Instructor Guide for Using
Effective Teaming: A Resource Designed For and With Students

Overview

This guidance document is designed for instructors teaching courses that involve teamwork who are interested in incorporating “Effective Teaming: A Resource Designed For and With Students” to help their learners empower themselves towards more successful group experiences. The resource is best suited for courses that involve long-term (i.e., several weeks) team or group work experiences. Such courses might involve capstone group assignments, laboratory experiments, project- and problem-based learning experiences, community-engaged assignments, or presentations, but other options are possible.

Recommendations for Usage

Instructors can integrate this resource into their courses in a variety of ways. Based on feedback from students the following approaches will likely be more effective:

- Make effective teamwork a *learning outcome* of the course or individual assignment. Utilize tools such as the rubric developed by the Association of American Colleges & Universities (AAC&U) included below, a modified version, or some minimal criteria defining effective teamwork. Share these criteria with students when assigning the activity involving teamwork.

- Let students know on the *first day of the class* that being able to work effectively in a team is a learning outcome of the course even if group work experiences occur later in the term. On the first day of class show the class the resource and highlight key points. Consider incorporating a low-stakes student assessment to quiz students on various aspects of the guide.

- Have students engage with the resource *the first time* their teams meet up as part of an initial group assignment. Assign their completion of reflection activities #1 and #2.

- Encourage students to refer to the resource throughout the duration of the group activity including if and when they are navigating team problems. Encourage their completion of reflection activity #3, a check-in discussion, at least once midway through the group learning experience. Revisit the resource to remind students about it later in the term.

- Post the digital version of the resource in an accessible location on the course website.

- Incorporate opportunities for students to share their roles and contributions to the group project such as through self-reflection exercises.

- As relevant, for larger-sized courses, discuss the student resource with learning assistants and/or graduate students and the types of guidance they can give teams.

Addressing Student Buy-In

For various reasons some students might have initial resistance to using this resource. Reasons might include that they:

- Perceive that they already know how to effectively work in teams.
- Perceive that the resource will limit their agency.
- Focus more heavily on the product produced that is graded versus the teaming process.

Instructors can address this in a variety of ways;

- Acknowledge that it is perfectly normal for students to feel this way and that their prior experiences with teamwork are valid and will be useful as they explore the content of this resource.
- Be explicit about why you are sharing this resource with them.
- Actively encourage students to use the resource when they face challenges in group work so that they can see its utility in real-time, as applicable.
- Invite students to make modifications or additions to the resource.

Sample Rubric for Effective Teamwork

From “Teamwork VALUE Rubric” by the Association of American Colleges and Universities, 2009, https://www.aacu.org/initiatives/value. Reprinted with permission.

The Teamwork rubric developed by AAC&U can be modified and used to give instructors a more comprehensive picture of whether students meet learning outcomes for effective teamwork. Self- and other forms of assessment might be assigned a few times during the project depending on its length. For example, an instructor might consider assigning them at an early-mid point as well as at the end of the team activity as an early check-in can provide more opportunities for teams to better monitor and improve their functioning.

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 16 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to position learning at all undergraduate levels within a basic framework of expectations such that evidence of learning can by shared nationally through a common dialog and understanding of student success.

Definition

Teamwork is behaviors under the control of individual team members (effort they put into team tasks, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions).

Framing Language

Students participate on many different teams, in many different settings. For example, a given student may work on separate teams to complete a lab assignment, give an oral presentation, or complete a community service project. Furthermore, the people the student works with are likely to be different in each of these different teams. As a result, it is assumed that a work sample or collection of work that demonstrates a student's teamwork skills could include a diverse range of inputs. This rubric is designed to function across all of these different settings.

Two characteristics define the ways in which this rubric is to be used. First, the rubric is meant to assess the teamwork of an individual student, not the team as a whole. Therefore, it is possible for a student to receive high ratings, even if the team as a whole is rather flawed. Similarly, a student could receive low ratings, even if the team as a whole works fairly well. Second, this rubric is designed to measure the quality of a **process**, rather than the quality of an **end product**. As a result, work samples or collections of work will need to include some evidence of the individual's interactions within the team. The final product of the team's work (e.g., a written lab report) is insufficient, as it does not provide insight into the functioning of the team.

It is recommended that work samples or collections of work for this outcome come from one (or more) of the following three sources: (1) students' own reflections about their contribution to a team's functioning, (2) evaluation or feedback from fellow team members about students' contribution to the team's functioning, or (3) the evaluation of an outside observer regarding students' contributions to a team's functioning. These three sources differ considerably in the resource demands they place on an institution. It is recommended that institutions using this rubric carefully consider the resources they are able to allocate to the assessment of teamwork and choose a means of compiling work samples or collections of work that best suits their priorities, needs, and abilities.

	Capstone 4	Milestone 3	Milestone 2	Benchmark 1
Contributes to Team Meetings	Helps the team move forward by articulating the merits of alternative ideas or proposals.	Offers alternative solutions or courses of action that build on the ideas of others.	Offers new suggestions to advance the work of the group.	Shares ideas but does not advance the work of the group.
Facilitates the Contributions of Team Members	Engages team members in ways that facilitate their contributions to meetings by both constructively building upon or synthesizing the contributions of others as well as noticing when someone is not participating and inviting them to engage.	Engages team members in ways that facilitate their contributions to meetings by constructively building upon or synthesizing the contributions of others.	Engages team members in ways that facilitate their contributions to meetings by restating the views of other team members and/or asking questions for clarification.	Engages team members by taking turns and listening to others without interrupting.
Individual Contributions Outside of Team Meetings	Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project. Proactively helps other team members complete their assigned tasks to a similar level of excellence.	Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project.	Completes all assigned tasks by deadline; work accomplished advances the project.	Completes all assigned tasks by deadline.
Fosters Constructive Team Climate	Supports a constructive team climate by doing all of the following: -Treats team members respectfully by being polite and constructive in communication. -Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. -Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. -Provides assistance and/or encouragement to team members.	Supports a constructive team climate by doing any three of the following: -Treats team members respectfully by being polite and constructive in communication. -Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. -Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. -Provides assistance and/or encouragement to team members.	Supports a constructive team climate by doing any two of the following: -Treats team members respectfully by being polite and constructive in communication. -Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. -Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. -Provides assistance and/or encouragement to team members.	Supports a constructive team climate by doing any one of the following: -Treats team members respectfully by being polite and constructive in communication. -Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. -Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. -Provides assistance and/or encouragement to team members.
Responds to Conflict	Addresses destructive conflict directly and constructively, helping to manage/resolve it in a way that strengthens overall team cohesiveness and future effectiveness.	Identifies and acknowledges conflict and stays engaged with it.	Redirecting focus toward common ground, toward task at hand (away from conflict).	Passively accepts alternate viewpoints/ideas/opinions.

Student Contributions Taxonomy

CRediT (Contributor Roles Taxonomy) published by the National Information Standards Organization (https://credit.niso.org/) is “a high-level taxonomy…that can be used to represent the roles typically played by contributors to research outputs.” The contributors adapted this taxonomy for team projects in college courses including:

- **Research projects** - e.g. STEM laboratory experiments and research projects in disciplines such as psychology, sociology/anthropology, medicine, education, history, and others
- **Design projects** - e.g. engineering design, software creation, graphic design and media, architecture, theater design, fashion design, product design
- **Case studies or problem-based learning projects** - e.g. real-world cases or problems within various disciplines

The modified taxonomy is below. Not all roles might be used for a given team project and some might be assigned to more than one team member. Further, roles might evolve during the term. Instructors can encourage students to adopt these roles by doing the following:

- Have teams choose roles for expectation setting at the beginning of a project and include their roles in their team agreements,
- Conduct check-ins with students to provide them with the opportunity to share how they have fulfilled their chosen roles,
- Ask students to write a reflection on how they fulfilled their roles for the day and turn it in as an “exit ticket” before leaving class, and/or
- Have students include their contributor roles in a final report or presentation.

18 Possible Contributor Roles

Conceptualization/ Literature Review	Ideas; formulation or evolution of overarching project goals and aims.	**Software/Physical Design Elements**	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components. Also includes the design of physical elements for the team project.
Paperwork	Prepare relevant paperwork such as institutional review board applications for research involving human subjects, or other necessary documents or forms.	**Synthesis**	Tying all research and ideas together.
Documentation	Taking notes during the duration of the project.	**Validation**	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other project outputs. Includes testing (e.g. working in different conditions).
Data curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.	**Visualization**	Preparation, creation, and/or presentation of the project output, specifically visualization/data presentation.
Analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize project data. Can also include testing.	**Writing – original draft**	Preparation, creation, and/or presentation of the project output, specifically writing the initial draft. Team members identify which parts they will complete or have completed.
Investigation	Conducting a research and investigation process, such as performing experiments, prototyping, or data/evidence collection. This might also include reaching out to stakeholders (e.g. to better understand the problem, build trust, etc.).	**Writing – review & editing**	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision.
Methodology	Development or design of methodology; creation of models.	**Presentation – original draft**	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation). Team members identify which parts they will complete or have completed.
Project planning	Management and coordination responsibility for the research activity planning and execution.	**Presentation – review & editing**	Preparation, creation and/or presentation of the presentation by those from the team, specifically critical review, commentary or revision.
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.		

Additional Survey Instrument & Resource

Edmonson's psychological safety scale (below) can be administered anonymously in a formative manner to better understand how comfortable students within teams feel about taking risks and making contributions. Some professors have asked students to specify their group (no other identifiers) when taking the survey to allow them to monitor individual teams formatively. The survey might be administered multiple times while the students are completing the project (e.g. early, mid-term, etc.).

1. If you make a mistake on this team, it is often held against you.
2. Members of this team are able to bring up problems and tough issues.
3. People on this team sometimes reject others for being different.
4. It is safe to take a risk on this team.
5. It is difficult to ask other members of this team for help.
6. No one on this team would deliberately act in a way that undermines my efforts.
7. Working with members of this team, my unique skills and talents are valued and utilized.

Grading Approaches

Use the resource below to explore approaches for calculating student grades on teamwork assignments as well as their pros and cons to determine what works best for your course.

Eberly Center. Grading Methods for Group Work: Instructors Assessment of Group Product

Group Size and Composition

With regards to size, groups of four are generally advised. When groups are too small there can be less diversity in thought and perspective. Groups that are too large can also face distinct challenges, for example, not all group members might be able to effectively contribute, and freeloading can be more of a concern. Forming groups of four might not always be possible depending on the number of students in a course and in such cases groups of three or five might be more practical. Additionally, in some courses resources might be limited, necessitating somewhat larger teams to complete the activity.

Assigning students to groups generally is recommended rather than having them pick their own for long-term projects. Instructors might also consider providing learners with some choice by confidentially surveying them to find out if there is another student that they are interested in working with and using that information when assigning teams. Instructors might consider randomly assigning groups if they are just becoming familiar with students in their classes or if they want students to be able to work with a variety of peers during the course. There are several advantages to the instructor assigning teams including being able to arrange the group composition to support effective teaming and to minimize challenges that students can experience with having to pick their own group.

In general, group diversity (e.g. gender, race/ethnicity, culture, perspectives, lived experiences, knowledge, etc.) is recommended, and the psychological safety and norms that groups establish for welcoming the contributions of their teammates remain critical for effective teaming. When possible, instructors should be mindful to avoid isolating students from historically-minoritized groups across teams unless there is a valid contextual reason to do so. Please note that any of these approaches might not be feasible depending on the course and therefore may require some creativity and flexibility on behalf of the instructor.

Considerations for Short-Term Projects

This resource was designed to focus on effective teaming for long-term projects completed over multiple class sessions. Several of the principles from the resource can be applied to short-term projects such as designating roles, contributions, and more, however, establishing psychological safety often takes time as do group formation processes. For short-term projects the timeline might not allow for either of these processes to reach maturity. Regardless, short-term projects can be carried out effectively and play a critical role in supporting student learning, but they have several different considerations.

Relevant Resources

Aggarwal P, O'Brien CL. (2008). Social loafing on group projects: Structural antecedents and effect on student satisfaction. Journal of Marketing Education *30*, 255-264.

Apugliese A, Lewis SE (2017). Impact of instructional decisions on the effectiveness of cooperative learning in chemistry through meta-analysis. Chem Ed Res and Practice *18*, 271-279.

Brickell JL, Porter DB, Reynolds MF, Cosgrove RD. (1994). Assigning students to groups for engineering design projects: A comparison of five methods. J Engr Educ *83*, 259-262.

Chapman KJ, Meuter M, Toy D, Wright L. (2006). Can't we pick our own groups? The influence of group selection method on group dynamics and outcomes. Journal of Management Education *30*, 557-569.

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative science quarterly*, *44*(2), 350-383.

Feichtner SB, Davis EA. (1984). Why some groups fail: A survey of students' experiences with learning groups. Journal of Management Education *9*, 58-73.

Finelli, C. J., Bergom, I., & Mesa, V. (2011). Student teams in the engineering classroom and beyond: Setting up students for success. CRLT Occasional Papers; University of Michigan, 29.https://files.eric.ed.gov/fulltext/ED573963.pdf

Heller P, Hollabaugh M. (1992). Teaching problem solving through cooperative grouping. Part 2: Designing problems and structuring groups. Am J Phys *60*, 637-644.

Lamm AJ, Shoulders C, Roberts TG, Irani TA, Snyder JL, Brendemuhl BJ. (2012). The influence of cognitive diversity on group problem solving strategy. Journal of Agricultural Education *53*, 18-30.

Lou Y, Abrami PC, d'Apollonia S. (2001). Small group and individual learning with technology: A meta-analysis. Review of Educational Research *71*, 449-521.

McLeod PL, Lobel SA, Cox TH. (1996). Ethnic diversity and creativity in small groups. Small Group Research *27*, 248-264.

Myers SA. (2012). Students' perceptions of classroom group work as a function of group member selection. Communication Teacher *26*, 50-64.

Niler, A. A., Asencio, R., & DeChurch, L. A. (2020). Solidarity in STEM: How Gender Composition Affects Women's Experience in Work Teams. *Sex Roles*, *82*(3–4), 142–154. https://doi.org/10.1007/s11199-019-01046-8

Takeda S, Homberg F (2014). The effects of gender on group work process and achievement: an analysis through self- and peer-assessment. British Educational Research Journal *40*, 373-396.

Thompson, M., & Sekaquaptewa, D. (2002). When Being Different Is Detrimental: Solo Status and the Performance of Women and Racial Minorities. *Analyses of Social Issues and Public Policy*, *2*, 183–203. https://doi.org/10.1111/j.1530-2415.2002.00037.x

Treen E, Atanasova C, Pitt L, Johnson M. (2016). Evidence from a large sample on the effects of group size and decision-making time on performance in a marketing simulation game. Journal of Marketing Education, *38*, 130-137.

Watson SB, Marshall JE. (1995). Effects of cooperative incentives and heterogeneous arrangement on achievement and interaction of cooperative learning groups in a college life science course. Journal of Research in Science Teaching 32, 291-99.

Watson WE, Kumar K, Michaelsen LK. (1993). Cultural diversity's impact on interaction process and performance: Comparing homogeneous and diverse task groups. Academy of Management Journal *36*, 590-602.

Wilson KJ, Brickman P, Brame CJ. (2018 Spring). Group Work. CBE Life Sci Educ. 17(1):fe1. doi: 10.1187/cbe.17-12-0258. PMID: 29378749; PMCID: PMC6007768.

Woolley AW, Chabris CF, Pentland A, Hashmi N, Malone TW. (2010). Evidence for a collective intelligence factor in the performance of human groups. Science 330, 686-688.