

SMARTER Teamwork: System for Management, Assessment, Research, Training, Education, and Remediation for Teamwork

Dr. Matthew W. Ohland, Purdue University and Central Queensland University

Matthew W. Ohland is Professor of Engineering Education at Purdue University and a Professorial Research Fellow at Central Queensland 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 over \$12.8 million from 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. Dr. Ohland is past Chair of ASEE's Educational Research and Methods division and a member the Board of Governors of the IEEE Education Society. He was the 2002–2006 President of Tau Beta Pi.

Dr. Richard A. Layton P.E., Rose-Hulman Institute of Technology

Dr. Misty L. Loughry, Georgia Southern University

Misty L. Loughry is a Professor of Management at Georgia Southern University. She earned a Ph.D. in management from University of Florida, an M.B.A. from Loyola College in Baltimore, and a B.A. from Towson State University. She was previously an Assistant Professor of Management at Clemson University and worked for ten years in banking before beginning her academic career. Her areas of research include control in organizations, especially peer influences and other social controls, and teamwork. Her research has been published in journals such as Academy of Management Learning & Education, Organization Science, Educational & Psychological Measurement, Journal of Managerial Issues, Information and Management, and Journal of Information Technology Management.

Dr. David Jonathan Woehr, University of North Carolina Charlotte

Mr. Daniel M. Ferguson, Purdue University, West Lafayette

Daniel M. Ferguson is the recipient of three 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 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, 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 and a member of Tau Beta Pi.

Dr. Eduardo Salas, University of Central Florida

Eduardo Salas is Trustee Chair and Pegasus Professor of Psychology at the University of Central Florida. He earned a Ph.D. in Industrial/Organizational Psychology at Old Dominion University, and has since co-authored over 425 journal articles and book chapters on topics such as teamwork, team training, and performance assessment.

Kyle Heyne, University of Central Florida

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NSF CCLI Phase 3 Grant 0817403**

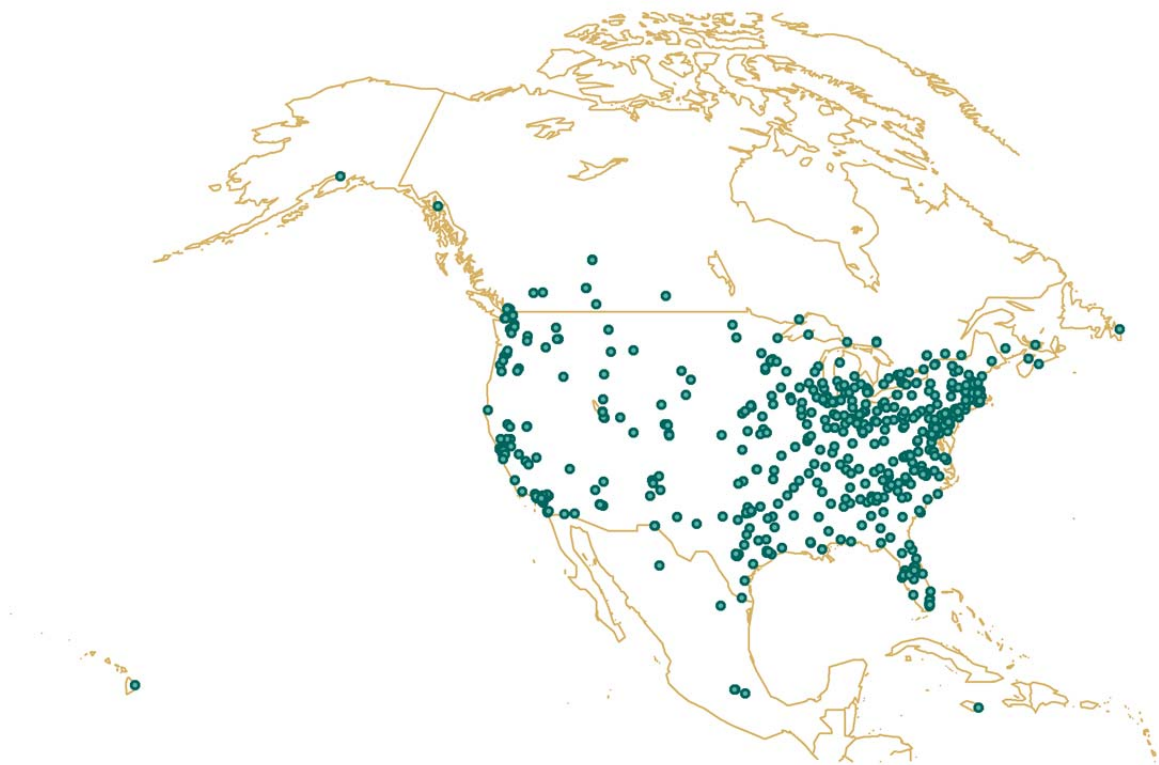
Project goals

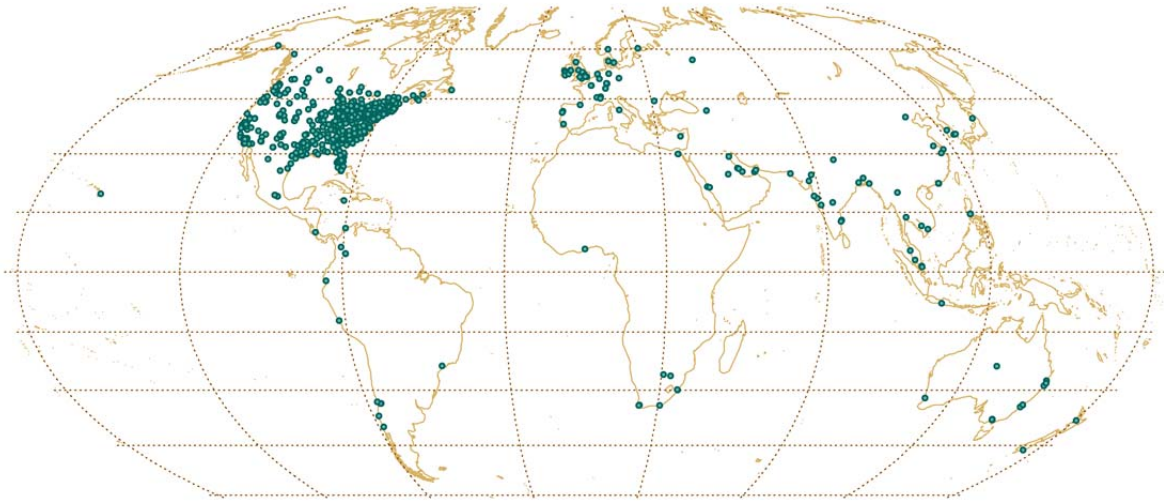
- To equip students to work in teams.
- To equip faculty to manage teams.
- To equip researchers to understand teams.

Major accomplishments

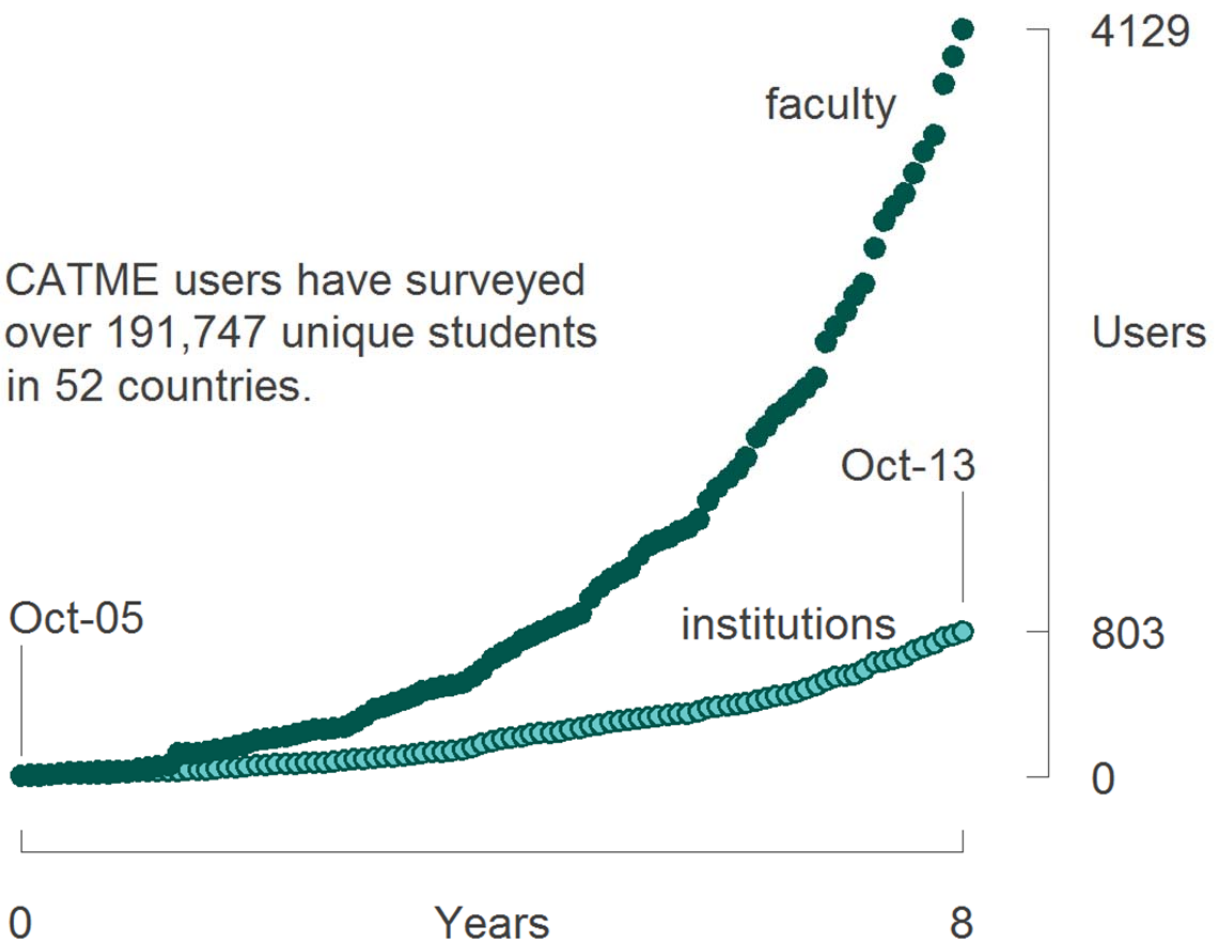
- Significant improvements to software system for managing teams.
- Addition of teamwork training features.
- Deployment of a greatly enhanced public website at www.CATME.org.
- Identified the disciplinary distribution of the software user base.
- Significant publications released and recognized for their quality.

The SMARTER Teamwork user base





CATME users have surveyed over 191,747 unique students in 52 countries.



Significant results

The web-based system for managing teams has been used by over 190,000 unique students of more than 4000 instructors at over 800 institutions in 52 countries.

A major paper describing the development and validation of the CATME Peer Evaluation system was published in *Academy of Management Learning & Education* in December 2012. On June 1, 2013, this paper received the Maryellen Weimer Scholarly Work on Teaching and Learning Award, “recognizing outstanding scholarly contributions with the potential to advance college-level teaching and learning practices,” at The Teaching Professor Conference.

- Loughry, M. L., Ohland, M. L., & Woehr, D. J. (in press). Assessing teamwork skills for assurance of learning using CATME Team Tools. *Journal of Marketing Education*. Accepted for publication June 17, 2013. Key findings: This paper describes how the CATME system could be used to document student learning for learning goals related to developing team skills as required by AACSB’s (the accrediting institution for business schools) new accreditation standards. A copy of the paper is posted on www.CATME.org to begin drawing readers before the paper is published (probably in April 2014).
- Loignon, A.C., Schmidt, P., Woehr, D.J., & Loughry, M.L. (presented in 2013, November). *Justifying aggregation in multilevel research: A review and examination of cutoff values for common aggregation indices*. Paper presented at the Annual Meeting of the Southern Management Association. This paper is being revised for submission to *Organizational Research Methods*.
- Loughry, M. L., Ohland, M. W., & Woehr, D. J. (2013, August 9-13). *Assessing Teamwork Skills for Assurance of Learning Using CATME Team Tools*. Paper presented at the Annual Meeting of the Academy of Management, Lake Buena Vista, FL.
- Ohland, M. W., Loughry, M. L., Layton, R. A., Lyons, R., Ferguson, D. M., Heyne, K., & Driskell, T. Woehr, D. J., Pomeranz, H.R., Salas, E., Loignon, A.C., Sonesh, S. C. (2013, June 23-26). SMARTER Teamwork: System for Management, Assessment, Research, Training, Education, and Remediation for Teamwork. Paper and poster presented at the NSF Grantees’ session. *Proceedings of the 2013 American Society of Engineering Education Annual Conference & Exposition*, Atlanta, GA.
- Ohland, M.W., Loughry, M.L., Woehr, D.J., Finelli, C.J., Bullard, L.G., Felder, R.M., Layton, R.A., Pomeranz, H.R., & Schmucker, D.G. (2012). [The Comprehensive Assessment of Team Member Effectiveness: Development of a Behaviorally Anchored Rating Scale for Self and Peer Evaluation](#). *Academy of Management Learning & Education*, 11 (4), 609-630. Key findings: The article described the development of the CATME behaviorally anchored rating scale for peer evaluation and three studies providing evidence for its validity. The article won the 2013 Maryellen Weimer Scholarly Work on Teaching and Learning Award. This \$1,000 award, sponsored by Magna Publications, “recognizes outstanding scholarly contributions with the potential to advance college-level teaching and learning practices.” Articles published in any pedagogical journal from any discipline, or a cross-disciplinary journal or higher education journal can be considered for the award. The award was presented at the Teaching Professor Conference in New Orleans on June 1, 2013. The prize money was

used to purchase merchandise from Lands End embroidered with the CATME logo to publicize the system at conferences.

- Layton, R. A., Ohland, M. W., & Loughry, M. L. (2012, October). Training students to become better raters: Raising the quality of self and peer evaluations using a new feature of the CATME system. Workshop conducted at the *Proceedings of the Frontiers in Education Conference*, Seattle, WA.
- Loughry, M. L., Ohland, M. W., Woehr, D. J., Bedwell, W. L., & Lyons, R. (2012, August). *Effective Management of Student Teams Using the CATME System: Practice Informed by Research*. Professional Development Workshop (PDW) presented at the Annual Meeting of the Academy of Management (co-sponsored by the Management Education and Development and Organizational Behavior divisions), Boston, MA.
- Loughry, M. L. (2012, August). Types of Projects: Implications for Teaching Teamwork. In R. Piccolo & W. Bedwell (Co-chairs), *Teaching Teamwork: Integrating Innovative Science into the Classroom*. Symposium conducted at the Annual Convention of the American Psychological Association, Orlando, FL.

Other dissemination

In addition to the release of and updates to a significantly improved website, we have delivered various presentations to reach US faculty:

- Loughry, M. L. (2013, October 11). “Overview of the CATME system for forming teams and Peer Evaluation,” Presented to the faculty of the Georgia WebMBA at the Fall Retreat.
- Ohland, M.W., “CATME and Team-Maker software for managing student teams,” Management Distinguished Lecture, UNC Charlotte, September 28, 2012.
- Ohland, M.W., invitation to speak at Stanford Engineering Education Colloquium, hosted by ASEE Student Chapter, October 11-12, 2012.
- Ohland, M.W., *Students in Teams*. Science and Engineering Teaching Lunch, hosted by the Center for Teaching and Learning, Sheri Sheppard, Brad Osgood, and Robyn Dunbar, Stanford University, October 11, 2012.

We developed a new brochure overviewing the CATME system and highlighting the three awards that the system has received. This was distributed at the Teaching Professor Conference on June 1, at ASEE on June 24, and other venues. A PDF version of the brochure was posted to www.CATME.org.

Website development

In December 2012 a redesigned public website at www.CATME.org went live. The website provides easy access to information about the CATME system including:

- A newly developed mission statement
- A demonstration of CATME’s five-dimension model of teamwork
- A practice-rating exercise that anyone can use to preview the Peer Evaluation tool.
- A description of all of the CATME tools

- News on current CATME happenings
- A link to the CATME Users group on the professional networking website LinkedIn, created in November 2011 to establish a community of users to discuss strategies for managing student teams as well as the mechanics of using the system. This group has grown to over 200 members, and membership is likely to increase as faculty find the link on the home page of CATME's new website.
- About Us information, including
 - An overview description of the CATME project
 - Acknowledgement of NSF support
 - A detailed development history
 - Information on user institutions, including maps and alphabetical lists of institutions, along with number of faculty and student users
 - Information on data security and IRB approval
 - A list of research about the CATME tools, including journal publications and various types of conference presentations
 - Infrastructure to facilitate communication between faculty users and the CATME development team.
 - Meeting support tools, including templates and a citation for an article about using team charters and team-member preparation before the first team meeting, and templates for a meeting agenda and meeting minutes. These additional CATME tools to support teamwork were developed this year.

Impact on engineering education

In engineering education, we have had a significant impact on classroom practice in how faculty manage teams. As our report shows, in addition to the large user base from engineering, there are engineering education researchers who not only cite our work, but also do research using CATME as a tool. Thus, we are benefiting students, faculty, and researchers as we planned. The selection of CATME and Team-Maker for the Premier Award for Excellence in Engineering Education Courseware in 2009 was evidence that the engineering community recognizes CATME's contribution.

Impact on other disciplines

Our work is broadly applicable across all of science and engineering. Researchers are not only citing our work, but they are conducting research using CATME as a tool. Many citations can be identified in Google Scholar.

Impact on the development of human resources

Noting that team skills are among the most important skills cited by employers, our impact on the practice of teaching teamwork skills in the classroom is a contribution to Human Resource Development. Since women function better in social learning environments and team experiences have social, attitudinal, and affective outcomes that affect participation and success in college, particularly in STEM disciplines, improving team experiences is particularly important in making STEM education female-friendly.

Impact on society beyond science and technology

Our work is highly relevant to other disciplines as well, particularly other disciplines in which students are expected to develop team skills – business, nursing, and food and nutrition programs all include the development of team skills in the accreditation process. Some business schools are planning to use CATME as a college standard for accreditation purposes. The research team was recognized for delivering the Best Symposium in Management Education and Development (recognizing the symposium at the Academy of Management Conference that offers the most significant contribution to advance management education and development) in 2011, which shows that we are recognized for the quality of our contribution to disciplines outside engineering. This past year, the research team was recognized with the Maryellen Weimer Scholarly Work on Teaching and Learning Award for a paper published in 2012 in *Academy of Management Learning & Education*. The Teaching Professor Conference, where the award was given, includes faculty from all disciplines and invited the CATME Team to present a workshop on the system at the conference in Boston in June 2014.