Teaming Across Curriculum: One-Pager for Team Formation

Extended Abstract
28

Shraddha Sangelkar, Benjamin Mertz, Ashley Bernal, Patrick Cunningham

Rose-Hulman Institute of Technology

ROSE-HULMAN INSTITUTE OF TECHNOLOGY

The way teams are formed can have a significant impact on both team performance and student attitudes [1]. Summarized here are the advantages of various methods of team formation and strategies that may help mitigate negative impacts for different strategies, as described in literature. Instructor role and extent of instructor control in forming teams varies depending on time devoted for forming teams and Course Learning outcomes for both teaming and core concepts [2].

"Literature suggests that randomly assigning team does not enrich teaming experience [3]."

The main audience for this work is experienced capstone instructors who would like to help the other faculty in their department make informed decisions while forming teams. Newer faculty often ask for advice on managing teams from the faculty mentors who primarily teach project-based classes such as capstone design. Prior experiences that senior students receive before coming to a capstone design course are important because they can significantly influence the students' perceptions when dealing with teams.

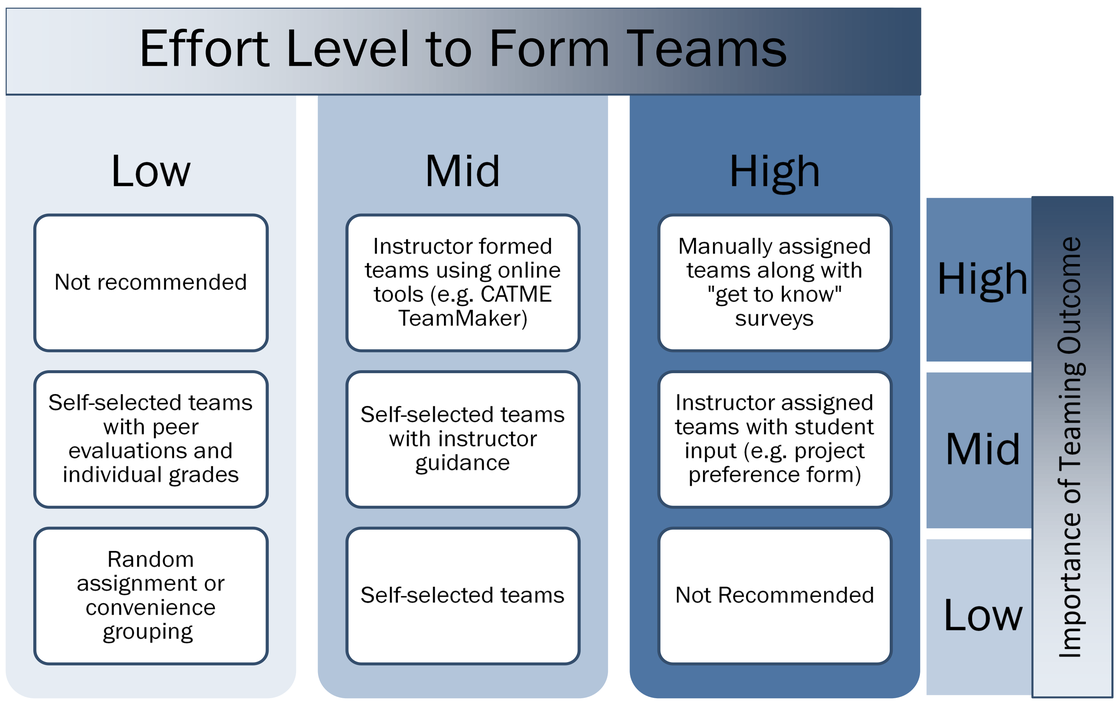
Importance of teaming outcomes

High: Specific teaming outcomes are being assessed as a part of the course objectives and teaming is a major part of the course

Medium: Some teaming assessment is given but it is not the primary focus of course objectives or instruction

Low: Teaming is used for logistical reasons such as lack of equipment or ease of assessment, and teamwork is not being assessed explicitly

This visual aims at helping the instructor make decisions on forming teams based on the course outcomes and effort involved in forming teams.



1. *Choose your course learning outcomes*
2. *Decide on how much efforts you are willing to put in*
3. *Choose a strategy that is most suitable for you*

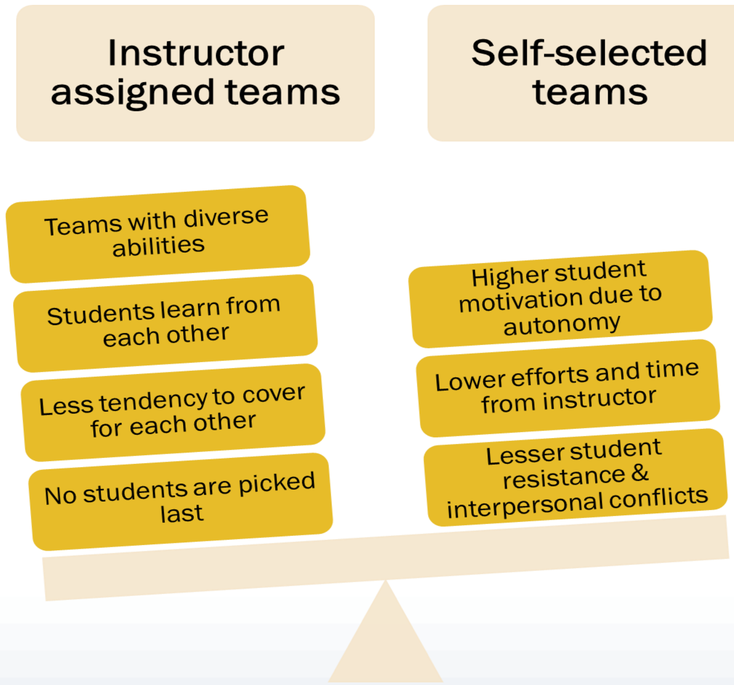
Overcoming student resistance to instructor assigned teams

- ❑ Explain that in the workforce they will be assigned to project teams and their job performance rating may depend on their ability to work with others; better start learning that now
- ❑ Give students the option to dissolve and re-form teams at midpoint. Unless they choose to stay together (most teams will choose to stay)
- ❑ Allow requests to quit or fire from a team. Facilitate a mini crisis-clinic to help teams and provide coaching to deal team dysfunction

Considerations for improving student self-selection

If teams are self-selected by the students, consider a few ways to improve the teaming outcomes

- ❑ Facilitate a pre-mingling activity with prescribed questions to get to know team member skills and abilities
- ❑ Give students rules under which they can form teams
- ❑ Consider students ability to weigh professional preferences over personal preferences in making team member choices



Positive trade-offs of the instructor-assigned versus self-selected team formation methods is shown in the figure.

Criteria for forming effective teams

Consider these criteria when forming teams with any method (listed in the order of importance)

1. Three to five-person team size is ideal. Initially, aim for 4-person teams which leaves room for dropouts, or reassignments (quitting/firing).
   a. Pairs are useful for collaboration but does not provide a rich teaming experience
2. Teams work better when members have common blocks of available time
3. Student teams with homogeneous curricular interest and heterogeneous GPA perform better [5]
4. Students that are under-represented in engineering
   a. In the first two years of a curriculum, avoid isolating at-risk minority students
   b. After third year, risk of dropping out becomes minimal so focus on preparing students for the workforce

Important: Allow students to **opt-out** of questions pertaining to grades, gender, ethnicity (if such data is collected for team formation)

Students have reported that their worst group work experiences were from self-selected teams [4]. Instructor assigned teams with research-based criteria may improve student teaming experience [1].

Feedback from the workshop:

"I feel like I know how to assign teams and what to look for", " I understand how team formation affects time and assessment", and *"I didn't pay attention to teams before, and now I know why I had some of the problems I had".*

Ref:

1. *Paretti, M., et al., Managing and mentoring capstone design teams: Considerations and practices for faculty. International Journal of Engineering Education, 2011. 26(6): p. 1992.*
2. *Parker, R., et al., Launching for success: A review of team formation for capstone design. The International journal of engineering education, 2019. 35(6): p. 1926-1936.*
3. *Bacon, D.R., K.A. Stewart, and W.S. Silver, Lessons from the best and worst student team experiences: How a teacher can make the difference. Journal of Management Education, 1999. 23(5): p. 467-488.*
4. *Oakley, B., et al., Turning student groups into effective teams. Journal of student-centered learning, 2004. 2(1): p. 9-34.*
5. *Brickell, L.C.J.L., et al., Assigning students to groups for engineering design projects: A comparison of five methods. Journal of Engineering Education, 1994. 83(3): p. 259-262.*

Contact:
sangelka@rose-hulman.edu