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 difficult for instructors, especially in large classes and when more than a few criteria are used. Team-Maker was created to make the team-assignment process simple, even when using a complicated set of criteria. A web-based system at www.CATME.org collects data from students and forms teams according to instructor-specified criteria.

Only Use the Criteria that are Important to You

Team-Maker offers a list of criteria from which instructors can choose when forming teams. Instructors can also write their own questions. Research has found some of the criteria below to be important to student learning. Others are suspected to be important and awaiting further research.

- *Schedule:* Students mark unavailable times in a weekly schedule grid and the system tries to match students with compatible schedules. No more complaints that teams can't meet!
- *Gender:* Some research in the hard sciences suggests women not be outnumbered on teams.
- *Race / ethnicity:* Some research in the hard sciences suggests minorities not be outnumbered on teams.
- *Grade-Point Average:* Some research suggests forming teams of heterogeneous ability.
- *Pre-Requisite course grade:* Some research suggests forming teams of heterogeneous ability.
- *Software skills:* Self-assessed skill with software named by the instructor.
- *Discipline:* Useful for assigning teams in classes that have students from a variety of disciplines.
- *Sub-discipline:* Available for Engineering and Business sub-disciplines.
- *Writing skills:* Self-assessed. Can be used to distribute writing 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. Used to distribute preferences for leading vs. following.
- *Big-picture / detail-oriented:* Self-assessed. Used to balance perspectives on teams.
- *Commitment level:* Self-assessed, estimated as the number of hours per week a student is willing to spend on coursework. Teams of students with incompatible goals tend to experience conflict.
- *Fraternity / Sorority:* Some have proposed that forming teams in which some students also have a social affiliation can improve social cohesion. Others have expressed concern that cliques may form when some members have strong affiliations outside of class. 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.

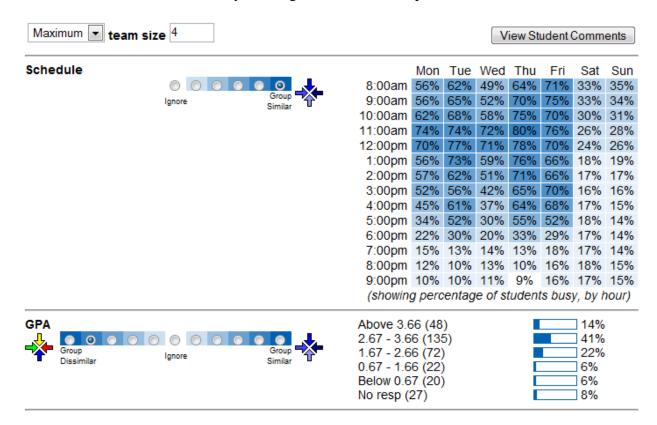### *Information on the Development and Validation of Team-Maker is Published*

Layton, R. A., Loughry, M. L., Ohland, M. W., & Ricco, G. D. (2010). Design and validation of a web-based system for assigning members to teams using instructor-specified criteria. *Advances in Engineering Education*, 2, 1-28.

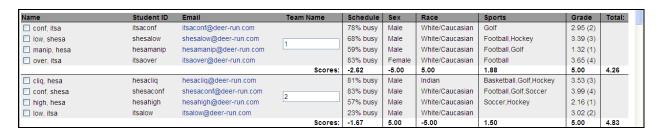The CATME Team-Maker team-formation software is copyrighted.

Instructors Decide How the Criteria are Used to Form Teams

Using too many criteria weakens the contribution of the others. Fortunately, Team-Maker can collect student responses on many criteria, and faculty can later choose different weights for each criterion—including ignoring some criteria. In general, instructors choose to group similar or dissimilar students for each criterion used, or "ignore" the criterion. As shown below, Team-Maker does not allow intentionally forming teams with incompatible schedules.

See How Well the Teams Meet the Selected 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-fitting 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 each team meets the instructor's criteria. Instructors can change the team-formation criteria run Team-Maker again to form new teams.

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		68% busy	Male	White/Caucasian	Football,Hockey	3.39 (3)	
☐ manip, hesa	hesamanip	hesamanip@deer-run.com	1	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

CATME Team-Maker is part of the CATME SMARTER Teamwork system, available at www.CATME.org, which includes other team-support tools. The Team-Maker online interface was developed by Deer Run Associates. This material is based upon work supported by NSF Awards 0243254 and 0817403.