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

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SMARTER TEAMWORK: SYSTEM FOR MANAGEMENT, ASSESSMENT, RESEARCH, TRAINING, EDUCATION, AND REMEDIATION FOR TEAMWORK

Dr. Matthew W. Ohland, Purdue University, West Lafayette

Matthew W. Ohland is Associate 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 more than $11.6 million from the National Science Foundation and the Sloan Foundation, and his team received the William Elgin Wickenden Award for the Best Paper in the Journal of Engineering Education in 2008 and multiple conference Best Paper awards. Ohland is Past Chair of ASEE's Educational Research and Methods Division and an at-large member the Administrative Committee of the IEEE Education Society. He was the 20022006 President of Tau Beta Pi.

Dr. Misty L. Loughry, Georgia Southern University

Misty L. Loughry received her Ph.D. in management from the University of Florida. She studies teamwork, team-member performance, peer evaluation, and peer control in organizations. Her work has been published in journals such as Organization Science, Small Group Research, Information & Management, Educational & Psychological Measurement, and the Journal of Engineering Education.

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

Richard A. Layton is past Director of the Center for the Practice and Scholarship of Education and Associate Professor of mechanical engineering at Rose-Hulman Institute of Technology. He received a B.S. from California State University, Northridge, and an M.S. and Ph.D. from the University of Washington. His areas of scholarship include student team formation and peer evaluation; persistence, migration, and retention in engineering education; and data analysis and visualization for investigating and presenting quantitative data. Elements of his teaching practice include formal and informal cooperative learning and informal inquiry-based, hands-on experiences in labs, mini-labs, and student workshops. For a decade, he has been the key developer of reform of the experimental-based curriculum in his department. Most of his courses and laboratories involve instructor-assigned teams and guided instruction for students to become more effective team members. He is a founding developer of the CATME/Team-Maker System, a free, web-based system that helps faculty assign students to teams and conduct self- and peer-evaluations. He collaborates with his technical communications colleagues in developing scaffolded communications activities for use in his disciplinary technical courses.

Mr. Hal R. Pomeranz, Deer Run Associates

Ms. Wendy L. Bedwell, University of Central Florida, Institute for Simulation and Training

Wendy L. Bedwell is a doctoral candidate in the Industrial/Organizational Psychology program at the University of Central Florida (UCF). Bedwell earned a B.A. in psychology with a minor in business from James Madison University and a master's in distance education (M.D.E) from the University of Maryland. As a Graduate Research Associate at the Institute for Simulation and Training, her research and applied work focuses on enhancing adaptive collaborative performance through training. Bedwell's emphasis is two-fold: enhancing training effectiveness by linking training characteristics to learning outcomes, and understanding membership fluidity and its effects on adaptive collaborative performance in collocated and distributed teams.

Rebecca Lyons, University of Central Florida, Institute for Simulation and Training

Rebecca Lyons is a doctoral candidate in the Industrial and Organizational Psychology program at the University of Central Florida (UCF). She earned a B.S. in psychology from Davidson College in 2004. Lyons is a Graduate Research Associate at the Institute for Simulation and Training, where her research includes individual and team training, simulation, performance measurement, decision-making/adaptation, and theory development related to team macrocognition. Much of this work has related to teams working in complex environments, such as healthcare and military populations.

Mr. Daniel Michael Ferguson, Purdue University, West Lafayette

Daniel M. Ferguson is a Graduate Student in the Engineering Education program at Purdue University. He received his B.A. in pre-engineering in a five-year BA/BS program at the University of Notre Dame and a M.B.A. and M.S.I.E. from Stanford 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 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 establishing the revolutionary EDI/EFT payment system implemented by General Motors. He is a two-time award winner of the Best Paper in Cash Management awarded by the Bank Administration Institute.

Kyle Heyne, University of Central Florida

Institute for Simulation and Training

Tripp Driskell, University of Central Florida

Tripp Driskell is a doctoral student in the Applied Experimental and Human Factors program at the University of Central Florida. He received his M.S. in human factors from Embry-Riddle Aeronautical University.

Dr. David J. Woehr, University of North Carolina, Charlotte

David Woehr is currently professor and Chair of the Department of Management at the University of North Carolina, Charlotte. He has also served on the faculty at the University of Tennessee, and at Texas A&M University. Woehr has also served as a Visiting Scientist to the Air Force Human Resource Laboratory and as a consultant to private industry. His research on managerial assessment centers, job performance measurement, work-related attitudes and behavior, training development, and quantitative methods has appeared in a variety of books and journals, as papers presented at professional meetings, and as technical reports. Woehr currently serves as an Associate Editor for Human Performance as well as on the editorial boards for Organizational Research Methods, and the European Journal of Work and Organizational Psychology. Woehr is currently serving as the Chair of the Management Department.

HIGHLIGHTS OF THE PAST YEAR

- Continued substantial growth of the CATME and Team-Maker user base
- Received award for Best Symposium in Management Education and Development; sponsored by McGraw Hill/Irwin for the symposium at the Academy of Management Conference that offers the most significant contribution to advance management education and development. February 17-20, 2012.
- Development of training vignettes, including selection of video clips using video-based modeling and video vignettes. Permission for using the video clips has been granted.
- Development of training modules for faculty and students
- Additional publications were written and accepted.
- Multiple workshops conducted promoting the CATME system, with more scheduled including participation in the 10th offering of a Bucknell University Workshop in July 2011, which trains faculty in *How to Engineer Engineering Education*.
- New logos, brochures and posters developed, shared and distributed at the ASEE annual meeting in Vancouver and other events.
- System improvements implemented, including repairs addressing usability concerns;
- Progress made toward development and implementation of the SMARTER system;
- Progress made on databases of literature on team formation and peer evaluation;

GROWTH OF THE CATME PEER REVIEWAND TEAM-MAKER SYSTEMS

The system has had 80,323 unique student users.

Fitted curves are second order.
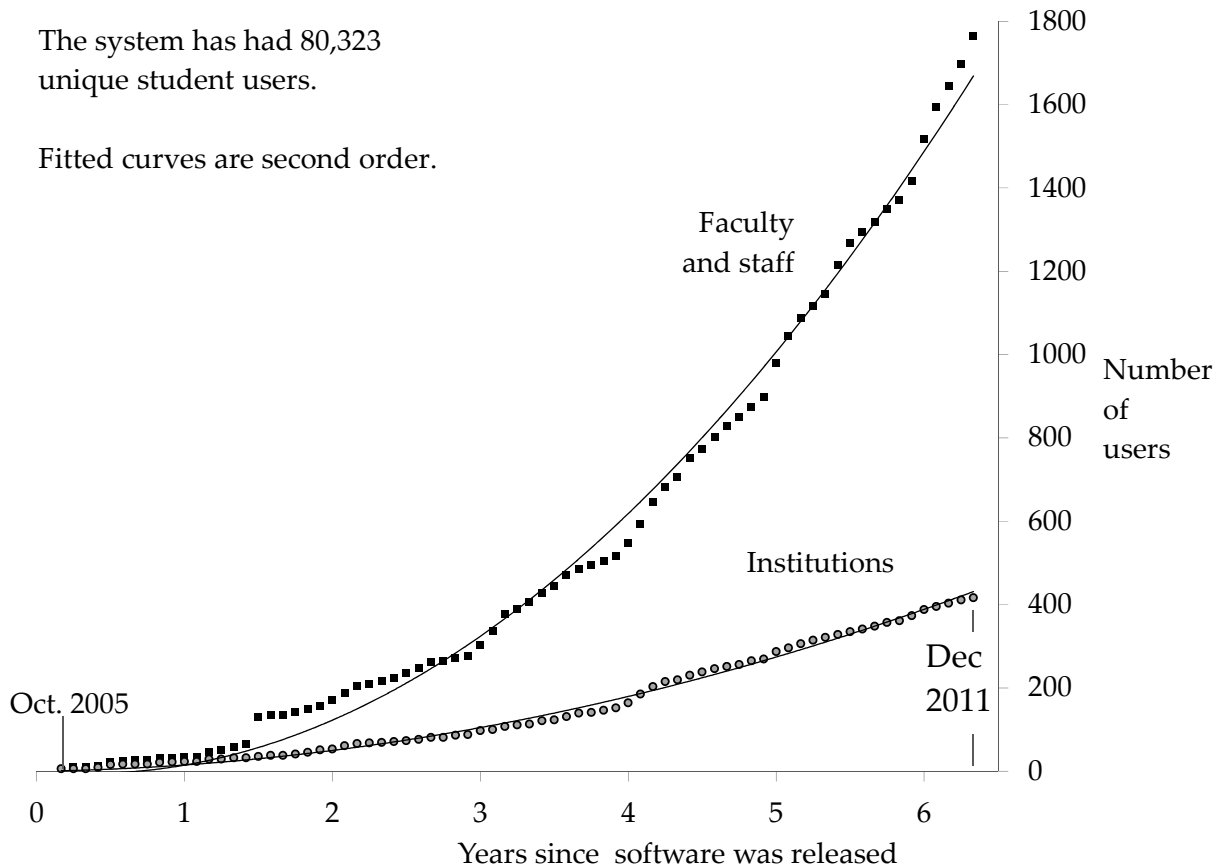
DEVELOPMENT OF TRAINING MATERIAL

Team members at UCF are continuing to work on the training modules for CATME, which include training for educators and students on teamwork issues.

TEAMWORK TRAINING:

The educator training begins with the introductory module. This module explains what constitutes good training and how we are going to follow the information, demonstration, practice, and feedback framework throughout all of the educator and student training modules. It also lists the modules that are planned. All training will be accessed via a web browser. A draft has been developed and is under review by the team.

TECHNICAL TRAINING:

The technical training will consist of a series of mini training videos that demonstrate how to perform each teamwork task. Researchers at UCF are identifying tasks that are available to each user and organizing these tasks hierarchically based on their dependencies. These training clips will be very short and available on demand. The implementation will use *Captivate* so trainees can see exactly what links to click and how to navigate through the system.

BUDGET

Spending is proceeding as budgeted. Some subcontractor and consultant invoices from Year 3 are still being processed. There will be an invoicing delay particularly at University of Tennessee Knoxville, which needs to submit a final invoice before it is clear how much funding will transfer to a subcontract at UNC Charlotte, where David Woehr is now employed.

PUBLICATIONS (Journal and Conference)

- Ohland, M.W., M.L. Loughry, D.J. Woehr, C.J. Finelli, L.G. Bullard, R.M. Felder, R.A. Layton, H.R. Pomeranz, and D.G. Schmucker, "The Comprehensive Assessment of Team Member Effectiveness: Development of a Behaviorally Anchored Rating Scale for Self and Peer Evaluation." ***in press***, *Academy of Management: Learning & Education*, Manuscript ID: AMLE-RR-2010-0056, September 5, 2011.
- Pung, Christopher P. Farris, John, Assessment of the CATME Peer Evaluation Tool Effectiveness, *American Society for Engineering Education 2011Annual Conference*. [External use and validation of instrument.]
- Rentsch, J.R., Delise, L.A., Salas, E., & Letsky, M.P. (2010). Facilitating knowledge building in teams: Can a new team training strategy help? *Small Group Research, 41*(5)*,* 1-19.

- Rosen, M.A., Bedwell, W.L., Wildman, J.L., Fritzsche, B.A., Salas, E., & Burke, C.S., (in press). Managing adaptive performance in teams: Guiding principles & behavioral markers for measurement. *Human Resources Management.*
- Salas, E., Fiore, S.M., Warner, N., & Letsky, M.P. (2010). Emerging multi-disciplinary theoretical perspectives in team cognition: An overview. *Theoretical Issues in Ergonomics Science, 11*, 245-249.
- Ohland, M.W., M.L. Loughry, D.J. Woehr, C.J. Finelli, L.G. Bullard, R.M. Felder, R.A. Layton, H.R. Pomeranz, and D.G. Schmucker, "The Comprehensive Assessment of Team Member Effectiveness: Development of a Behaviorally Anchored Rating Scale for Self and Peer Evaluation." In revision for *Academy of Management: Learning & Education*, March 26, 2010, Manuscript ID: AMLE-RR-2010-0056.
- Ohland, Matthew W., Richard A. Layton, Misty L Loughry, Hal R. Pomeranz, Eduardo Salas, David J Woehr, "SMARTER Teamwork: System for Management, Assessment, Research, Training, Education, and Remediation for Teamwork," *American Society for Engineering Education 2010 Annual Conference*.
- Layton, R.A., M.L. Loughry, M.W. Ohland, and G.D. Ricco, "Design and Validation of a Web-Based System for Assigning Members to Teams Using Instructor-Specified Criteria," *Advances in Engineering Education*, **2**(1), Spring 2010, pp. 1-28.
- Zhang, B., and M.W. Ohland, "How to Assign Individualized Scores on a Group Project: an Empirical Evaluation," *Applied Measurement in Education*, **22**(3), 2009.
- Meyers, K., S. Silliman, M. Ohland, "Comparison of Two Peer Evaluation Instruments for Project Teams," *Proceedings of the American Society of Engineering Education Annual Conference*, Pittsburgh, PA, June 2008.

PRESENTATIONS

- Ohland, M., "Managing Teams," Project-Centered Learning Symposium, Cambridge -MIT Institute, http://web.mit.edu/cmi/ue/workshop2008/, March 18, 2008.
- Layton, R.A., M.L. Loughry, M.W. Ohland, and H.R. Pomeranz, *Assigning Students to Teams: Scholarship, Practice, and the Team-Maker Software System*, ASEE/IEEE Frontiers in Education Saratoga, NY, October 22, 2008.
- Pomeranz, H.R., *Managing Student Teams Scholarship, Practice, and the Team-Maker/CATME Applications*, Faculty Brown Bag Lunch Series, Oregon State University, February 20, 2009.
- Layton, R.A., M.L. Loughry, M.W. Ohland, H.R. Pomeranz, "Resources for Student Teams: The Team-Maker and CATME systems (and why they work)," Academy of Process Educators Conference, Gaston College, July 9, 2009.
- Ohland, M.W., "Tools for Teams," workshop at Wichita State University, October 30, 2009.
- Ohland, M.W., "Teams: creating a community of learning through peer accountability," invited talk, November 20, 2009, Clemson University Environmental Engineering and Environmental Science.
- Layton, R.A., M.L. Loughry, M.W. Ohland, "The Effective Management of Student Teams Using the CATME/Team-Maker System: Practice Informed by Research," invited to Capstone Design Conference 2010, June 7-9, 2010: Boulder, CO.
- Layton, R.A., M.L. Loughry, M.W. Ohland, "Research into Practice: Tools for Effective

Management of Student Teams," workshop at *American Society for Engineering Education 2010 Annual Conference*.

- Layton, R.A., M.L. Loughry, M.W. Ohland, H.R. Pomeranz, "The Effective Management of Student Teams Using the CATME/Team-Maker System," INGRoup (Interdisciplinary Network for Group Research) Conference, Arlington, VA, July 22-24, 2010.
- Ohland, Matthew W., Lisa G. Bullard, Richard M. Felder, Cynthia J. Finelli, Richard A. Layton, Misty L. Loughry, Hal R. Pomeranz, Douglas G. Schmucker, David J. Woehr, "The Comprehensive Assessment of Team Member Effectiveness: Development of a Behaviorally Anchored Rating Scale for Self and Peer Evaluation," Academy of Management 2010 Annual Meeting, paper #13912, Cross Divisional Paper Session, "Research Methods: Construct and Scale Development in Organizational Behavior and Networks," August 9, 2010, 1:15-2:45 pm.
- Ohland, Matthew W., Alessio Gaspar, and Cen Li, "Building Teams and Learning Communities," Workshop W55, Pedagogy Track, 2011 CCLI PI Conference, Session B, January 27, 2011, 3:30-4:45 p.m.
- Lyons, Rebecca, and Piccolo, Ron, "Applying Science to Improve the Teaching of Teamwork in Classrooms," Society for Industrial and Organizational Psychology (SIOP) Symposium, Chicago, IL, April 10-12, 2011.
  - o Ohland, Matthew W., "Team Formation: Alternative Methods for Assigning Students to Teams."
  - o Loughry, Misty L., and Woehr, David J., "Self/Peer Evaluations of Member Contributions: Benefits, Risks, and Unresolved Issues."
  - o Lyons, Rebecca, Bedwell, Wendy L., Salas, Eduardo, and Heyne, Kyle, "Teamwork in the Movies: Applying Science to Instructional Design."
- Ohland, Matthew W., Daniel M. Ferguson, Richard A. Layton, Misty L Loughry, Hal R. Pomeranz, Eduardo Salas, David J Woehr, "SMARTER Teamwork: System for Management, Assessment, Research, Training, Education, and Remediation for Teamwork," *American Society for Engineering Education 2011 Annual Conference*.
- Layton, R.A., and M.W. Ohland, "Effective management of student teams using the CATME system: Practice informed by research," workshop at *How to Engineer Engineering Education*, Bucknell University, July 21, 2011.
- Team-Based Learning and Peer Evaluation in Management Education: Issues, Challenges, and Solutions, Symposium at Academy of Management Annual Conference, San Antonio, TX, August 12-16, 2011.
  - o Loughry, Misty L., "The Compelling Need to Do Team-Based Learning Well and Why It Is Challenging."
  - o Ohland, Matthew W., "Assigning Students to Teams."
  - o Woehr, David J., "Self and Peer Evaluation of Team-Member Contributions."
  - o Lamm, Eric, and Petkova, Antoaneta, "Teaching and Assessing Team Member Skills."
  - o Madden, Timothy, and Collins, Mark, "Peer Evaluation in Management and Marketing Classes at University of Tennessee."
- Ohland, M.W., multi-day faculty development workshop and seminar series, including "Managing Student Teams: Team Formation and Peer Evaluation" and "Managing Student Teams: Diagnosing and Remediating Team Issues," King Fahd University of Petroleum and Mining, Dammam, Saudi Arabia, September 5-7, 2011. [invited]

OTHER DISSEMINATION

- Team-Maker / CATME flyers distributed at multiple Mudd Design Workshops, Claremont, CA, the INGRoup Interdisicplinary Network for Group Research conference in Colorado Springs, CO, in July 2009, and the ASEE 2011 Conference.
- Richard Layton is championing the development of presentation resources so that other members of the team can effectively promote the use of the system. Further, our "power users" – those who use the system frequently and who are very excited about using it – might be able to give presentations on behalf of the team (particularly to smaller groups of faculty.at their own institution).
- Hal Pomeranz is investigating the possibility of user group conference at San Francisco State University. Depending on the success of such an event, there are active user communities at University of Southern Maine, Rose-Hulman Institute of Technology, Georgia Southern, and other sites. A multi-site EPICS conference might be possible.

SYSTEM IMPROVEMENTS RELEASE IN DECEMBER 2011

Two major developments in the SMARTER Teamwork system were released in December 2011—rater calibration for training students as raters, and usability action items (particularly various new navigation elements).

Two additional significant developments are due for August 2012 release—a question editor that will enable instructors to add their own supplementary questions, and a migration of database support from MySQL to Postgres. This last change is needed to ensure the viability of the system in the face of the acquisition of MySQL by Oracle and the uncertainty of open-source support for the software.
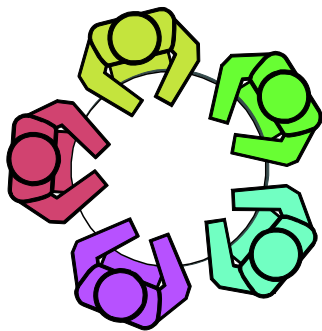
NEW LOGOS

A new family of logos was evolved to retain the branding of "CATME" while providing a logo that was transferrable to different parts of the larger SMARTER Teamwork system.
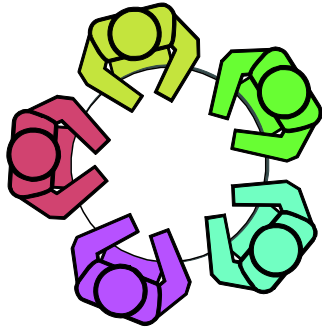
CATME
SMARTER Teamwork
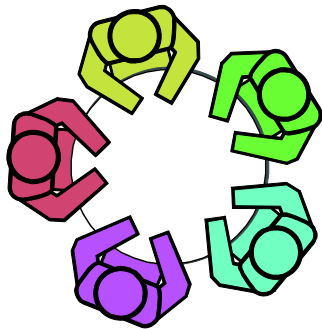
CATME
Team-Maker

CATME
Peer Evaluation

NEW CATME FLYERS were developed, printed, and distributed

CATME
Team-Maker

A Tool for Criterion-Based Team Assignment

Team composition affects the success of individuals and teams in cooperative learning and project-based team environments. Using appropriate criteria when assigning students to teams should result in improved learning experiences. In spite of the benefits, assigning teams can be a lot of work for instructors, especially in larger classes and when more than a few simple criteria are used. Team-Maker was created to make the team assignment process simpler, even when using a complicated set of criteria. A web-based survey at www.catme.org collects data from students that is used to form teams according to instructor-specified criteria.

Only Survey the Criteria that are Important to You

The Team-Maker offers a variety of criteria to choose from to use in forming teams. Some criteria have been found by research to be important to student learning, as noted below. Others are suspected to be important, particularly in some situations, but no research has been identified that conclusively supports how those criteria should be used.

- *Schedule:* students mark unavailable times in a weekly schedule grid and the system tries to match students with compatible schedules. No research is available on the effect of schedule compatibility, because it has never been possible to form teams on the basis of schedule to the extent that Team-Maker offers. No more complaints that they can't meet!
- *Gender:* women should not be outnumbered on a team.
- *Race / ethnicity:* minorities should not be outnumbered on a team.
- *Grade-Point Average:* students learn better in teams of heterogeneous ability.
- *Pre-Requisite course grade:* students learn better in teams of heterogeneous ability.
- *Software skills:* self-assessed skill with software entered by the faculty member.
- *Discipline:* useful for assigning teams that have students from a variety of disciplines
- *Sub-discipline:* available for Civil Engineering and Business to date. Others to be added.
- *Writing skills:* self-assessed. Can be used to distribute certain skills among teams.
- *Hands-on skills:* self-assessed. Can be used to distribute certain skills among teams.
- *Shop skills:* self-assessed. Can be used to distribute certain skills among teams.
- *Leadership preferences:* self-assessed. Can be used to distribute preferences.
- *Big-picture / detail-oriented:* self-assessed. Can be used to distribute preferences. This measure has not been validated.
- *Commitment level:* self-assessed, estimated as the number of hours per week a student is willing to give the course. Research shows that teams of students with incompatible goals experience conflict. This assessment has not yet been shown to be a valid measure.
- *Fraternity / Sorority:* Some have proposed that teams in which some students also have a social affiliation can improve social cohesion. At the same time, others have expressed concern that cliques may form within teams formed this way. Research is needed.
- *Sports:* Similar to the fraternity / sorority question, there are reasons to group students together based on this criterion and other reasons why it may be better to separate them.

Team-Maker team formation software © Richard A. Layton, Matthew W. Ohland, and Misty L. Loughry.

Choose How the Criteria are Used to Form Teams

Using too many criteria weakens the contribution of the others. Fortunately, Team-Maker can survey many criteria, but faculty can later choose different weights for each criterion—including ignoring some criteria. In general, you can group similar students or dissimilar students. The default is "ignore," except where research is clear that a particular method is preferred. As shown below, Team-Maker does not allow intentionally forming teams with incompatible schedules.

Maximum ▼ **team size** 4   View Student Comments

Schedule

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
8:00am	56%	62%	49%	64%	71%	33%	35%
9:00am	56%	65%	52%	70%	75%	33%	34%
10:00am	62%	68%	58%	75%	70%	30%	31%
11:00am	74%	74%	72%	80%	76%	26%	28%
12:00pm	70%	77%	71%	78%	70%	24%	26%
1:00pm	56%	73%	59%	76%	66%	18%	19%
2:00pm	57%	62%	51%	71%	66%	17%	17%
3:00pm	52%	56%	42%	65%	70%	16%	16%
4:00pm	45%	61%	37%	64%	68%	17%	15%
5:00pm	34%	52%	30%	55%	52%	18%	14%
6:00pm	22%	30%	20%	33%	29%	17%	14%
7:00pm	15%	13%	14%	13%	18%	17%	14%
8:00pm	12%	10%	13%	10%	16%	18%	15%
9:00pm	10%	10%	11%	9%	16%	17%	15%

(showing percentage of students busy, by hour)

Ignore — Group Similar

GPA

Group Dissimilar — Ignore — Group Similar

Above 3.66 (48)	14%
2.67 - 3.66 (135)	41%
1.67 - 2.66 (72)	22%
0.67 - 1.66 (22)	6%
Below 0.67 (20)	6%
No resp (27)	8%

See How Well the Teams Meet Your Criteria

After criteria and weights are selected, the Team-Maker algorithm scores how well each team fits the instructor's criteria and maximizes the score of the worst-fit team. Research has shown this algorithm to outperform an experienced faculty member using the same criteria. Team-Maker shows a final screen illustrating how well the teams meet your criteria. If needed, you can change your team-formation criteria in just a few clicks and run Team-Maker again.

Name	Student ID	Email	Team Name	Schedule	Sex	Race	Sports	Grade	Total:
☐ conf, itsa	itsaconf	itsaconf@deer-run.com		78% busy	Male	White/Caucasian	Golf	2.95 (2)	
☐ low, shesa	shesalow	shesalow@deer-run.com	1	68% busy	Male	White/Caucasian	Football,Hockey	3.39 (3)	
☐ manip, hesa	hesamanip	hesamanip@deer-run.com		59% busy	Male	White/Caucasian	Football,Golf	1.32 (1)	
☐ over, itsa	itsaover	itsaover@deer-run.com		83% busy	Female	White/Caucasian	Football	3.65 (4)	
		Scores:		-2.62	-5.00	5.00	1.88	5.00	4.26
☐ cliq, hesa	hesacliq	hesacliq@deer-run.com		81% busy	Male	Indian	Basketball,Golf,Hockey	3.53 (3)	
☐ conf, shesa	shesaconf	shesaconf@deer-run.com	2	83% busy	Male	White/Caucasian	Football,Golf,Soccer	3.99 (4)	
☐ high, hesa	hesahigh	hesahigh@deer-run.com		57% busy	Male	White/Caucasian	Soccer,Hockey	2.16 (1)	
☐ low, itsa	itsalow	itsalow@deer-run.com		23% busy	Male	White/Caucasian		3.02 (2)	
		Scores:		-1.67	5.00	-5.00	1.50	5.00	4.83

Comprehensive Assessment of Team Member Effectiveness

In many situations where teams are used to accomplish work, people want to use peer evaluations and self-evaluations to assess how effectively each team member contributes to the team. The Comprehensive Assessment of Team Member Effectiveness (CATME) was developed for this purpose based on extensive university research. A web-based survey at www.catme.org makes it possible to collect data on team-member effectiveness in five areas that research has shown to be important. Faculty can configure the site to survey any or all of the areas.

1. Contributing to the team's work
2. Interacting with teammates
3. Keeping the team on track
4. Expecting quality
5. Having relevant knowledge skills and abilities

The primary CATME instrument is a behaviorally anchored rating scale, which describes behaviors that are typical of various levels of performance in each of the five categories. Raters select the category of behaviors that most closely matches the actual behavior of each student on their team (including themselves). A sample instrument on the CATME website shows the behavioral descriptions for all five categories and allows faculty and students to practice using the system by rating four fictitious team members.

Special Feature—helping professors understand what is happening in student teams

One of the most valuable features of the system is that it alerts faculty regarding exceptional conditions that provide information about teams and team-members.

- **Low**—a student who rates him/herself as ineffective and who also receives "ineffective" ratings by teammates.
- **Overconfident**—a student rated as "ineffective" by teammates but rates him/herself as much more effective.
- **High**—a student who is rated as highly effective according to both teammate and self ratings.
- **Underconfident**—a student rated as highly effective by teammates but who under-rates her/himself.
- **Manipulator**—a student who rates him/herself as highly effective and who rates teammates as ineffective in disagreement with teammates. Such a student may be trying to influence the distribution of grades unfairly.
- **Conflict**—a team in which there is considerable disagreement among the various raters about the effectiveness of an individual student.
- **Clique**—a team in which cliques appear to have formed. The ratings show that subsets of the team rate members of their subset high and members of other subsets low.

Most importantly, some of these conditions have more than one explanation. A student flagged as a "manipulator" might actually have performed a disproportionately large amount of the work on the project even though they worked to engage their teammates in the process. Thus, an instructor's involvement and judgment are critical when exceptional conditions are flagged. Though the formal study of these exceptions has not been completed, faculty using the system have reported that both the clique and conflict conditions have accurately provided early warnings of those conditions. Information on the design of the instrument and research supporting its use (including validity studies) can also be found at www.catme.org.

CATME behaviorally anchored rating scale © Matthew W. Ohland (PI), Lisa F. Bullard, Richard M. Felder, Cynthia J. Finelli, Richard A. Layton, Misty L. Loughry, and Douglas G. Schmucker
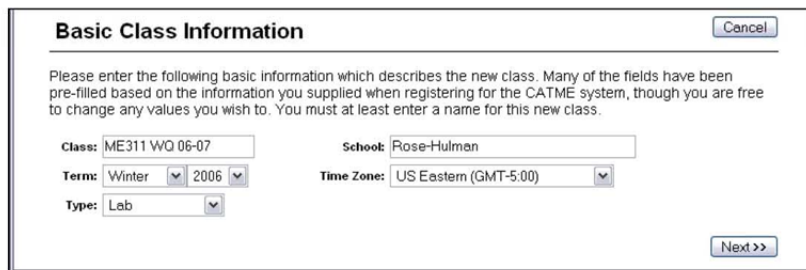
The Online Interface

The CATME website is a secure interface for collecting data on team-member effectiveness and reporting different views of the data to faculty and students. The CATME system has a number of convenient features—the ability to upload student and team data from files generated by Excel; support for multi-section courses and teaching assistants; the ability to edit teams, reset surveys, send email reminders, and track survey completion. The system also allows students to make comments for instructors to read and can compute grade adjustments based on how the ratings patterns compare with faculty-specified criteria.

Faculty can request an account at www.catme.org. The process of defining a class and setting up teams is wizard-based, but a tutorial is available. Several typical screen shots are captured here:
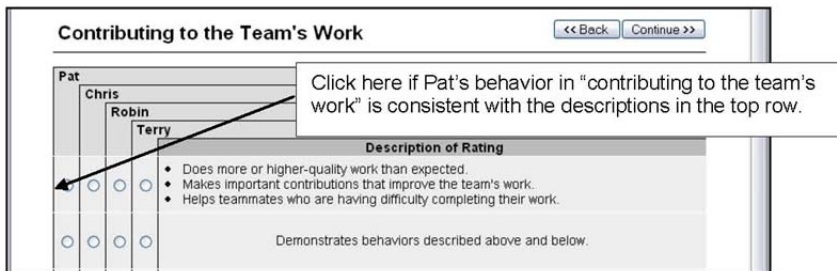
The first of five rating categories: Contributing to the Team's Work.

The wizard-based interface for class creation in CATME is typical of other setup screens.

Faculty summary results (raw data available).   *Student results: by self, by team, average*
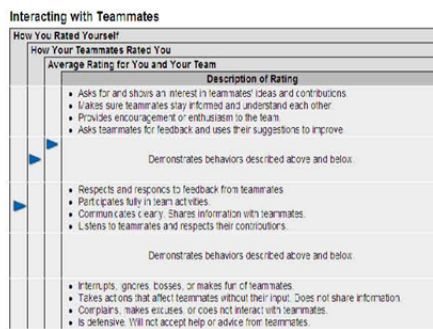
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