Purdue University

NOMINATION FORM FOR

HELPING STUDENTS LEARN AWARD

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Title of Innovation

CATME Team Tools

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Nominations must be received electronically to cie@purdue.edu, no later than 5 pm, Friday, February 26, 2016.

Nomination of Matthew W. Ohland for the
Class of 1922 Outstanding Innovation in Helping Students Learn Award

February 24, 2016

Since 2003, Dr. Matthew W. Ohland has directed the development of the Web-based CATME (*Comprehensive Assessment of Team-Member Effectiveness*) Team Tools for supporting student teams: the Team-Maker tool and the Peer Evaluation tool. The *Team-Maker* tool enables instructors to form teams based on instructor-specified criteria [1]. The *Peer Evaluation* tool enables students to rate the contributions of their teammates and themselves, based on behaviors that research has shown to promote effective team functioning [2, 3, 4]. This tool collects survey data from students, prepares reports for instructors, and provides individual feedback to students. The CATME Team Tools have received three major awards: the Maryellen Weimer Scholarly Work on Teaching and Learning Award, the MED Best Symposium in Management Education and Development Award, and the Premier Award for Excellence in Engineering Education Courseware. This nomination will show how the CATME Team Tools exceed all four criteria for the Class of 1922 Outstanding Innovation in Helping Students Learn Award.

1. How does the improvement facilitate learning?

The Team-Maker tool assigns students to teams using instructor-defined criteria. For example, the instructor may set the team size, typically three to five, so that each team is small enough to ensure individual accountability and face-to-face interaction (see below). The instructor can also define which attributes of students to measure and choose weights to express the relative importance of those attributes. Team-Maker surveys students to determine their attributes and applies the weights in the team assignments. For example, the instructor might specify that if possible, a student from an underrepresented group should not be isolated on a team [2].

The Peer Evaluation tool enables students to rate themselves and their teammates on five criteria: contributing to the team's work, interacting with teammates, keeping the team on track, expecting quality, and having task-related knowledge/skills/abilities (KSAs). For each criterion, students choose ratings a behaviorally anchored scale [5, 6]. In addition to ratings, students enter comments confidentially. Students receive an anonymous summary of their teammates' ratings.

The CATME Team Tools are based on the principles of cooperative learning, a research-based approach to teamwork that has repeatedly been shown to promote the attainment of learning objectives [2, 3]. Cooperative learning requires five elements [2]:

Individual accountability. Peer evaluations hold students accountable to each other for their effectiveness. Formative evaluations identify areas in which students are doing well and areas in which they can improve. Summative evaluations provide data that instructors can use to calculate course grades for individual students.

Face-to-face promotive interaction. The Team-Maker tool forms teams of students whose schedules are mutually compatible, to ensure that students have many common times available to meet as a team outside of classes.

Appropriate use of collaborative skills. The Peer Evaluation tool assesses the behaviors that research has shown to promote effectiveness in student teams [5, 7].

Group processing. The formative feedback provided by the Peer Evaluation tool generates discussion within teams about what the team does well and how the team can improve.

Positive interdependence. Although the instructor is primarily responsible for structuring team activities so that students must rely on their teammates in a positive way, the Peer Evaluation tool reinforces positive interdependence through the five evaluation criteria.

2. How is this work creative and/or innovative?

The CATME Team Tools offer features that facilitate use by instructors and students. The instructor uploads a roster using any common text file format. The instructor views reports online and can download them. The instructor can schedule peer evaluation surveys in advance, and students are automatically notified by e-mail when a survey opens. If a student partially completes a survey, the system stores the data already entered, so the student can resume later.

The Team-Maker tool gathers students' class and work schedules. Team-Maker maximizes the mutually available time that students on each team have outside of class and work commitments, to enable them to meet face-to-face as an entire team.

The Peer Evaluation tool applies heuristics to highlight rating patterns that may indicate dysfunctional students and teams. When used for formative evaluation, this tool identifies teams that may require intervention by the instructor.

3. What are the broad impacts?

The CATME Team Tools are hosted at Purdue. More than 10,000 instructors are approved to use the CATME system at 1,542 institutions in 68 countries. Over 500,000 unique students have completed surveys or received feedback using the system. CATME Team Tools are used each semester at Purdue by First-Year Engineering instructors, including Dr. Ohland, and in Agronomy; Aviation Management; Biological Sciences; Biomedical Engineering; Botany and Plant Pathology; Chemical Engineering; Computer Graphics Technology; Computer and Information Technology; Computer Science; Electrical Engineering Technology; Engineering Education; Human Development and Family Studies; Libraries; Management; Mechanical Engineering; Nursing; Nutrition Science; Pharmacy; Physics; South Bend / Elkhart Statewide Technology; Technology, Leadership, and Innovation; and Visual and Performing Arts.

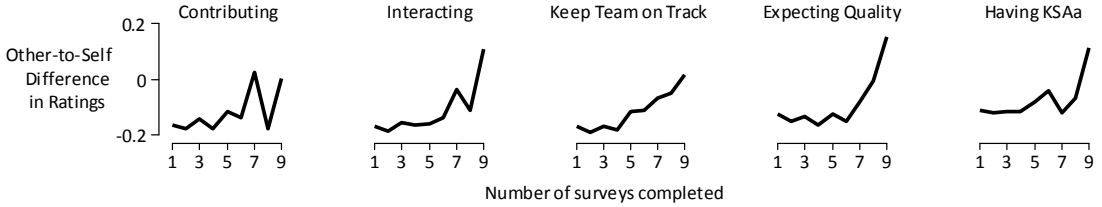
Although designed for use in higher education in the United States, the CATME Team Tools have been used in K-12 schools, including Wea Ridge Middle School, Benton Central High School, Marion County Schools, and South Bend Community Schools in Indiana. The tools have also been used in other countries, even where English is not the primary language.

4. What is the evidence of student learning?

The Peer Evaluation survey has been validated in multiple settings [1, 6, 7]. As a consequence, we can be confident that it measures students' team performance accurately.

According to research on self-assessments [8], unskilled people consistently overestimate their abilities, whereas skilled people consistently underestimate their abilities. When applied to the CATME system, this research predicts that when students first use the CATME system, they may overestimate their teamwork abilities, so their self-ratings would exceed their ratings from teammates. As students gain experience in teams and in peer evaluation, they would begin to underestimate their teamwork abilities, and their self-ratings would fall below their peer ratings.

We see the predicted pattern for each of the five Peer Evaluation criteria in the graphs below from a sample of over 200 students taken from Rose-Hulman, where peer evaluations are administered in a sequence of classes. Vertical axes represent the difference between the average peer rating and self-rating (Rating by others minus Rating by self), and horizontal axes represent the number of surveys a student has taken. Negative values indicate overestimates of oneself, and positive values indicate underestimates. These data provide evidence that students learn teamwork skills as they use the CATME system. Other learning experiments are underway [9].



Summary

In summary, the innovative CATME Team Tools facilitate student learning of teamwork skills. The design of these online tools is based on research on cooperative learning. The tools have been used in hundreds of institutions, by thousands of instructors, with hundreds of thousands of students. Few innovations can boast this combination of effectiveness and breadth of impact. For these reasons, the CATME Team Tools should be recognized by receiving the Class of 1922 Outstanding Innovation in Helping Students Learn Award.

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