Northeastern University
Center for Advancing Teaching
and Learning Through Research

Successful Student Team Projects: Mental Models, Task Work, and Team Work

Team assignments are a mainstay in the teaching of many disciplines and can deliver powerful benefits for students. These benefits including increased motivation and effort, deeper understanding of content and sustained academic performance, development of communication and teamwork skills, positive classroom relationships, and even improved psychological health and well being (Johnson, et al., 2014; Joshi, et al., 2022; Poort, e al., 2020; Swanson, et al, 2019).

If team assignments are not designed well, however, they can be difficult experiences for both students and faculty. Commonly reported problems include unfair distribution of work, relationship conflicts, poor planning, communication problems, and lack of engagement (Iacob & Faily 2019; Opatrny-Yazell & Houseworth, 2018).

The good news is that evidence-based practices exist for preventing and responding to these issues and these practices can make your team assignments highly successful. This handout organizes some of those strategies around things to do in class (1) before project work begins and (2) while it is underway, as well as (3) how to structure the project itself so it unfolds productively over time.

1. Before Project Work Begins

Two important ideas for planning successful team projects are (1) the mental models we use to understand the world, and (2) the distinction between team work vs. task work.

We all create mental models of how the world works and teams perform better when members get practice aligning their understandings of each other and their work (Stout, Cannon-Bowers, Salas, & Milanovich, 2009). It is this experience that shifts students from thinking of themselves as individuals to thinking like a team member. You want to give teams as many opportunities as possible to practice bringing their understandings of many things into convergence–both during project work and also other in-class work like team consensus discussion activities and even quizzes. This repeated practice converging their mental models makes them better able to think as a team.

We not only create mental models of concepts and tasks–we also create them about each other and our relationships, which leads to the distinction between task work and team work (e.g., Guchait, Lei, & Tews, 2016). Task work consists of the functional, content-focused activities of the team and team work describes the set of perspectives and actions required to productively work with other people toward a common goal. Successful team projects require both task work and team work to be done well, and a well-organized assignment can help your students learn how to do both.

Organizing Successful teams

Size: Teams should be no larger than necessary to succeed at the work of a team project. Motivation decreases and complications increase with larger teams (Gibbs, 2009). As team size increases, so does the complexity of aligning mental models and the possibility that team work needs could overshadow task work. Teams of four or five students are commonly considered "right-sized" (Hunkeler & Sharp, 1997; Monson, 2017; Swanson, et al. 2019).

Composition: Avoid allowing students to choose their own teams. Students tend to choose those similar to themselves, which can lead to homogenous and underperforming teams, and pre-existing relationships can create cliques within teams (Sibley & Ostafichuk, 2014). Instead, strategically populate your teams by determining what characteristics would make it easier or more difficult for students to do the expected work, and distribute those characteristics as evenly as possible across teams (Sweet & Michaelsen, 2012). It is also important to ensure that students with marginalized identities are not the only one with that identity on their team (Macke, Canfield, Tapp & Hunn, 2019).

Duration: Early stages of team relationships are marked by social anxiety as members learn about each other and find their place in the team (e.g., Levi & Askay, 2020; Poole, 1983; Tuckman & Jensen, 1977). These concerns diminish and productivity increases as shared experiences accumulate. Across time, relationships deepen and students move toward converging mental models of both the task at hand and the team itself (McComb, 2007). Therefore, project teams should be as permanent as you can make them.

Rotating Project Manager Role: Producing complex products in teams is so difficult that an entire workplace profession has arisen to support it: the profession of project management–which has a great deal to offer student project assignments (Hussein, 2021). A rotating project manager role in each team can provide the coordination and information that teams need to make progress toward the next deliverable. In addition to providing essential support for both task work and team work, a student's time as project manager can be a rich experiential learning activity for them.

Launching Successful Teams

Orienting Students to Successful Teamwork: Giving students an orientation to successful team work can foster mental model convergence and team work skill development. What does good team work look like in your discipline? Drawing from your own experience as a team member, you can highlight the importance of things like attendance, responsibility, and commitment, along with suggesting processes for decision-making, conflict management, and meeting management, for example (Tombaugh & Mayfield, 2014). Drawing also on students' own past team project experiences, concerns, anticipated challenges, and recommended strategies can make for a very relatable conversation for all (O'Connor & Yballe, 2007).

Practice Activity: Small scale practice or "launcher" activities provide students with a low stakes opportunity to collaborate before the project begins and begin the process of mental-model convergence without the pressure of grades or the complexity of the project (Holbrook & Kolodner, 2000). Engaging students in such activities can help teams get to know each other, establish norms,

and try out their decision-making and collaboration skills. Practice activities are most effective when they conclude with prompts for students to reflect on their own contributions and those of others, what worked well, and what didn't.

Templates for Organizing: Providing project documentation can scaffold students' planning process, support mental model convergence, and serve as helpful tools for keeping the project on track (Hunsaker, Pavett, & Hunsaker, 2011). A Team Charter template, for example, provides space for students to document their ground rules and team processes (Hunsaker, Pavett, & Hunsaker, 2011). Team Charters are important: they are a place where the team can move toward mental model convergence around what they think good team work looks like for them. A Project Plan template can help students break the work down into smaller tasks, assign those tasks to individuals, and identify deadlines–helping to align mental models around task work.

2. While Team Project Work is Underway

Two-Stage Quizzes can be powerful for learning course content and team building (Sibley & Ostafichuk, 2014; Zipp, 2007). These activities begin with students first taking a quiz or test over course content and turning it in. They then take the exact same quiz as a team, coming to consensus on their team answers and getting immediate feedback on their team performance. This second stage of discussion and immediate feedback is often extremely motivating and rewarding as students clarify their understandings and explain things to each other in their own words. This practice of mental model convergence builds cohesion within a team that can support teammate relationships across their other project work.

Team Work Peer Assessments not only ensure individual accountability but also provide students with critical information about what their teammates value from their contributions and how they might grow their teamwork skills. These assessments should occur at least once during the project work–not just at the end of the term–and often include prompts about what teammates "Appreciate" about and "Request" from each other (Sweet & Michaelsen, 2012). Free software platforms like TEAMMATES can make the process very efficient (teammatesv4.appspot.com).

3. Structuring the Project Assignment

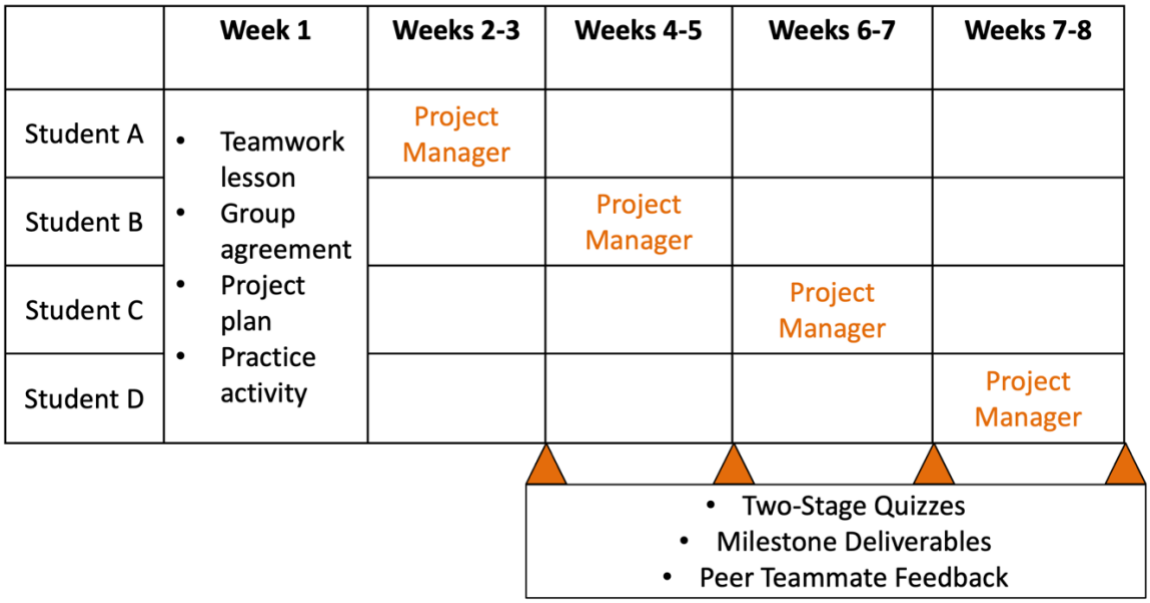
Project Size and Complexity: One factor in team dynamics is the size and complexity of the project (Aggarwal & O'Brien, 2008). The scope and complexity of the project should be appropriate for the number of students on the team as well as their developmental level and project experience. Projects that are too easy or narrow could result in social loafing, while projects that are too difficult or broad can be overwhelming and frustrating.

Iterative Assignments and Feedback: Too often, students do not receive feedback or guidance until they have completed an assignment. Assignments like drafts or other forms of iteration—and feedback given between versions—enable students to learn from their mistakes and apply what they have learned to get back on track. This approach is associated with gains in student performance in multiple

disciplines (Hattie, 2009). For maximum impact, feedback should serve as an interim step that guides students toward successfully completing and achieving the goals of the assignment (Ambrose, et. al., 2010). Feedback from multiple sources, including peers, instructors, and any external stakeholders is most valuable.

Both Individual and Team Grades: What you choose to grade sets students' expectations, signals to them what is important, and thereby drives behaviors. While solely individual grades for team work may lead to accountability and perceptions of fairness, they may fail to promote collaboration (Opatrny-Yazell & Houseworth, 2018). Alternatively, team grades alone may provide cover for social loafers and lay the groundwork for conflict. Therefore, the ideal is to assess performance at both the team and individual levels. In addition to instructor-assigned grades, periodic self- and peer assessments should be included to focus attention on team processes as well as one's own learning and contributions.

How These Practices Can Come Together



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