Best practices for team projects

Preparing students for teamwork

Students will come to class with different levels of experience. Some students may have worked in teams frequently, while others may have only done it a few times. Therefore, when these skills are incorporated into an assignment, it is important to scaffold them, provide space for practice, and regularly assess them with positive and constructive feedback. More specific suggestions include:

- Outline and discuss learning outcomes and relevance of the project to get students engaged, and help them find the work authentic and valuable to their learning experience.
    - Identify and explain all expectations clearly, regarding both content and teamwork skills.
    - Specify why teamwork is important, how these skills will be developed and assessed during the assignment, and how they relate to the course learning outcomes.
    - Outline the transferable professional skills that students will develop in team-based projects and how these will be necessary in their careers.
- Set aside time in class for students to meet and get to know each other, conduct icebreakers, complete a Team Skills Audit and prepare ground rules as part of their Team Contract. It is important to do this prior to giving out the assignment task so that students are focused on the teamwork aspects and not distracted.
- Model, through your teaching, how you want students to interact with each other. When implementing these strategies, highlight them and briefly explain why they are important and how students can use them in their teams.
    - Use conversation management techniques during class when students ask questions, share comments or ideas.
    - Assign roles to some students during class discussions.
    - Be open about constraints on your time, response time to e-mails, specific information you may need before meeting students during your office hours, etc.
- Provide ongoing support while students develop their teamwork skills.
    - Provide clear instructions for when students face common challenges, including:
        - Missing teammate, or a teammate who “ghosts” the team.
        - Submission of “low quality” work.
        - Freeloading or free riding.
    - Ensure somebody is available to support students during this work. It could be the instructor or a course TA. If possible, an instructor/TA/staff member not associated with the course would be ideal for this role. A support person who remains at arm’s-

length from the teaching team would be able to provide students with the safest possible environment to discuss and solve challenges (without a notion that teamwork conflicts could impact grades or leave a negative impression on the person assisting the team).

- Openly discuss plagiarism and other breaches of academic integrity in teamwork.
    - Explain what it is and why abiding by academic integrity is still important in teamwork.
    - Provide guidelines and/or resources to help students cite sources properly and prevent plagiarism.
    - Explain the potential penalties when guidelines are not followed.

Preparing students for teamwork in online environments

- When possible, encourage your teams to hold regular synchronous meetings to get to know each other and build trust and cohesion.
- When possible, encourage students to leave their cameras on during meetings as it helps students build trust and closer relationships with their team members (Falloon, 2011). For tips to encourage students to turn on their cameras, see Castelli and Sarvary's work (2021).
- Ask students, early on, to choose a method of asynchronous communication; and remind students of common accessibility issues with different online platforms.
- Show students that they can take advantage of the online environment by participating during team meetings in multiple ways, such as speaking, writing on the chat, sharing a video, etc.
- Show students how to enable closed captions during synchronous team meetings.
- Emphasize the importance of avoiding distractions and multitasking during meetings.
- Encourage students to ensure all members participate and always leave enough space for questions and comments. Visual cues and facial expressions tend to be harder to read and/or interpret in the online environment so time for communication should be a priority.

Forming teams

- Location
    - In-person
        - Check that your classroom is equipped for teamwork. Some accommodations might be needed in the space to ensure everyone can sit next to their team members and participate.
    - Online
        - If you would like your students to introduce each other and work together during class time, check in advance to make sure it is possible to put them into breakout rooms.
- Team Size

    - Team size should depend on the project learning outcomes. Keep in mind:
        - Teams of 2 may not benefit from the full teamwork experience (Sinno & Zanella, 2019).
        - Teams larger than 5 or 6 tend to have more difficulty organizing and ensuring equal participation (Eberly Centre, Carnegie Mellon University, 2022a; Sinno & Zanella, 2019).
- Team formation
    - Student choice
        - Students experience less conflict and perceive the work as more enjoyable when they can choose their own teams (Sinno & Zanella, 2019; Weimer, 2014). However, teams tend to be more homogenous (Eberly Centre, Carnegie Mellon University, 2022b) and produce lower-quality work when students are allowed to work with their friends (Sinno & Zanella, 2019; Weimer, 2014).
    - Instructor choice
        - Instructors can divide students randomly, by matching characteristics or motivation levels, to promote diversity in teams, or by role selection. Review Carnegie Mellon University's How can I compose teams? for a detailed breakdown of the options.

Creating effective team projects

- Teamwork should be easily divided into interdependent tasks that students can complete.
    - Projects should be sufficiently complex that they encourage collaboration and involvement of all team members.
    - These tasks should align with the team size so that all members can contribute equally. Doing this can help reduce freeloading as students can be held accountable for specific parts of the project.
- Divide larger projects into parts or sections with interim deadlines. This can serve as a soft check-in and help to reorient problematic teams.
- Set aside time in class for students to work on the team project.

General considerations for assessments

As any other skills, teamwork skills develop over time. Based on previous experiences, students will start at different levels of expertise, so it is important to teach the skills and make space for errors. Formative assessment through regular low-stake grading gives students the opportunity to receive feedback and change ineffective strategies and approaches when necessary. This could be accomplished through multiple strategies, such as asking teams to gradually submit small parts of their project, asking for reflections, or fostering team discussions.

It is also important that students become familiar with the assessment criteria as early as possible within the learning process. Project learning outcomes (related to content and teamwork skills), learning activities and assessments should align with each other to ensure students acquire the intended knowledge and skills.

What to assess (Adapted from Barkley et al., 2014.)

In teamwork projects, there are usually two elements to be assessed: content and process.

- Content
    - Content refers to the discipline-specific knowledge intended for the project. This is typically assessed through multiple tools, such as rubrics, rating scales or checklists to determine students' achievement level.
- Process
    - In this context, process relates to the skills that students employ, as a team, to design and execute the task at hand effectively. Similar to content, different assessment tools can also be used to evaluate these skills (more information below).

Who should do the assessment? (Adapted from Barkley et al., 2014.)

- Instructor
    - The teaching team, i.e., instructors and/or TAs, are usually responsible for assessments in higher education, to determine whether students met the relevant learning outcomes. However, there are several advantages to multiple perspectives.
- Self-assessment
    - After task completion, it is helpful for students to pause and reflect on their work. This gives students space to identify and value their strengths and recognize areas for growth. Through a metacognitive approach (Schraw et al., 2006), students can follow their reflections with a concrete plan to accomplish their goals, monitor their progress and make adjustments as needed, and again, evaluate the effectiveness of the new process. In teamwork, self-assessment allows individual students to reflect upon their mindsets and skills while working with others.
- Peer feedback
    - Feedback from team members can be highly valuable as these students were part of the same process, have inside information and relevant experience with the tasks. In addition, when students provide feedback to their peers, they improve their own work and transfer new knowledge to future tasks (Ion et al., 2019). Giving students the opportunity to provide feedback to peers highlight the process of co-teaching by sharing responsibilities with the whole team. Finally, peer feedback is also helpful to show students that learning does not exclusively take place through interactions with the teaching team, but also through contact with other students.
- Team assessment

- Team assessment focuses on the overall collaborative process during the team project. When incorporated early in the process, this type of assessment is helpful to recognize strengths and identify challenges that impact the whole team. It is important for students to know that facing difficulties and identifying potential solutions are an important component of teamwork skills, and highly relevant in the workplace.

Individual vs team grades (Adapted from Barkley et al., 2014.)

- Individual grades
  - These grades are important to give students a sense of individual accomplishment, value their unique contributions, and hold them accountable for their work. However, using only individual grades during team projects may undermine the importance of teamwork skills.
- Team grades
  - These grades show students that they are accountable to the team so it is important they support each other. However, a few students may take advantage of this model and try to receive passing grades for outcomes that they did not meet. If you are only using team grades, make sure the teaching team can provide students with clear expectations, guidelines, ongoing support, assessment and feedback throughout the entire process.
- Combination of individual and team grades
  - For some educators/researchers, this is the most effective approach as it incorporates different levels of assessment. One example could be to use 75% of the total grade to assess individual work, and 25% for teamwork. In this context, students receive feedback on multiple skills.

Best practices when using rubrics, rating scales and checklists

Rubrics, rating scales and checklists are highly effective tools for students to identify learning outcomes and expectations, clarify the assessment process and recognize areas that need further development. Although widely used for content, these tools can also be applied effectively to professional skills, such as teamwork. Some common criteria to include in teamwork include (Teaching and Learning Services, McGill University, 2018):

- Presence (e.g., attendance to meetings, reliability).
- Contributions (e.g., sharing ideas, effort, quality of work).
- Team skills (e.g., collaboration, contributions to a positive and trusting environment, problem solving, ability to meet team goals).
- Communication (e.g., prompt, constructive).

To ensure these tools become a valuable learning opportunity for students and an effective assessment method for educators, it is important to provide support during the process (Arnold, 2021; Teaching and Learning Services, McGill University, 2018).

- Identify and explain to students, very early in the process, how they should contribute to teamwork.
- Explain the value of assessment (e.g., accountability, identification of strengths and areas for growth, relevance to professional environments).
- Introduce the assessment tool as early as possible.
- Ensure the criteria is relevant and applicable to the project.
- Describe the assessment to all students and explain how to complete it.
- Use the tool for formative and summative assessments (i.e., ensure students complete it more than once).
- Encourage team discussions after completing the assessment.
- Evaluate the assessment process (e.g., rubrics and/or reflections) to determine whether students found it valuable, fair and objective.
- Consider implementing anonymity in peer/group assessment (but still encouraging synchronous team reflections). Some research shows that anonymous feedback increases the perceived value of assessments, fosters further critical feedback and tends to increase performance (Panadero & Alqassab, 2019).

Samples

- See Appendices A, B and C for sample of self-assessment in teamwork, peer feedback, and team assessment forms.

Some common challenges in teamwork

An important first step to minimize challenges is to carefully plan the teamwork project. By clarifying the learning outcomes and expectations, highlighting the importance of teamwork, and providing clear guidance and support throughout the process, problems tend to decrease. However, challenges will inevitably arise in some teams, and in those cases, it is important to support and guide the students. Problem solving and conflict resolution are part of teamwork skills, so it is also important to encourage teams to solve their issues as independently as possible. Some common challenges include:

- Missing students
    - Include a clear guideline that specifies steps for teams to contact missing students, such as when/how to make the first contact, how long to wait for a follow-up, when to contact the instructor, etc.
- Non-responsive students who contact the team when most of the work is already completed

- Encourage students to create a safe environment that allows team members to share their constraints, ask for help, and take responsibility.
- Encourage the team to get together and discuss the issue. There may be a valid reason to explain the non-responsiveness and, if there is an upcoming task, the team could potentially re-allocate responsibilities for the next deadline.
- Through a class or team contract, establish an attendance policy that makes students accountable to the instructor and/or the team.

- Unequal contributions
  - If there is an individual component in the final grade, contributions would be graded accordingly (e.g., based on effort and quality of work).
  - If there is only one grade for the whole team, ensure these issues are caught early on, during initial low-stake assessments. At that time, the team can be encouraged to discuss the issues, ensure clear internal communication and a concrete plan to move forward. The teaching team can intervene when needed. One issue to keep in mind is the possibility that some students are more dominant within their teams and leave little space for others to participate. This can be minimized by reminding students to use different roles, including an observer (to ensure everyone is engaged).
  - Ensure the assignment design includes multiple tasks and allows for collaboration.
- Uneven skill level
  - Emphasize the value of having different skills within each team, and the impact of past experiences when completing tasks at hand: Not everyone's knowledge will overlap (and it shouldn't).
  - Encourage students to create a safe environment that allows them to ask for help when needed. You can also remind students that peer teaching has multiple benefits, including deeper comprehension of the content (Fiorella & Mayer, 2013).
  - Ensure there are available resources for all students to review information when needed (including basic discipline-related content to allow students with less experience to catch up). Support should include the opportunity to contact the teaching team.
- Interpersonal difficulties
  - Plan regular short sessions for students to get to know each other and build relationship.
  - Discuss with students the importance of team cohesion and trust, as well as positive, respectful, safe and accountable spaces. Provide clear examples (e.g., avoid assumptions and judgements, ask questions, remain positive and solution-focused)
  - Encourage the team to discuss the issue. If students cannot solve it on their own, somebody from the teaching team or a teamwork mentor (if applicable) can facilitate a session to identify the challenges and brainstorm solutions.

- Academic integrity
    - Provide adequate guidance and resources that give students the knowledge, tools, and strategies to understand the expectations around academic integrity.
    - Include intermediate deadlines for students to submit part of their work. This would alleviate student workloads and give them more time to complete their tasks and receive formative feedback (lack of time is a common reason that drives students to plagiarism).
    - Consider using some class time for teams to discuss their projects. This practice would also alleviate students' workloads and facilitate connections with the teaching team.
    - If possible, change the assignment instructions after each term, to minimize discussions with previous students.

Considerations: teams in academic contexts vs workplaces

Teams in both contexts have multiple similarities and differences that are important to consider when establishing learning outcomes, designing the assignment, providing support and guidelines, and assessing teamwork in the classroom (Berge, 1998).

- Similarities
    - Both teams have goals and purposes for their projects.
    - Roles can be assigned within both teams.
    - Both teams depend on trust and cohesion to complete projects effectively.
- Differences
    - Trust is diminished in academic contexts as teams do not interact or stay together long enough to get to know each other. Consequently, students may not trust the skills of other team members.
    - Collaboration is very common in the workplace, but it is not usually the case in academic contexts (so students may be less experienced).
    - Stakes, stress, and motivation levels are much higher in the workplace.
    - Standards and accountability are better defined in the workplace.
    - Team members in the workplace have equal access to technology and other resources, and they are able to connect with each other during work hours, which is not the case with students.
    - Leadership
        - Managers and teaching teams have some common responsibilities, such as establishing goals or evaluating tasks and assignments. However, managers have a stronger presence as leaders and are usually part of the team. Instructors, however, tend to be much less involved in the process.

Considerations: team vs group work

Although the terms group work and teamwork are often used interchangeably, some researchers/educators highlight their difference. Group work refers to individuals who may sometimes work together, but usually complete different parts of an assignment independently and combine them into one document. In this context, there is usually not much collaboration among members.

Alternatively, teamwork refers to collaborative work, where members need to make decisions together and regularly communicate to complete their work cohesively. Members take different roles and responsibilities within the team, and help one another when needed (Oakley et al., 2004).

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Appendix A

Sample of Student Self-Reflection (from Barkley et al., 2014)

1. What have you learned about yourself as a learner? As a team player?
2. How can you apply what you learned in this activity to new situations?
3. Describe your most successful (or least successful) interaction with your peers.
4. How did collaborative learning contribute to learning course content?
5. What were the advantages and disadvantages?
6. What connections do you see between this experience and your other college courses?
7. How did this experience challenge your assumptions and stereotypes?
8. How would you do this differently next time?
9. What was the best/worst/most challenging thing that happened?

Appendix B

Sample of a Peer Assessment Form

For each team member, indicate the extent to which you agree with each statement, using a scale of 1-5 (1=strongly disagree; 2=disagree; 3=neither disagree nor agree; 4=agree; 5=strongly agree). Add two comments for each member: one strength and one area for growth. Add the totals in the bottom row.

Evaluation Criteria	Team member:	Team member:	Team member:	Team member:
Contributed to a trusting environment.				
Managed difficult situations with a respectful and solution-orientated approach.				
Checked in with others regularly and provided support when needed.				
Submitted high quality work.				
Attended meetings.				
Shared ideas, and/or expanded on others' ideas.				
Met deadlines.				
Asked for input from colleagues and provided feedback.				
Responded promptly to e-mails.				
Asked clarifying questions when needed.				
Ensured everyone was heard.				
Was responsive and open to feedback.				
Expressed new viewpoints in a respectful and constructive manner.				
One strength				
One area for growth				
TOTALS				

Appendix C

Sample of a Team Assessment Form

Rate your team's performance during the project using the following scale:

1 = Poor 2 = Fair 3 = Average 4 = Good 5 = Excellent

1. How would you rate your team's ***cohesion and trust***? ☐

   Some examples of team cohesion and trust:

   - Members contributed to a trusting environment (e.g., avoided assumptions and judgements, asked questions, had a positive attitude, members felt supported if they encountered difficulties).
   - Members managed difficult situations with a respectful, empathetic, and solution-orientated approach.
   - Members checked in with each other regularly and provided support when needed.

2. How would you rate your team members' ***contributions*** to the assignment? ☐

   Some examples of members' contributions:

   - Members submitted high quality work (that met the requirements stipulated by the group).
   - Members attended meetings.
   - Members shared ideas, and/or expanded on others' ideas.
   - Members met deadlines.
   - Members asked for input from colleagues and provided feedback.

3. How would you rate your team's ***communication***? ☐

   Some examples of team communication:

   - Members responded promptly to e-mails and calls.
   - Members asked questions, especially if something was unclear.
   - Members ensured all ideas and people were heard.
   - Members were responsive and open to feedback.

- When in disagreement with an approach, members expressed new viewpoints in a respectful and constructive manner.

4. What went well in your team while completing the task?
5. What was challenging? Why do you think that was the case?
6. As a team, what should you keep doing for the next task that worked well so far? What do you think should be done differently?