dr. Tom O'Neill, University of Calgary

Tom is a Professor of Industrial/Organizational Psychology and leading expert in the areas of team dynamics, virtual teams, conflict management, personality, and assessment. He is director of the Individual and Team Performance Lab and the Virtual Team Performance, Innovation, and Collaboration Lab at the University of Calgary, which was built through a \$500K Canada Foundation for Innovation Infrastructure Grant. He also holds operating grants of over \$300K to conduct leading-edge research on virtual team effectiveness. Over the past 10 years Tom has worked with organizations in numerous industries including oil and gas, healthcare, technology, and venture capitals. He is currently engaged with the Schulich School of Engineering at the University of Calgary to train, develop, and cultivate soft-skill teamwork competencies in order to equip graduates with strong interpersonal and communication capabilities.

Ms. Semin Park, University of Connecticut

Semin Park is a doctoral student in management at the University of Connecticut. She earned her M.Sc. and B.B.A. in the College of Business Administration from the Seoul National University and has had a research experience at the University of Calgary. Her primary areas of interest include team process and multi-level team effectiveness, leadership, and cross-level models of motivation.

Ms. Nicole Lynn Larson, University of Calgary

Nicole is completing her final year of her Masters in Industrial Organizational psychology at the University of Calgary under the supervision of Dr. Thomas O'Neill. Nicole has been working with the Schulich School of Engineering for the past two years. During this period she has been involved in several initiatives such as assessing student learning and engagement, implementing systems for peer evaluations, and leading teamwork training sessions. She is currently conducting research on team learning processes in engineering student project teams. Additionally, she has co-developed a framework for measuring and interpreting an array of team dynamics. An online assessment tool has been created based on this framework which allows teams to diagnose and improve the "health" of their team. She is passionate about her area of research and plans to continue conducting research on factors that contribute to effective teamwork.

Ms. Amanda Deacon, University of Calgary

I am currently in my second year masters in Industrial Organizational Psychology at the University of Calgary under the supervision of Dr. Tom O'Neill. My area of focus is teams within organizational contexts and that results in a plethora of research conducted with engineering students. Our lab uses these results to better prepare engineering students for teamwork within institutions of all kinds, educational and business.

Ms. Genevieve Hoffart, University of Calgary

Genevieve is completing her honours degree under the supervision of Dr. Thomas O'Neill at the University of Calgary looking at the influence processes in teams. She has been working with the Schulich School of Engineering for the past three years during which time her focus has been on improving team dynamics and maximizing the student experience. In addition co-developing the communication training framework that has now been applied to over 2500 students campus wide, Genevieve has personally facilitated many of the training sessions. Her goal is to continue working on developing applicable and universal tools to improve the functioning of both student and industry teams in institutions and organizations across North America.

Dr. Bob Brennan, University of Calgary

Prof. Marjan Eggermont, University of Calgary



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Marjan Eggermont is the current Associate Dean (Student Affairs) and a Senior Instructor and a faculty member at the University of Calgary in the Mechanical and Manufacturing department of the Schulich School of Engineering, University of Calgary, Canada. She teaches graphical, written and oral communication in their first Engineering Design and Communication course taught to all 650 incoming engineering students. With co-editors Tom McKeag (San Francisco) and Norbert Hoeller (Toronto) she co-founded and designs ZQ, an online journal to provide a platform to showcase the nexus of science and design using case studies, news and articles (zqjournal.org). As an instructor, she was one of the recipients of The Allan Blizzard Award, a Canadian national teaching award for collaborative projects that improve student learning in 2004. In 2005, she was one of the recipients of the American Society of Mechanical Engineers Curriculum Innovation Award. She is - as PIC II chair - currently a board member of ASEE.

Dr. William Rosehart, University of Calgary

**Peer Feedback and Intentions to Change: Adopting the CATME
Dimensions to Conduct Peer Feedback**

Introduction

Teamwork skill development is recognized as an important and pressing issue in engineering education. To better prepare graduates for industry there is a need to move beyond technical skill acquisition to ensure interpersonal and collaboration skills, such as teamwork capabilities, are honed and mastered through targeted undergraduate education initiatives. A partnership at the University of Calgary between the Individual and Team Performance Lab in the Department of Psychology and the Schulich School of Engineering has resulted in a new online platform that allows skill development through peer feedback. Specifically, this platform is free to use and provides instant emailed peer feedback to all team members for development and action planning purposes. Our vision is that the tool can become an internationally adopted and recognized assessment for enhancing teamwork capabilities in post-secondary education. We will describe the theoretical background, the tool, how to access it, and show example feedback forms during the presentation, as per the below descriptions. Anyone wishing to use this free platform should contact the first author.

Background

The theory of peer feedback is simple and intuitive. By being introduced to the behaviors of effective team members, observing and rating team members on these behaviors, and receiving personalized feedback on the behaviors, team members learn how to be an effective team member^{1,2}. We have data indicating that continuous participation in peer feedback through the undergraduate education provides consistent and accumulated returns on both the capability levels and later citizenship behaviors once students are employed in organizations. The behaviors are based on extensive research by Ohland et al.³ who introduced the Comprehensive Assessment of Team Member Effectiveness (CATME). As such, at present we defer to their extensive psychometric analyses, reliability, and construct validity. However, we use a different interface that we believe is more user friendly for both instructors and students, and could enhance the psychometrics although our data analyses in that regard are still currently underway.

We now have two different peer feedback tools that the instructor can choose from. The first invites students to rate each other on the 5 CATME dimensions, which were identified as the key factors underlying effective team member performance by Ohland's research team³. A five point scale including the anchors *Unsatisfactory* (1), *Bare Minimum* (2), *Moderate* (3), *Strong* (4), and *Outstanding* (5). The output appears in each team member's dashboard once all team members have completed their feedback ratings. The output for each individual contains the median of his or her peer ratings for each dimension (see Appendix A). This output can then be used in class as a framework to support individual or team debriefs, action steps, and development planning.

The second peer feedback tool involves distributing $10*(k-1)$ points across other team members for each CATME dimension, where k = the number of team members. Sliders allow the rater to adjust the point allocation for each member and encourage comparisons across team members. A self rating slider is also provided although it does not take into account the fixed total points that can be allocated to other members. As such, the self rating is not included in the calculation of others' ratings. Rather, on the output the self rating appears as a comparison between the student's perceptions of his or her own performance and how he or she is perceived on average by team members for each dimension (Appendix B). A third indicator on the output is the median of the team members' median ratings by others, which gives the student a benchmark

with respect to the team's overall median performance level on each dimension.

Method

The tool is an online platform accessible to anyone with the Internet and usable on most mobile devices. An instructor area allows the instructor to input student team membership and email contact information, and send email invitations to students instantly through a website. A simple copy-paste from a class list allows for seamless, simple, and time efficient input of team membership. Students then receive an email indicating they can participate in the peer feedback assessment. Once all team members have provided anonymous and confidential round-robin ratings of other team members on teamwork competencies, the team members are emailed a personalized report that represents the average peer rating on each dimension or the ranked dimensions based on achievement level, depending on the instructor's preference. The peer feedback version 1 has been administered to approximately 600 students, and by the time of this conference the total number should be up to approximately 1,000.

Results

Initial data suggest that students have positive attitudes about the feedback. At the midpoint of the semester in a second year electrical engineering design course, 185 students completed the version 1 peer feedback. 68% agreed or strongly agreed that the feedback would be reliable, 68% agreed or strongly agreed that the feedback would be useful, and 83% agreed or strongly agreed that they would use the feedback to change.

Discussion

Both peer feedback versions presented here capitalize on social comparison theory⁴. Social comparison theory postulates that we make better appraisals of others and ourselves when we make relative comparisons. Relative comparisons involve comparing several people and ourselves at the same time when making appraisals such as providing ratings. Absolute comparisons on the other hand involve making ratings without explicitly identifying others for comparison, such as in the CATME system in which ratings for all dimensions are provided for a given team member, one member at a time. Our procedure involves rating across dimensions with respect to other members or the self, one dimension at a time. This latter approach capitalizes on social comparisons, which have been shown to be superior to absolute ratings in reliability and validity and accuracy^{5,6}.

Additionally, Donia, O'Neill, and Brutus⁷ found that over multiple peer feedback uses (using a slightly different instrument than those presented here) during post-secondary education, students maintain a consistent upward trajectory in their ratings received from others, and that these rating levels were correlated with on the job citizenship behaviors after graduation. As such, it would appear that peer feedback is a valuable way to improve teamwork skills. We believe this occurs through orienting students toward effective team member behaviors, observing others, and providing and receiving meaningful and personalized feedback.

Conclusion

At the conference we will provide an overview of how instructors can implement the team metrics system in their courses. The dashboard can be used at no cost as the work was funded by industry and government contributions. Our mission is to support the uptake of these assessments

at a global scale in order to improve teamwork skills in post-secondary education all over the world.

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Appendix A

Peer Feedback Output Version 1

Prepared by:

The Individual & Team Performance Lab



This report summarizes your teammates' feedback of your teamwork competencies. Specifically, the following represents the average rating assigned by your team regarding your effectiveness as a team member. You can use this feedback to identify potential strategies for increasing your effectiveness as a team member.

Proficiency	Team Competencies	Potential Improvement Behaviors
Outstanding	Contributing to the team's work	Increase your share of the team's workload. Take on and complete even more responsibilities. Prepare even more for team meetings. Improve the accuracy of your work, and complete it even more quickly.
Strong	Communicating with teammates	Facilitate effective communication in the team. Exchange information with teammates more quickly. Listen even more to what teammates have to say about issues. Always get team input on important matters before going ahead.
Moderate	Strong foundation of knowledge, skills, and abilities	Always look for ways to improve your skills and expertise. Try to obtain more knowledge of teammates' jobs. Continue to build the skills and expertise to do excellent work.
Bare Minimum	Encouraging high performance	Express stronger expectations that the team will succeed. Express more of a belief that the team can produce high-quality work. Believe that the team will achieve high standards. Care even more that the team produced high-quality work.
Unsatisfactory	Keeping the team on track	Maintain a better awareness of fellow team members' progress. Assess more whether the team is making progress as expected. Provide more constructive feedback to others on the team. Continue to help the team plan and organize its work.

Adapted from the Comprehensive Assessment of Team Member Effectiveness; Obland et al., 2012

Appendix B

Peer Feedback Output Version 2, Truncated

This report summarizes your teammates' rankings of your teamwork competencies. If you are not satisfied with the rankings you can use this feedback to identify strategies for increasing your effectiveness as a team member. The "potential improvement behaviors" provide specific behavioral examples of how to build each of the five team competencies.

Team Competency	Contributing to the team's work	
Proficiency	Self Score:	10
	Peer Rated:	10
	Group Median:	11
Potential Improvement Behaviors	<p>Increase your share of the team's workload. Take on and complete even more responsibilities. Prepare even more for team meetings. Improve the accuracy of your work, and complete it even more quickly.</p>	
Team Competency	Communicating with teammates	
Proficiency	Self Score:	10
	Peer Rated:	10
	Group Median:	10
Potential Improvement Behaviors	<p>Facilitate effective communication in the team. Exchange information with teammates more quickly. Listen even more to what teammates have to say about issues. Always get team input on important matters before going ahead.</p>	
Team Competency	Strong foundation of knowledge, skills, and abilities	
Proficiency	Self Score:	15
	Peer Rated:	10
	Group Median:	10
Potential Improvement Behaviors	<p>Always look for ways to improve your skills and expertise. Try to obtain more knowledge of teammates' jobs. Continue to build the skills and expertise to do excellent work.</p>	
Team Competency	Encouraging high performance	