USING PEER ASSESSMENT TO MAKE TEAMWORK WORK

A RESOURCE DOCUMENT FOR INSTRUCTORS

McGill | Teaching and Learning Services

March 2021

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March 2021

INTRODUCTION

Imagine…

You've assigned students to small groups to work on an assignment that will take almost the whole semester to complete. You've given students explicit written instructions that detail what the purpose of the assignment is and what the completed assignment should include when they submit it. The instructions also state that each member of the group should contribute to the assignment.

Several weeks into the assignment, students start emailing you with complaints that certain group members are not pulling their weight. In one case, a group has let you know that members are no longer even talking to each other. You realize that instead of working together as *teams,* students are "locking horns."

Sculptor: Shalom Bloom

Have you ever had this experience? Or have you ever wanted your students to work in teams to complete an assignment but feared this scenario? This resource document describes how instructors can implement peer assessment of teamwork* so as to foster students' productive and collegial work in teams and minimize instances of students "locking horns."

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* While the terms "group work" and "teamwork" are sometimes used interchangeably, teamwork "implies something about *how* the students are working together" (Weimer, 2013). Specifically, "teamwork" refers to a group of students' intentional, sustained collaboration toward achieving a common goal over a period of time, such as a semester. As some authors have explained, "With a group, the whole is often equal to or less than the sum of its parts; with a team, the whole is always greater" (Oakley, Felder, Brent, & Elhajj, 2004).

HOW CAN PEER ASSESSMENT ADDRESS CHALLENGES ASSOCIATED WITH TEAMWORK?

Teamwork can be challenging when:

- students are more accustomed to completing assignments individually than with peers as part of a team;
- students feel their peers are not contributing equally: A common concern is "social loafing" or "free-loading," when certain individuals "make less effort when they work collectively than when they work alone" (Peñarroja, Orengo, & Zornoza, 2017); and
- interpersonal conflicts bear on students' learning experience.

Peer assessment (PA) of teamwork, namely, having students assess peers' contributions to teamwork as well as their behaviour throughout the completion of the assignment, has the potential for mitigating these challenges. While students' past experiences may include some of the challenges described above, PA of teamwork has the potential to:

- contribute to group learning, the development of shared understandings, and a sense of accountability / responsibility for one another's learning (Falchikov, 1993; London & Sessa, 2006; Sibley & Ostafichuk, 2014);
- encourage full participation in group work and help improve students' perception of fairness when students' individual contributions to group work are assessed (Elliott & Higgins, 2005); and
- allow students to develop their collaboration, negotiation and pre-emptive conflict management skills (Odom, Glenn, Sanner, & Cannella, 2017; Sibley & Ostafichuk, 2014).

When carefully planned, having students assess peers' performance can be a pedagogically sound addition to a course that encourages students to reflect on the team experience (Barkley, Cross, & Major, 2014). Indeed, attending to team members' abilities to work together and regularly reflecting on efforts to foster teamwork is widely recommended because these efforts can support effective teamwork (Peñarroja, Orengo, & Zornoza, 2017; Weimer, 2014).

This resource document presents a four-stage framework—forming, storming, norming, and performing (Tuckman, 1965)**—for setting up student groups to work effectively as teams as a means of laying a solid foundation for the integration of PA activities. In turn, PA activities can support students with having meaningful teamwork learning experiences.

** Tuckman and Jensen (1977) later introduced a fifth stage: adjourning. As adjourning refers to the closure of the teamwork activities, adjourning is not addressed in this resource document.

A FRAMEWORK FOR TEAM DEVELOPMENT

FORMING

Forming is a stage of teamwork where students come together in groups and begin to orient themselves to what it means to work interdependently. It is important to let students know why you are asking them to work in teams. For example, you can explain to students that teamwork affords them opportunities to:

- exchange ideas with peers, which is essential for developing critical thinking (Falchikov, 2004);
- learn and develop skills, such as interpersonal skills (Deeter-Schmelz, Kennedy, & Ramsey, 2002; Feichtner & Davis, 1984);
- prepare their skills for real-world experiences (Feichtner & Davis, 1984) such as those in the workplace (Falchikov, 1993); and
- relate to one another as co-constructors of knowledge in a cooperative (rather than a competitive) way that is more conducive to learning (Falchikov, 1993; Trigwell, Prosser, & Waterhouse, 1999).

It is recommended that instructors form teams, rather than letting students choose their teams, in order to limit cliques or relationship fall-out within groups (Brickell, Porter, Reynolds, & Cosgrove, 1994; Feichtner & Davis, 1984; Oakley, Felder, Brent, & Elhajj, 2004; Sibley & Ostafichuk, 2014). Careful consideration of group size, diversity and work location (e.g., within or outside the classroom, in-person or online (Falchikov, 1993) can help lay the groundwork for productive teams.

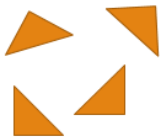
Group size: Group size will vary depending on the goal and scope of the assignment (Pursel, n.d.). Some educators recommend groups of three to four students (Oakley, Felder, Brent, & Elhajj, 2004), while others suggest four to seven (Feichtner & Davis, 1984; Sibley & Ostafichuk, 2014). If teams are too small, there may not be an adequate diversity of ideas and abilities. If teams are too big, there may not be enough work to keep each member engaged in the assignment, and finding common time outside class to advance group projects can be challenging (Barkley, Cross, & Major, 2014).

Group diversity: You can survey the students (e.g., with a show of hands or a questionnaire) to elicit students' backgrounds (e.g., field of study, interests, and work experience) so as to create diverse teams (Barkley, Cross, & Major, 2014). Alternatively, a more formal method, such as a survey, can be used (see Appendix A). Survey data can be gathered on paper or online. Online possibilities include Polling @ McGill, the Forms tool in Office 365 and the survey tool in myCourses. Other technology-supported solutions to address the logistics of forming groups are available. Request a consultation with Teaching and Learning Services (https://www.mcgill.ca/tls/contact/consultations) for further information.

In all cases, be intentional about how you form the groups: do so based on what you are hoping students will take away from the experience. Be sure to let students know why *you* are forming the teams and what criteria you are using to form the teams (Feichtner & Davis, 1984). These explanations, along with your rationale for having students work in teams, may pre-empt students' resistance to teamwork and increase their buy-in.

STORMING AND NORMING

Students will likely need guidance with how to function as a team and deal with interpersonal conflicts. The next two stages address these points.



Storming is a stage of teamwork when students struggle with interpersonal concerns, which may include conflict and disagreement about roles and responsibilities within the team (Tuckman, 1965). Calling upon students to do PA can exacerbate these concerns. Instructors should be aware of potential issues:

- Students may believe that existing student relationships of either friendship or enmity will inform the assessment of peers' contributions to teamwork (Falchikov, 2004).
- If students are aware of the identity of the student who assessed them, this may lead students to fear retaliation. Whether this fear is justified or not, students may consequently assess one another more generously than they would otherwise (i.e., "You scratch my back, I'll scratch yours") (Elliott & Higgins, 2005; Falchikov, 2004).
- While students may be frustrated by an unreliable teammate, they may hesitate to use PA to raise the issue as they might see this as punitive (Fellenz, 2006; Murrell, 1984; Weimer, 2012; Weimer, 2013).

Such concerns impact a team's ability to function effectively. Strategies such as carefully planning the teamwork assignment and using PA to gauge team members' ability to work as a team can help to mitigate the potential for "storms." These strategies may even result in teams skipping the storming stage entirely, such that students move directly from *forming* to *norming* with little or no interpersonal difficulty.

Norming is a stage of teamwork where students develop greater cohesiveness within their teams, clarify and adopt agreed-upon roles and responsibilities, and become comfortable expressing their points of view (Tuckman, 1965). Instructors might ask students to do some PA in the *norming* stage, but before calling upon students to assess one another, a number of other strategies can be implemented to build team cohesiveness, thereby equipping students to engage in PA with confidence. For example, instructors can:

- raise students' awareness of the difference between working as a group and working as a team (see p. 1 footnote), as this information can help them better understand your expectations for their performance.
- provide students with written guidelines about what they are expected to do and guide them in how to undertake the assignment (Falchikov, 2004; Feichtner & Davis, 1984). For example:
    - be explicit about how the teamwork assignment is relevant to course content (Feichtner & Davis, 1984).
    - give students tools, such as checklists or rubrics, to track their progress toward completing the assignment (see Appendix A).
    - explain what qualities make for good team members, such as being prepared for team meetings and being willing to find ways to contribute to teamwork even if unable to attend a meeting (Creelman, 2017).
    - suggest team member roles and ask students to collectively decide which student will assume which role (Oakley, Felder, Brent, & Elhajj, 2004).
    - ask students to describe how their own contribution to the team will fit with other team members' contributions.
- have students engage in team building activities so that they learn how to work together (Weimer, 2014). For example, task student teams with building the "best" tinker toy structure they can within 15 minutes, and then have a team spokesperson attempt to convince the rest of the class why the resulting structure

is the best (McKendall, 2000). Even a short activity like this can surface the types of challenges students may encounter in more extended teamwork situations, such as poor time management and unequal participation. Another example is to have students create team names that reflect the assignment they are working on. Teams in a business course analyzing refrigeration companies created names such as: "We be Kuhl; Polar Bares; Nice Fellows on Ice; and Frozen Assets Unlimited" (Feichtner & Davis, 1984).

- provide time for students to write a document (a charter, contract, or agreement) (McKendall, 2000; Oakley, Felder, Brent, & Elhajj, 2004; Willcoxson, 2006) that articulates the team's goals, the plan they will follow to achieve those goals, and the expectations for members' participation (Searby & Ewers, 1997) (see Appendix A). Creating such a document can be an entry point for discussions of PA within the team, given that students may be asked to assess the very behaviours described in such a document. It can also ensure students have a common understanding of the assignment (Peñarroja, Orengo, & Zornoza, 2017). Instructors may wish to vet such documents prior to implementation (Nicol & Macfarlane-Dick, 2006).
- foster team cohesiveness by allowing time for students to do some in-class work together in addition to out-of-class work (Feichtner & Davis, 1984). These in-class opportunities will allow you to observe how team dynamics are developing (e.g., the extent to which students are focused on the task at hand and participating equitably), and to see if there are any issues that need to be addressed (Barkley, Cross, & Major, 2014).
- provide students with the opportunity to learn how to have productive discussions. Brookfield and Preskill (2016) share 50 strategies that can be used to encourage discussion in groups of various sizes.

Despite best efforts to have students work harmoniously in teams, disagreements and uncooperative behaviors may arise. *Norming* therefore also involves providing students with strategies to address such issues (Falchikov, 2004). For example, instructors can:

- provide students with an email template for notifying them of a team problem (Creelman, 2017) (see Appendix A);
- proactively acknowledge and address interpersonal concerns by preparing students to give constructive feedback to each other and ensuring that students justify the feedback they provide (Weimer, 2012); and
- ensure that students have the time necessary to reflect upon the feedback, as "team feedback seems to be more effective when accompanied by a period of guided [reflection]" (Peñarroja, Orengo, & Zornoza, 2017).

For cases where conflicts cannot be resolved, a process for asking or allowing a student to quit the team and either move to another team or work alone can be implemented (Oakley, Felder, Brent, & Elhajj, 2004). This process involves a mediation session with the instructor and carefully documented communication among team members.

PERFORMING

Performing is the stage of teamwork where students are truly working in concert to achieve the assignment goals. Issues regarding how students can work together productively have been addressed, and now, "group energy is channeled into the task" (p. 396) (Tuckman, 1965). Students engage in PA during the *performing* stage as a means of supporting effective teamwork throughout the time students are working to achieve the assignment goals.

HOW CAN PEER ASSESSMENT BE INTEGRATED INTO TEAMWORK?

PA of teamwork can be integrated at different points throughout the time students are working together. For example, students can peer assess during *storming* to address unhelpful behaviour such as social loafing (Aggarwal, & O'Brien, 2008; Falchikov, 2004; Feichtner & Davis, 1984; Goldfinch & Raeside, 1990); during *norming* to provide feedback on team members' initial contributions; and during *performing* to foster interdependence and accountability.

In all cases, it is important that you make expectations for PA of teamwork explicit and visible (Hillier, & Dunn-Jensen, 2012; Oakley, Felder, Brent, & Elhajj, 2004). Assessment criteria should be fair, observable, and closely related to the assignment goals (Bloxham & West, 2004).

Criteria for assessing peers' contributions to teamwork can be developed on your own or with student involvement (Bloxham & West, 2004). Often, criteria address multiple aspects of student behaviours that contribute to positive group experiences and assignment completion, such as (Ballantyne, Hughes, & Mylonas, 2002; Cheng & Warren, 1997; Nicol & Macfarlane-Dick, 2006):

- presence (meeting attendance, dependability);
- contributions (demonstrated quality of work and ideas shared, effort);
- team skills (cooperation, contributions to a trusting team environment, ability to manage conflict, ability to set / work toward / meet group goals); and
- communication (prompt, consistent, constructive).

If students develop the criteria, they will have to reflect on what behaviours related to working as a team they value. This reflection can lead students to a greater understanding of the criteria and to buy-in of PA altogether (Barkley, Cross, & Major, 2014). Instructors can provide final oversight and, if appropriate, approval of the criteria based on whether the desired goals of the assignment have been addressed and are appropriate (Bloxham & West, 2004).

Once the criteria are determined, think about how and when you will ask students to provide feedback on peers' performance in the team (e.g., part-way through the assignment or at the end). Your desired learning outcomes should inform your planning, but keep in mind that PA tasks should not take students an inordinate amount of time to complete and responses should be easy for you to compile (Baker, 2008).

Students can provide feedback on peers' contributions in a variety of ways. A number of strategies are listed here, and specific examples appear in Appendix A. Students can:

- fill in a numerical scale (e.g., 1-5) for each criterion and justify the numerical ratings with feedback comments (Oakley, Felder, Brent, & Elhajj, 2004 ; Patri, 2002; Topping, 1998). Baker (2008) also provides a thorough summary of various rating scale possibilities (pp. 187-188);
- address guiding questions, which can be as simple as (1) "Who worked hard in your group and why did you choose this person?" and (2) "Who needs to work harder next time, and why did you choose this person?" (Williams, 2016, p. 366);
- write a brief assessment of the overall contributions of each team member (Ballantyne, Hughes, & Mylonas, 2002);
- write a short reflection (~1/2 page) in which they discuss team dynamics and the progress on the team assignment (Patri, 2002);

- identify which team member made particularly strong contributions in each category of a rubric (Ballantyne, Hughes, & Mylonas, 2002);
- keep project diaries that the instructor reads (Baker, 2008; Creelman, 2017) as a means of documenting their own and their peers' contributions to specific components of the assignment; and
- divide a set number of points among group members to reflect their contributions, such that no two group members receive the same number of points. This may be appropriate in circumstances where you are concerned that students will give an equal number of points to all team members in exchange for the same treatment from their peers (Ballantyne, Hughes, & Mylonas, 2002), and it instead encourages students to carefully consider teammates' relative contributions (Baker, 2008; Ballantyne, Hughes, & Mylonas, 2002). This requirement may prove problematic in situations where teammates have truly contributed equally and may therefore need to be reconsidered.

Plan for students to assess peers' contributions more than once so that they can practice their PA skills (Peñarroja, Orengo, & Zornoza, 2017).

SHOULD PEER ASSESSMENT COUNT TOWARD AN ASSIGNMENT GRADE AND IF SO, TO WHAT EXTENT?

Whether or not PA counts toward students' assignment grade should depend on the goal(s) of the assignment (Baker, 2008; Elliott & Higgins, 2005). PA that takes place early or mid-way through an assignment typically aims to let students know *how they are doing,* and gives them a chance to learn and improve. In these cases, PA does not need to be graded. PA that takes place toward (or at) the end of an assignment typically aims to let students know *how they did*, often with a letter or numeric grade.

You might want to communicate to students the value of team interdependence while still emphasizing the importance of students' individual contributions to their team. PA can count for a percentage of a student's grade, typically limited to 5-25% of a given assignment (Baker, 2008; Barkley, Cross, & Major, 2014; Hillier & Dunn-Jensen, 2012; Williams, 2016). Thus, each student's individual grade reflects both the team assignment grade and the student's contributions as assessed by their peers (Barkley, Cross, & Major, 2014). Here are two examples of how this assessment can be calculated:

- A student's grade may be composed of a group grade (the same grade is assigned to all group members) plus an individual grade (each student's individual grade is assigned based on peer assessments) (Barkley, Cross, & Major, 2014). For example, 90% of the student's grade may be based on the group grade and 10% based on peers' assessments of their contributions. Appendix B offers sample calculations that illustrate varying ranges of impact on students' grades when PA is based on different assignment percent calculations.
- A student's grade may be determined by applying an adjustment factor to the group grade based on PA. An adjustment factor is a way to calculate individual student grades taking into consideration the assessment of the group assignment, as well as individual student contributions based on self and peer assessments. Appendix C offers sample calculations that illustrate varying ranges of impact on students' grades when PA is based on an adjustment factor calculation.

Instructors may consider whether students also receive a grade for *completing* an assessment of their peers, which can encourage students to take the task seriously and provide constructive comments (Baker, 2008; Hillier & Dunn-Jensen, 2012). In all cases, it is important that the purpose and implementation method of grading decisions be clearly explained to students and be easy for them to understand.

Some students will be pleased to have their teamwork contributions assessed by peers. However, students who have been accustomed to receiving good grades for group assignments *despite* their limited individual contribution may be less pleased with the process or their resulting grade. Discussing with students early on, such as during the *storming* and *norming* stages, the extent to which PA will impact individual grades is important. It may also be helpful to integrate short readings, such as "Coping with Hitchhikers and Couch Potatoes on Teams" (Oakley, Felder, Brent, & Elhajj, 2004) or "Tips for Dealing with Free Riders: A Handout for Students" (Weimer, 2021). Such readings can help students identify when team members aren't contributing to a team and then consider the impact of this behavior. These readings also offer ideas for how students may address the issue of a team member who is not doing their part. Having a small percentage of students' grade be informed by PA may mitigate concerns about teamwork, as students understand that peers' contributions to the assignment—or lack thereof—will be reflected in their grade (Baker, 2008).

HOW WILL YOU KNOW IF THE TEAMWORK ASSIGNMENT IS GOING ACCORDING TO PLAN?

Plan to gather student feedback several times over the course of a team assignment on how well things are going (Feichtner & Davis, 1984). Such feedback can be formal (e.g., a mid-course evaluation) or informal (e.g., an in-class discussion) (Falchikov, 2004). Explain to students that the feedback will allow you and them to identify teamwork issues early on so that they can be addressed before they negatively affect team members' motivation and before students submit the completed assignment (Hillier & Dunn-Jensen, 2012; Peñarroja, Orengo, & Zornoza, 2017). This feedback may also improve the experience for future students as it may help you hone your skill at implementing teamwork and PA of the teamwork experience in your courses.

HOW VALID IS ASSESSMENT OF PERFORMANCE BY PEERS COMPARED TO TRADITIONAL FORMS OF ASSESSMENT?

A number of variables affect the validity of assessment by peers (as compared to assessment by instructors). One survey of research studies (Falchikov, 2004) found that both students and instructors are most consistent in assessing student work when they focus on assessing a specific academic task, and are provided with specific criteria to consider.

WHAT'S NEXT?

If you have questions about how to use PA to make teamwork work or simply want to get feedback on the design and implementation of your existing PA assignments, submit an individual consultation request to TLS at https://mcgill.ca/tls/contact/consultations. Note that TLS can also help you with technology-supported solutions that address the logistics of PA.

REFERENCES

Aggarwal, P., & O'Brien, C. L. (2008). Social loafing on group projects: Structural antecedents and effect on student satisfaction. *Journal of Marketing Education, 30*(3), 255-264. http://journals.sagepub.com/doi/abs/10.1177/0273475308322283

Baker, D. F. (2008). Peer assessment in small groups: A comparison of methods. *Journal of Management Education, 32*(2), 183-209. http://journals.sagepub.com/doi/pdf/10.1177/1052562907310489

Ballantyne, R., Hughes, K., & Mylonas, A. (2002). Developing procedures for implementing peer assessment in large classes using an action research process. *Assessment and Evaluation in Higher Education, 27*(5), 427-441. https://doi.org/10.1080/0260293022000009302

Barkley, E. F., Cross, K. P., & Major, C. H. (2014). *Collaborative learning techniques: A handbook for college faculty.* San Francisco, CA: John Wiley & Sons. https://ebookcentral.proquest.com/lib/mcgill/reader.action?docID=1745058

Beaman, R. (1998). The unquiet ... even loud, andragogy! Alternative assessments for adult learners. *Innovative Higher Education, 23*(1), 47-59. http://journals.sagepub.com/doi/pdf/10.1177/104515959500600308

Bloxham, S., & West, A. (2004). Understanding the rules of the game: Marking peer assessment as a medium for developing students' conceptions of assessment. *Assessment and Evaluation in Higher Education, 29*(6), 721-733. http://www.tandfonline.com/doi/abs/10.1080/0260293042000227254

Brickell, L. C. J. L., Porter, L. C. D. B., Reynolds, L. C. M. F., & Cosgrove, C. R. D. (1994). Assigning students to groups for engineering design projects: A comparison of five methods. *Journal of Engineering Education, 83*(3), 259-262. https://doi.org/10.1002/j.2168-9830.1994.tb01113.x

Brookfield, S. D., & Preskill, S. (2016). *The discussion book: 50 great ways to get people talking*. San Francisco, CA: Jossey-Bass. https://ebookcentral.proquest.com/lib/mcgill/reader.action?docID=4306433

Cheng, W., & Warren, M. (1997). Having second thoughts: Student perceptions before and after a peer assessment exercise. *Studies in Higher Education, 22*(2), 233-239. http://www.tandfonline.com/doi/abs/10.1080/03075079712331381064

Creelman, D. (2017). *Using groups and teams: A practical approach to forming, using, and troubleshooting groups and team.* Workshop at Concordia University, Montreal, QC.

Deeter-Schmelz, D., Kennedy, K., & Ramsey, R. (2002). Enriching our understanding of student team effectiveness. *Journal of Marketing Education, 24*(2), 114-124. http://journals.sagepub.com/doi/pdf/10.1177/0273475302242004

Elliott, N., & Higgins, A. (2005). Self and peer assessment – does it make a difference to student group work? *Nurse Education in Practice, 5*(1), 40-48. http://ac.els-cdn.com/S1471595304000344/1-s2.0-S1471595304000344-main.pdf?_tid=39a7e862-6da5-11e7-8b2d-00000aacb35d&acdnat=1500594386_10d5cd5161d335d57b87e250d94345f3

Falchikov, N. (1993). Group process analysis: Self and peer assessment of working together in a group. *Innovations in Education & Training International, 30*(3), 275-284. http://srhe.tandfonline.com/doi/pdf/10.1080/0954730930300308

Falchikov, N. (2004). Involving students in assessment. *Psychology Learning & Teaching, 3*(2), 102-108. http://journals.sagepub.com/doi/pdf/10.2304/plat.2003.3.2.102

Feichtner, S. B., & Davis, E. A. (1984). Why some groups fail: A survey of students' experiences with learning groups. *Organizational Behavior Teaching Review, 9*(4), 58-73. http://journals.sagepub.com/doi/abs/10.1177/105256298400900409

Fellenz, M. R. (2006). Toward fairness in assessing student groupwork: A protocol for peer evaluation of individual contributions. *Journal of Management Education, 30*(4), 570-591. http://journals.sagepub.com/doi/abs/10.1177/1052562906286713

Goldfinch, J., & Raeside, R. (1990). Development of a peer assessment technique for obtaining individual marks on a group project. *Assessment & Evaluation in Higher Education, 15*(3), 210-231. https://doi.org/10.1080/0260293900150304

Hillier, J., & Dunn-Jensen, L. M. (2012). Groups meet ... teams improve. *Journal of Management Education, 37*(5), 704-733. http://journals.sagepub.com/doi/abs/10.1177/1052562912459947

London, M., & Sessa, V. I. (2006). Continuous learning in organizations: A living systems analysis of individual, group, and organization learning. *Research in Multi Level Issues Multi-Level Issues in Social Systems, 5*, 123-172. doi:10.1016/s1475-9144(06)05006-5

McKendall, M. (2000). Teaching groups to become teams. *Journal of Education for Business, 75*(5), 277-282. https://doi.org/10.1080/08832320009599028

Michaelsen, L. K., Knight, A. B., & Fink, L. D. (Eds.). (2002). *Team-based learning: A transformative use of small groups.* Westport, CT: Praeger.

Murrell, K. L. (1984). Peer performance evaluation: When peers do it they do it better. *Journal of Management Education, 9*(4), 83-85. http://journals.sagepub.com/doi/abs/10.1177/105256298400900411

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education, 33*(2), 199-218. http://www.tandfonline.com/doi/abs/10.1080/03075070600572090

Oakley, B., Felder, R. M., Brent, R., & Elhajj, I. (2004). Turning student groups into effective teams. *Journal of Student Centered Learning, 2*(1), 9-34. https://www.engr.ncsu.edu/wp-content/uploads/drive/1ofGhdOciEwloA2zofffqkr7jG3SeKRq3/2004-Oakley-paper(JSCL).pdf

Odom, S., Glenn, B., Sanner, S., & Cannella, K. A. (2017). Group peer review as an active learning strategy in a research course. *International Journal of Teaching and Learning in Higher Education, 21*(1), 108-117.

Patri, M. (2002). The influence of peer feedback on self- and peer-assessment of oral skills. *Language Testing, 19*(2), 109-131. http://ltj.sagepub.com/content/19/2/109.short

Peñarroja, V., Orengo, V., & Zornoza, A. (2017). Reducing perceived social loafing in virtual teams: The effect of team feedback with guided reflexivity. *Journal of Applied Social Psychology, 8*(47), 424–435. https://doi.org/10.1111/jasp.12449

Pursel, B. (n.d.). Lost at sea. Penn State University. Retrieved March 30, 2021 from http://sites.psu.edu/schreyer/stages-of-the-teaming-process/stage-1-storming/

Pursel, B. (n.d.). Team configuration. Penn State University. Retrieved March 30, 2021 from http://sites.psu.edu/schreyer/team-configuration/

Pursel, B. (n.d.). Team project phase 1: Team information. Penn State University. Retrieved March 30, 2021 from http://sites.psu.edu/schreyer/wp-content/uploads/sites/213/2012/07/2_teamContract_lab.pdf

Pursel, B. (n.d.). Team reflection and feedback. Penn State University. Retrieved March 30, 2021 from https://cpb-us-east-1-juc1ugur1qwqqqo4.stackpathdns.com/sites.psu.edu/dist/9/213/files/2012/07/6-team_reflection.pdf

Pursel, B. (n.d.). Teaming roadmap example. Penn State University. Retrieved March 30, 2021 from http://sites.psu.edu/schreyer/stages-of-the-teaming-process/stage-4-performing/

Searby, M., & Ewers, T. (1997). An evaluation of the use of peer assessment in higher education: A case study in the School of Music, Kingston University. *Assessment & Evaluation in Higher Education, 22*(4), 371-383. https://doi.org/10.1080/0260293970220402

Sibley, J., & Ostafichuk, P. (2014). *Getting started with team-based learning*. Sterling, VA: Stylus.

Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of Education Research, 68*(3), 249-276. http://rer.sagepub.com/content/68/3/249.short

Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education, 37*(1), 57-70. https://link.springer.com/article/10.1023/A:1003548313194

Tuckman, B. (1965). Developmental sequences in small groups. *Psychological Bulletin, 63*(6), 384-399. http://dx.doi.org/10.1037/h0022100

Tuckman, B. W., & Jensen, M. A. C. (1977). Stages of small-group development revisited. *Group & Organization Studies*, *2*(4), 419-427. http://journals.sagepub.com/doi/pdf/10.1177/105960117700200404

University of Arizona. (n.d.). Guidelines for writing a team contract. Retrieved March 30, 2021 from math.arizona.edu/~busmath/teamcontb.doc

Weimer, M. (2012). Peer assessment is not an elixir for all group work challenges. *Faculty Focus* https://www.facultyfocus.com/articles/teaching-professor-blog/peer-assessment-is-not-an-elixir-for-all-group-work-challenges/

Weimer, M. (2013). Defining and promoting teamwork in the classroom. *Faculty Focus.* http://www.facultyfocus.com/articles/teaching-professor-blog/defining-and-promoting-teamwork-in-the-classroom/

Weimer, M. (2014). 10 recommendations for improving group work. *Faculty Focus.* https://www.facultyfocus.com/articles/effective-teaching-strategies/10-recommendations-improving-group-work/

Weimer, M. (2021). Tips for dealing with free riders: A handout for students. *The Teaching Professor.* https://www-teachingprofessor-com.proxy3.library.mcgill.ca/topics/resource-collections/resources-for-students/handouts/tips-for-dealing-with-free-riders/

Willcoxson, L. E. (2006). "It's not fair!": Assessing the dynamics and resourcing of teamwork. *Journal of Management Education, 30*(6), 798-808. http://journals.sagepub.com/doi/abs/10.1177/1052562906287964

Williams, S. J. (2016). An approach for the assessment and allocation of individual grades for group-based, collaborative work by combining self-assessment, group-evaluation and wiki data: Results from an action research. In S. Tang & L. Logonnathan (Eds.). *Assessment for Learning Within and Beyond the Classroom* (pp. 361-372). Singapore, HK: Springer. https://doi.org/10.1007/978-981-10-0908-2_29

APPENDIX A: TOOLS TO SUPPORT PEER ASSESSMENT OF TEAMWORK

This appendix is a curated list of tools to support peer assessment of teamwork, including tools to support students with working as a team.

GROUP FORMATION: FORMAL AND INFORMAL SURVEYS

- Techniques for Sorting Groups by Interest and Characteristics (Barkley, Cross, & Major, 2014, pp. 82-84): 10 techniques, along with implementation descriptions, for gathering data to inform team formation.
- Forming Teams in Large Classes (Sibley, & Ostafichuk, 2014, pp. 70-73): a description of a survey that students fill in, indicating their background (e.g., field of study, work experience, overseas living experience); guidance is offered for (1) developing an Excel file to form heterogeneous teams and (2) finding teammates in large classrooms.
- Getting to Know You (Oakley, Felder, Brent, & Elhajj, 2004, pp. 24-25): a detailed 2-page form that students fill in to indicate their background (e.g., field of study, hobbies, sports activities) and scheduling availability.

TEAM CONTRACTS AND TEAM BUILDING ACTIVITIES

- Sample Group Learning Contract (Barkley, Cross, & Major, 2014, pp. 68-69): an example of a 1-page contract for students to sign, along with questions students can address for creating their own team agreement.
- Team Charter (Hillier & Dunn-Jensen, 2012, pp. 722-724): a 3-page form students fill in with their names, relevant skills and a plan for how the team will work together.
- Team Effectiveness Feedback (Hillier & Dunn-Jensen, 2012, pp. 725-726): a 2-page form that each student fills in at each project milestone to give feedback on the effectiveness of the team. The team uses the results to improve their team performance.
- Team Policies (Oakley, Felder, Brent, & Elhajj, 2004, p. 26): a 1-page document articulating policies that team members are expected to abide by, with guidance for addressing uncooperative behaviour from team members.
- Team Expectations Agreement (Oakley, Felder, Brent, & Elhajj, 2004, p. 27): a 2-paragraph description of how students can develop a document to guide their teamwork; the document should include teammates' names, as well as rules and expectations/responsibilities that the team has agreed upon.
- The Egg Game (Beaman, 1998, pp. 53-54): as practice for PA, students complete an ungraded team task that focuses on process and allows students to address typical teamwork concerns regarding fairness and collusion.
- Guidelines for Writing a Team Contract (University of Arizona, n.d.): a 5-page document for students that offers a rationale for creating a team contract, along with guidance for creating a contract: establish procedures; identify expectations; articulate consequences for failing to follow procedures and meet expectations.
- Team Project Phase 1: Team Information (Pursel, n.d.): a 3-page document of directions for carrying out the assignment, along with a rubric for developing a team contract.
- Lost at Sea (Pursel, n.d.): a team building activity that takes ~30 minutes of class time with ~30 students.

NOTIFICATION OF TEAM PROBLEMS

- When things start to go astray: an email template for notifying the instructor of a team problem (Creelman, 2017).

> Invitation to the Professor to Assist Group # _____
>
> Date: _____
>
> We wanted to let you know that our group is experiencing a problem. One of the group members is not acting in accordance with the group's code of conduct and we think this behaviour is compromising the work of the group as a whole.
>
> *Optional Section*
>
> In order to assist with the process, we have provided the following information about the problem:
>
> (Creelman, 2017, developed with C. Kennedy)

- Coping with Hitchhikers and Couch Potatoes on Teams (Oakley, Felder, Brent, & Elhajj, 2004, pp. 32-34): a 3-page guide for students about how to address potentially challenging teammates' behaviours.
- Evaluation of Progress toward Effective Team Functioning (Oakley, Felder, Brent, & Elhajj, 2004, p. 28): a 1-page rubric that student teams can use to diagnose behaviours that may impede group functioning; can be used several times throughout the teamwork assignment.

PEER ASSESSMENT FORMS

- Group-Evaluation Form (Williams, 2016, p. 370): Students fill in a 6-item self-evaluation form (p. 370), followed by a 4-question team evaluation form; the instructor uses the latter evaluation to corroborate the self-assessment data.
- Sample Peer Evaluation Form (Barkley, Cross, & Major, 2014, p. 110): a brief form that students fill in, where they rate peers on a 3-point scale: Needs improvement; Adequate; Outstanding.
- Sample Group Evaluation Form (Barkley, Cross, & Major, 2014, p. 111): a 6-item (quantitative and qualitative) form that students fill in to assess how well the team worked together.
- Formal Team Assessment Form (Hillier & Dunn-Jensen, 2012, pp. 726-729) and Formal Team Summary Form (pp. 729-730): the Formal Team Assessment Form is a Likert-scale form each team member fills in halfway through the assignment to assess the effectiveness of the team process. Using the Formal Team Summary Form, team members summarize the data and use the results to address how they can work yet more effectively going forward.
- Team Member Evaluation Form (Oakley, Felder, Brent, & Elhajj, 2004, p. 29): a 1-page Likert scale form students can use to evaluate each team member's contributions at mid-semester and end-of-semester.
- Peer Rating of Team Members (Oakley, Felder, Brent, & Elhajj, 2004, p. 30): a 1-page team member evaluation form students can use to provide a 1-word rating plus commentary for each team member; can be used at mid-semester and end-of-semester.

- Team Reflection and Feedback (Pursel, n.d.): a 1-page form students fill in to assess team members according to four considerations: preparation, contribution, gatekeeping and flexibility. Students allocate a specified number of points without awarding the same number of points to all team members (modeled on an Assessment of Contributions of Group Members [Michaelsen, Knight, & Fink, 2002]).

Peer assessment form (Creelman, 2017):

Name: _____

Student Number: _____

Team Number: ____

This is your opportunity to evaluate the contributions of your peers to your team. Rank each member of your team (excluding yourself). Give the #1 ranking to the member who has made the strongest contribution to the group. Give the lowest ranking to the individual whose participation was least helpful. After each student has ranked each member of their group, I will convert the rankings into a mark.

You should consider the following criteria as you determine the rank of your group members:

A good team member ...

- attends regularly and makes an effort to participate
- concentrates on the question or the assignment at hand
- shares the responsibility of helping the team achieve its best results
- is well prepared, listens carefully, and is considerate of others' opinions
- contributes as well as listens
- does not distract others in the group and is careful not to compromise the team's work
- informs members if unable to attend a group meeting
- finds ways to contribute even if a meeting has to be missed

Note: You must give a spread of ranks, and you must justify each of your rankings on the reverse of this sheet. Please explain why you gave the ranking you did, and include – if you like – any suggestions you would like to pass on which you think might help your fellow students improve.

If you wish to assign two individuals the same rank, you must also explain your reasons on the reverse.

Students' Names and Rankings

1 _____

2 _____

3 _____

4 _____

TEAM ASSIGNMENT OVERVIEWS

These resources offer overviews of teamwork assignments that illustrate when to use the different tools and what the purpose is of each tool.

- Description of Documents Used in Class (Hillier & Dunn-Jensen, 2012, p. 710)
- Forms to Use in Working with Teams (Oakley, Felder, Brent, & Elhajj, 2004, p. 10)
- Teaming Roadmap Example (Pursel, n.d.)

APPENDIX B: GRADING INFORMED BY PEER ASSESSMENT – ASSIGNMENT % CALCULATION

A student's grade may be composed of a group grade (the same grade assigned to all group members) plus an individual grade (each student's individual grade assigned based on self/peer assessments) (Barkley, Cross, & Major, 2014). For example, 90% of a student's grade may be based on the group grade (i.e., for the assignment product) and 10% based on their own and their peers' assessments of their contributions (i.e., the teamwork experience). Sample calculations with the peer assessment weighing at 5%, 10% and 25% are provided below to help instructors determine to what extent they would like peer assessments to have an impact on students' assignment grades.

							5%	10%	25%
Team member names	Team assignment grade	Team member rating 1 (self-assessment)	Team member rating 2	Team member rating 3	Team member rating 4	Individual average	Individual assignment grade	Individual assignment grade	Individual assignment grade
Fatameh	77.0	95.0	77.0	87.0	81.0	85.0	77.4	77.8	79.0
Ali	77.0	88.0	78.0	95.0	80.0	85.3	77.4	77.8	79.1
Robin	77.0	91.0	90.0	68.0	82.0	82.8	77.3	77.6	78.4
Sujong	77.0	76.0	68.0	71.0	63.0	69.5	76.6	76.3	75.1
					Team average	**80.6**			

Explanation of calculations when PA counts for 5%, 10% or 25% of a student's assignment grade:

5% (.95 x team assignment grade) + (.05 x individual average of self and peer assessments)
Example: Fatameh: (.95 x 77) + (.05 x 85) = 73.15 + 4.25 = 77.4

10% (.90 x team assignment grade) + (.1 x individual average of self and peer assessments)
Example: Fatameh: (.9 x 77) + (.1 x 85) = 69.3 + 8.5 = 77.8

25% (.75 x team assignment grade) + (.25 x individual average of self and peer assessments)
Example: Fatameh: (.75 x 77) + (.25 x 85) = 57.75 + 21.25 = 79

APPENDIX C: GRADING INFORMED BY PEER ASSESSMENT – FACTOR CALCULATION†

	1	2	2	2	2	3	4	5	6
Team member names	**Team assignment grade**	**Team member rating 1 (self-assessment)**	**Team member rating 2**	**Team member rating 3**	**Team member rating 4**	**Individual average**	**Team average**	**Adjustment factor** [+]	**Individual assignment grade**
Fatameh	77	95	77	87	81	85	80.7	1.05	80.9
Ali	77	88	78	95	80	85.3	80.7	[1.06 ➔ 1.05] ††	80.9
Robin	77	91	90	68	82	82.8	80.7	1.03	79.3
Sujong	77	76	68	71	63	69.5	80.7	[.86 ➔ .95] ††	73.2
						80.7			

Calculation steps		Example: Fatameh
*1. Determine a **grade** for the team's assignment.*	Team assignment grade	77.0
*2. Ask students to **rate** each other and themselves. Enter student ratings.*	Team member rating 1-4 (self-assessment)	95.0, 77.0, 87.0, 81.0
*3. Calculate the average for each individual's student rating by summing **Team member ratings 1-4** for that student and dividing the result by the number of students in the team.*	Individual average	(95.0 + 77.0 + 87.0 + 81.0)/4 = 85.0
*4. Calculate a team average by adding all **individual averages** and dividing the result by the number of students in the team. Enter that number in a separate column.*	Team average	(85.0 + 85.3 + 82.8 + 69.5)/4 = 80.6
*5. Calculate the adjustment factor for each student by dividing the individual average by the **Team average** (column 4). Enter that number in a separate column.*	Final adjustment factor	85.0/80.6 = 1.05
*6. Calculate the individual assignment grade by multiplying the **Team assignment grade** by the **Adjustment factor**. Enter that number in a separate column.*	Individual assignment grade	77.0 x 1.05 = 80.9

† Adapted from Oakley et al. (2004)

†† The adjustment factor determines how far apart a student's individual assignment grade is from the team assignment grade. To limit the impact of student ratings on their peers' assignment grades, instructors can set maximum and minimum adjustment factors. For example, some authors have recommended that the *maximum* adjustment factor be set at 1.05 in cases where the calculated number exceeds 1.05 (Oakley et al., 2004). An instructor at our university has recommended a *minimum* adjustment factor be set at .95 in cases where the calculated number is lower than .95.