

Transparent and Data Driven Team Formation for Class Projects

Abstract

The class exercise-based interactive session walks through a three-step team formation process: (1) class-wide identification of project team success factors to generate a survey that all students complete, (2) distribution of all collected data to all students and students ranking their top teammate options, and (3) in-class team formation based on first two steps. The process supports students project understanding, identifying team success factors, gaining awareness of their own and others knowledge, skills, and abilities, and increasing teammate accountability.

We will share resources and are open to hearing ideas to improve the process.

Keywords: Team formation, class projects, process transparency

Introduction

Many undergraduate and graduate Management courses employ student team projects with instructors facilitating team formation in a variety of ways, including random assignment, students forming their own teams, or formation based on certain factors (Bacon, Stewart, & Silver, 1999; Hansen, 2006). The proposed transparent and data driven team formation exercise describes a process of team formation in which the instructor and students engage in a three-step exercise prior to forming teams. First, the students identify what will make this team successful for this particular project and the class generates a survey based on these factors. Next, all students complete the survey. The results shared across all students providing data for each student to select and rank their top teammate choices. Last, the instructor leads a discussion on the process and forms teams guided by student top choice submissions.

The process can create more effective teams, facilitate learning about informed decision making, aid in learning about self and others in team contexts, and increase teammate accountability. The exercise can be used with students in all levels of education, from early undergraduate to graduate students, and is applicable to in-class, hybrid, and online project teams.

Theoretical Foundation / Teaching Implications

Peer learning provides opportunities for collaboration and feedback, making it an important component of education (e.g. Crook, 1998; Xie, Ke, & Sharma, 2008). Team projects are a way to encourage peer learning during a course (Ardaiz-Villanueva, Nicuesa-Chacon, Brene-Artazcoz, Sanz de Acedo Lizarraga, & Sanz de Acedo Baquedano, 2011). A team shares responsibility for a common outcome, views themselves as a team, and manages relationships with each other (Cohen & Bailey, 1997; Hoegl & Gemuenden, 2001). Successful performance

for a classroom team may be the team receiving a high grade on the assessment. However, effective classroom teams also provide and encourage expectations, feedback, and involvement (Tinto, 2012), so the desired outcome can also be increased self-awareness or better teamwork skills as opposed to, or along with, grades.

Furthermore, the team formation process contributes to the success of the team (Bacon, Stewart, & Silver, 1999; Hansen, 2006). Classroom teams can be formed through self-selection, random assignment, and teacher assignment (Bacon, et al., 1999). However, evidence shows that random assignment of students to teams leads to conflict, unequal work division, unclear goals, and may, ultimately, result in a poor experience (Hansen, 2006). More purposeful team formation leads to better success and can be accomplished through self-selection or teacher assignment. Students self-selecting into a team creates higher levels of team cohesion compared to random assignment (Bacon, et al., 1999), whereas teacher assignment can lead to better alignment of students' traits (e.g. Ardaiz-Villanueva et al., 2011).

In order to achieve their goals, teams require trust between the members (Erdem & Ozen, 2003). Good teamwork is built on “communication, coordination, balance of member contributions, mutual support, effort, and cohesion” (Hoegl & Gemuenden, 2001, p. 439). Teams with these characteristics lead to more efficient and effective team performance and increased personal success, such as increased satisfaction and knowledge/skills (Hoegl & Gemuenden, 2001). Building on team formation research, we propose an activity that combines self-selection and teacher assignment, plus adds transparency and data to inform the process.

Learning Objectives

1. Identify and understand the key success factors associated with student team projects.

2. Identify and understand each student's personal and shared values in student team projects.
3. Enhance and develop student awareness of their own team process behaviors.
4. Participate in a transparent process of student team formation to increase engagement, buy-in, and accountability.
5. Co-create an effective design and implementation of a student team formation process.

Exercise Overview

In spring 2018 semester, the first author began teaching a new class called Applied Decision Making to upper-level undergraduate business students. The course includes a semester-long applied team project. The instructor planned to collect data on students via a survey and form teams based on the criteria *he felt* were most important, as he used this approach in other courses. However, researching and designing the Applied Decision Making course highlighted the inherent flaws and biases in that approach, including making unilateral decisions based on one person's experiences and not involving participants in the decision-making process, where possible. A huge opportunity presented itself, as project team formation is a process where decision-making approaches and tools could be applied to increase the likelihood of effective decisions. Although the process described below emerged in a course on decision-making, it can be used in any course that includes a team-based project.

Step 1: Identification of Project Team Success Factors and Survey Creation

The transparent and data-driven team formation process begins with the instructor explaining the key aspects and deliverables of the team-based project for the course. If there are instructions associated with the team-project, it would be helpful to assign those to be read/reviewed prior to the class period when this exercise is introduced. Next, the instructor leads

a class discussion regarding what will make this project team successful. Many student comments have been based on teams in general, and they may share prior examples of poor teams. This candid, open conversation is a good place to start, but the instructor may need to push students to share what behaviors could have helped to either manage or prevent the ineffective teams. The instructor may also need to prompt the students to think about this class project in particular and what knowledge, skills, and abilities are essential to being successful. After the process is complete, the instructor has a list of many team-related concepts on the board. As the list may be very long, it may help to ask the class to form small groups and generate their votes for the top five items that are most important for this team project.

Once the class has collectively identified the top five to ten items, the instructor asks the class how to design survey questions to capture these phenomena, or operationalize the constructs? Some survey questions are straightforward, like the team needs to be good at financial analysis/modeling, so a question like, “Please rate yourself on a scale of 1 to 10 regarding your skills in conducting financial analysis and modeling”. Others can be a bit trickier, like teams that communicate frequently are more effective. This communication point may lead to questions regarding frequency of meetings, openness to using new collaboration tools, and/or response time expectations. As the facilitator of this process, the first author has been very open to generating survey questions regarding whatever students feel may be valuable at this point. In the next step (when students select teammates), the individual students can decide which variables are most valuable to them.

Step 2: Survey distribution and completion

After generating all questions with students, the instructor then loads all questions into a survey software tool. This will most likely be completed after class. Note: After this process is

completed for the first time and the initial survey is created, the instructor is able to recycle many prior questions which saves time. As part of the session, we will share a link to a googledocs survey and a printed survey to aid participants. The survey link is sent to students, with a completion deadline included. After all surveys are completed, the instructor downloads all data and sends all responses to the students. Instructors have the option of keeping students' names in the data, or replacing them with a letter or other identifier. If the goal is reduce the likelihood of students selecting their friends, then it may be wise to remove names. As a homework assignment, students are asked to rank, submit, and justify their top teammate choices. If creating teams of four is the goal, it may be helpful to ask students to rank their top five teammates providing the instructor more options when assigning teams.

In the class session where teams are assigned, it may add process value to lead a discussion regarding using data to make decisions before announcing the teams. Students often share how they became quickly overwhelmed and/or how they developed systems to work through and identify top candidates. This conversation is valuable, as collecting data is not necessarily useful unless you know how to analyze it. It may also be interesting to facilitate a discussion on reliability of self-ratings. Meaning, ask the students if they considered what a six out of ten rating may mean to each of them to see if there is consistency across the class. Or, ask if individuals may be more likely to inflate their ratings based on the outcome of this process, or social desirability influences. Based on the first author's experience, it is very interesting to see how students approach the self-rating process differently (i.e. some are conservative in their self-assessments due to their nature, and others grossly inflate as they want to be on a "good team").

Step 3: Team Formation and New Team Discussion

Once teams are assigned (based on student rankings—often the instructor needs to convey it's impossible to give everyone their top choices and does her or his best in matching people who selected each other), it may help the teams to have a discussion with their new team based on their responses. This process could help to identify potentially collective weakness areas, speak to strengths (as they may already be in the survey), and share information that may aid in holding each other accountable to their responses. This process also can aid in, as well as inform, peer rating that occurs later in the semester. Instructors can develop peer rating instruments based on this survey, or can use traditional peer rating and remind students to consider teammates responses in the initial survey when providing ratings and/or feedback.

Based on students participating in the process described above, the first author gathered optional and anonymous student feedback data in his spring 2018 Applied Decision Making course. Although the voluntary respondent sample was small ($n=10$) and the ratings were not extremely high, most students agreed that the process was valuable for their self and teammate understanding. See average ratings in table below. One student shared, "It made me aware of my own weaknesses and strengths, as well as my teammates and it was therefore easier to work together." Another shared, "I found the process structured and useful to create effective teams." Two students shared that the process took a long (or too much) time. We believe this presents an opportunity to share the design and facilitate discussion on potential improvements to the process.

Table 1: Student (n=10) feedback on the transparent team formation process

Question	Average	Range
Working as a class to identify and understand the key success factors of class project teams was helpful to me in the project team formation process for this class.	3.9	3 to 5
The team formation in this class allowed me to identify and understand what I value in teammates and teams.	4.1	3 to 5
The team formation process in this class enhanced and developed awareness of my own behaviors in class project teams.	3.7	2 to 5
Participating in a transparent process of student team formation (where I see everyone else's survey responses and characteristics), then selecting my top teammate choices, increases my accountability to my team.	3.6	2 to 5
Participating in a transparent process of student team formation (where I see everyone else's survey responses and characteristics), then selecting my top team mate choices, increases my ability to hold my teammates accountable.	3.5	2 to 5
Working as a class to create and facilitate the design and implementation of a student team formation process was helpful for me to apply in future project team situations.	3.9	3 to 5

Scale: 1 = Strong Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Session Description

Table 2 – Session activities and estimated time

Description of Time Block of Session	Estimated Time
Introduction of Presenters and Session Overview	3 to 5 mins
Interactive: Large group discussion on how session participants form teams in class projects	5 to 8 mins
Interactive: Depending on session size, a small and/or large group discussion on what student attributes make team projects successful based on participants experience. Gather criteria in a list.	10 to 12 mins
Display: Discuss/share how criteria is changed into a survey, or operationalized. Depending on time, can open survey software and provide demonstration.	5 to 8 mins
Discussion: Speak to collection process and downloading data	1 to 2 mins
Discussion: Speak to sharing of collected class data with all students. Show output of data: Option one without names and option two with names.	3 to 6 mins
Discussion: Share regarding in-class discussion around specifics on the project and which criteria may be most useful to them. In-class discussion opportunity regarding accuracy of self-reported data.	3 to 6 mins
Discussion: Explain process where students select and rank their top options and a few alternatives. Can also complete via a survey. Instructor pairs teams based on student preferences, as best as possible.	3 to 6 mins
Interactive: Session wrap-up with key take-aways, questions, feedback, additional insights from participants, and distribution of handouts.	7 to 10 mins
Estimated Full Session Time Range	40 to 63 minutes

References

- Ardaiz-Villanueva, O., Nicuesa-Chacon, X., Brene-Artazcoz, O., Sanz de Acedo Lizarraga, M., & Sanz de Acedo Baquedano, M. (2011). Evaluation of computer tools for idea generation and team formation in project-based learning. *Computers & Education, 56*(3), 700–711. <https://doi.org/10.1016/j.compedu.2010.10.012>
- Bacon, D. R., Stewart, K. A., & Silver, W. S. (1999). Lessons from the best and worst student team experiences: How a teacher can make the difference. *Journal of Management Education, 23*(5), 467-488.
- Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management, 23*(3), 239-290.
- Crook, C. (1998). Children as computer users: The case of collaborative learning. *Computers & Education, 30*(3-4), 237-247.
- Erdem, F., & Ozen, J. (2003). Cognitive and affective dimensions of trust in developing team performance. *Team Performance Management: An International Journal, 9*(5/6), 131-135.
- Hansen, R. S. (2006). Benefits and problems with student teams: Suggestions for improving team projects. *Journal of Education for business, 82*(1), 11-19.
- Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. *Organization Science, 12*(4), 435-449.
- Tinto, V. (2012). Enhancing student success: Taking the classroom success seriously. *Student Success, 3*(1), 1-8.

Xie, Y., Ke, F., & Sharma, P. (2008). The effect of peer feedback for blogging on college students' reflective learning processes. *The Internet and Higher Education, 11*(1), 18-25.