

Calculating Individual Grades using Peer Assessment Scores

Overview

If you choose to assign grades to students based on the peer assessments, there is a wide variety of possible approaches to choose from. This document will guide you through some of the most common types of grades to calculate, together with the reports provided by PAcom.

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Types of Grades

There are four common types of grades drawn from peer assessments. Each of these will be described and demonstrated in this article, along with the PAcom reports that support the grade. Overviews of these reports are in the appendix, or you may follow the link to a full description of each report.

#	Grade Type	Brief Description	Reports
A	Individualized Project Grade	Use peer assessment data to adjust the group project deliverables grade for each individual team member	Normalized Grade Report
B	Teamwork/ Participation Grade	Assign points for the quality of one’s teamwork or team participation, as evaluated by one’s peers	Quantitative Summary Report -OR- Normalized Grade Report
C	Completion Grade	Assign points for submitting assessment (or subtract for non-submission)	Normalized Grade Report
D	Given Feedback Quality Grade	Assign points for the quality of open-ended feedback that one gives to others	Feedback Assessment Report

This discussion has several limitations.

1. Here we do not discuss the content or theme of the questions used. We are only concerned with whether the responses are of a quantitative or qualitative nature.

2. Unless explicitly mentioned, grade calculations are applied using a single question set. Because averages are used for all calculations, it is immaterial whether the question set includes one or multiple questions.
3. PAcom reports only use values assigned by a student's peers in calculating a student's grade; self-ratings are always excluded.

A. Individualized Project Grade

An individualized project grade brings two separate evaluations together: Group Project Grade and Peer Assessment. The instructor assigns the group project grade to the team's project deliverables. Usually this single grade is for the entire team. The second involves the average peer assessment for each individual student. The instructor selects one peer question-set to apply when running the Normalized Grade Report.

Of the many ways individualized grades could be determined, we have applied a normalized approach, based on the research literature. The report divides each student's average peer-assessed value by the group average peer-assessed value. This provides a normalized grade factor for every student which is plus or minus 1.00. When the instructor enters the group project grades into the Normalized Grade Report spreadsheet, individualized grades are the product of the grade factor by the group project grade. Together, the average points in each team is the group project grade.

Based upon your grading policy, an issue may result if a student receives exceptionally low or high assessments relative to their teammates. This can result in one team member receiving 2 to 3 times more points than another team member on the same project. Thus, you may wish to limit the final points difference. PAcom has built in one method of percentage limits to restrain how large of disparities can exist.

>> [Normalized Grade Report](#) – This report adjusts the average individual assessment each student received by the group average. Thus, each student receives a grading factor of +/- 1.00. When multiplied by the group project score, some students will get more, and other's less than the number of pool points.

The Normalized Grade Report automatically calculates these grading factors in the spreadsheet. The instructor can enter the group project scores into the spreadsheet, and the calculations are automatically applied. Special columns of the report also calculate completion points and apply upper and lower limits to individualized grades.

B. Teamwork/Participation Grade

Some instructors grade individual teamwork or participation, assigning a set of possible points for that. Based on their peer assessment, each student receives a percent of the possible points. One benefit of this approach is that it highlights the importance of participating in the team.

Different reports support different approaches to calculate teamwork/participation.

>> [Quantitative Summary Report](#) – This report displays the raw average peer assessment and the percent of possible points received by each student. "For example, say Wendy received a

6.67 average score, on a possible 9.0 scale. Dividing 6.67 by 9.0 yields 74.07%. You may then multiply the percent times the possible points to calculate participation/teamwork grades in an empty column of the spreadsheet.

>> [Normalized Grade Report](#) – This report adjusts the Individual Peer-Assigned Average points by the Group Average. This works the same as with the individualized project grade except that, instead of multiplying the individual grade factor by the group project grade, you will multiply the factor by the possible points allowed for participation/teamwork. When multiplied by the pool of participation points, some students will get more, and other's less than the number of pool points.

C. Given Feedback Quality Grade

One of the trickier workplace communication skills to develop is giving high quality, constructive feedback to others. It is not unreasonable to expect that as you student's feedback skills grow, so to will their teamwork improve. PAcom provides ample opportunity to practice this important skill.

We provide a report and a rubric you may adapt and use to give graded or non-graded feedback to your students on the quality of constructive feedback they give others.

>> [Feedback Assessment Report](#) – This report simply organizes, on a single page, all of the open-ended feedback one student gave to their teammates and themselves. This expedites rapid scanning and grading the quality of the feedback, usually via a rubric.

The [Rubric](#) is based on a straight-forward model called C.O.I.N. for giving feedback to others. We have posted an [article](#) for you to give your students to learn the basic model.

D. Completion Grade

Peer assessments work best when most or all students fill it out. Thus, we strongly recommend you consider motivating students to do so. Many instructors chose to assign a small number of points for completing it.

>> [Normalized Grade Report](#) – In the report Settings box, enter the point incentive as a positive or negative point value. (Positive number awards points if the student completes it; Negative number subtracts points if the student does not.) When you View the report, as a spreadsheet, that setting is applied.

Research Literature Recommendations

Macfarlane (2016) among others found that students' primary concerns with group projects involve free-riding (aka social loafing) and unfair grades in which the effort and contribution of a student is not reflected in a grade that all team members share alike. As a result, most researchers and instructors argue for the use of peer assessments to assign individualized grades on group projects.

Researchers examining individualized grading acknowledge the important caveat of biases that can alter the veracity of student peer assessments. Suggestions from researchers to improve the validity of these assessments generally involve changes to the calculation algorithms, changes to the collection questions, modifying the conditions under which data is collected, and including self-assessments or not.

Algorithms for Validity of Individualized Grading

Guzman (2018) examined the peer assessment grading literature and systematically compared various methods of calculating individualized grades using Monte Carlo simulations. One method that produced the smallest amount of error was to create an individual grading factor from the individual student mean divided by the group total mean. This normalized grade factor could be multiplied by the group deliverables grade, for an individualized grade. This method was also advised by Cheng & Martin (2000) and others.

>> The PAcom normalized grade report is based this calculation method.

Guzman (2018) also recommends a second method that produced the smallest amount of error. "Each assessment score given to a student by an assessor is normalized by dividing it by the sum of all assessment scores given by that assessor."

>> Ultimately, PAcom did not apply this due to concerns over adding complexity of communicating this adjustment to students. However, it should be investigated further.

Questions for Collecting Raw Assessment Data

A variety of methods to improve the questions through which peer assessment data is collected have been examined. Guzman (2018) compiled the following methods from the literature.

Include qualitative question for student to justify their score for force reflection and reduce arbitrariness (Loddington et al. 2009).

<< PAcom makes this available to instructors and includes a qualitative entry in its default questions.

Ask students to assess each peer in multiple behavioral categories or assess each peer with one holistic score. (Lejk and Wyvill 2001b; Sharp 2006; Ohland et al. 2012).

<< PAcom has question sets designed around both approaches. For examples, see the two default Peer question sets, P-01 and P-02

Use likert scales starting from 0 instead of from 1, to prevent artificially adding a small inflation to grades. (Guzman 2018)

<< Most PAcom scales are 1 – 5, although a 0 based scale is available, question set P-304.

Gransberg (2010) recommends a single question in which each student assigns part of a fixed amount (100%) to each teammate and to themselves.

<< PAcom does not have this type of response at this time.

Include/Exclude Self-Assessments

In the research literature, there is no agreement over whether self-assessments should be included or excluded from grade calculations. Lejk and Wyvill (2001a) recommend against self-assessments. Their study found that the less a person contributes to their team, the more they tend to inflate their own self-assessments.

>> PAcom excludes self-assessments from grading calculations for that reason. But we do ask students to self-assess so they are able to compare their perception with that of their peers.

Assessment Collection Conditions

Make assessments confidential. (Lejk and Wyvill 2001a)

<< PAcom systematically applies this.

Provide an incentive or penalty for students who give valid or invalid assessments (Tu and Lu 2005)

<< PAcom has not operationalized this approach yet.

In their research, Sridharan et al (2018) found that students can assess their student peers accurately and consistently when grades are not an outcome. However, students are naturally reluctant to honestly assess their peers when it can penalize them.

>> PAcom recommends that you intersperse formative peer assessments with summative ones so students can have constructive feedback before their grade depends on it.

APPENDICES

Normalized Grade Report

The Normalized Grade Report is designed for fair, efficient and flexible grading using peer assessments. The instructor selects parameters on the Settings pop-up screen to:

- identify a specific question set to use
- set completion points to add to (or subtract from) a student’s grade if they complete (or not) the assessment, and
- set parameters to constrain how high and low the grading factor can vary.

The spreadsheet includes the following information:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Click here for Grade Report Instructions															
2	Last Name	First Name	Email	Student ID	Class	Assessment #	Team	Group Project Score	Completed (1=Yes)	Completion Points (5 pts if completed)	(P-02) Peer Average	(P-02) Peer Average	(P-02) Individ. Grading Factor	(P-02) Individ. Grading Factor w/ Limits (-.25% +10%)	(P-02) Individ. Project Grade w/ Limits	(P-02) Individ. Project Grade w/ Limits & Completion Points
3	Turner	Wendy	WendyTurner@gmail.com		ENGR 210	1	Blue	80	1	5	6.67	7.08	0.941	0.941	75.28	80.28
4	Daniels	Duncan	DuncanDaniels@gmail.com		ENGR 210	1	Blue	80	0	0	4.33	7.08	0.612	0.75	60	60
5	Baxter	Paul	PaulBaxter@gmail.com		ENGR 210	1	Blue	80	1	5	8.33	7.08	1.176	1.1	88	93
6	Parker	Amy	AmyParker@gmail.com		ENGR 210	1	Blue	80	1	5	9	7.08	1.271	1.1	88	93
7	Johnson	Sarah	SarahJohnson@gmail.com		ENGR 210	1	Red	69	1	5	3.67	6.33	0.579779	0.75	51.75	56.75
8	Wilson	David	DavidWilson@gmail.com		ENGR 210	1	Red	69	1	5	8.33	6.33	1.315956	1.1	75.9	80.9
9	Edwards	Brandon	BrandonEdwards@gmail.com		ENGR 210	1	Red	69	1	5	7.00	6.33	1.105845	1.1	75.9	80.9

Col. A-G: Demographics – This example shows 7 students, split into 2 teams.

Col. H: Group Project Score – Instructor enters grade for the team project deliverables.

Col. I-J: Completed – Shows whether student completed the assessment or not (=0), and the points awarded (or subtracted). Completion Points are identified on the Settings pop-up.

Col. K-L: Peer Averages – Shows individual and group peer averages on the question set (P-02) selected on the Settings pop-up.

Col. M: Individual Grading Factor – This is the raw normalized individual factor, as the individual divided by the group average.

Col. N: Individual Grading Factor with Limits – Limits are optionally set up on the Settings pop-up to constrain how high and low the grading factor can vary.

Col. O-P: Individualized Project Grades – These calculate each individual’s grade by multiplying the Group Project Score by the individual Grading Factor with Limits. (Col. P also includes Completion Points)

Quantitative Summary Report (formerly labeled “Grade Report”)

The Quantitative Summary Report spreadsheet summarizes the peer averages for each peer-assigned, quantitative, question set included on the assessment. You can use this to calculate certain types of grades (although the Normative Report is better suited to grading). But more importantly, with this spreadsheet the instructor can easily sort students by average ratings, to identify who may be experiencing difficulties. You can also compare question sets to determine if they are picking different rating responses. The percentages facilitate easy comparison across rating scales.

It includes a pair of columns for every quantitative question set used to assess peers. In this example, there were two peer question sets. The first (P-02) has a 9 point rating scale. The pair of columns includes the peer average received by each student (col. I), and their percentage out of the rating scale points possible (col. J). These will range from 0% to 100%. The second question set is (P-01a) which has a 5 point scale.

	A	B	C	D	E	F	G	H	I	J	K	L
	Last Name	First Name	Email	Student ID	Class	Assessment #	Team	Completed	(P-02) Team Member Overall Participation	(P-02) Percent	(P-01.a) Participation Activities	(P-01.a) Percent
2	Turner	Wendy	WendyTurner@gmail.com		ENGR 210	1	Blue	1	6.67	74.07%	3.96	79.26%
3	Daniels	Duncan	DuncanDaniels@gmail.com		ENGR 210	1	Blue	0	4.33	48.15%	2.59	51.85%
4	Baxter	Paul	PaulBaxter@gmail.com		ENGR 210	1	Blue	1	8.33	92.59%	4.67	93.33%
5	Parker	Amy	AmyParker@gmail.com		ENGR 210	1	Blue	1	9	100.00%	4.93	98.52%
6	Johnson	Sarah	SarahJohnson@gmail.com		ENGR 210	1	Red	0	3.67	40.78%	2.37	47.40%
7	Wilson	David	DavidWilson@gmail.com		ENGR 210	1	Red	0	8.33	92.56%	5	100.00%
8	Edwards	Brandon	BrandonEdwards@gmail.com		ENGR 210	1	Red	0	7	77.78%	4.33	86.60%

Col. A-G: Demographics – This example shows 7 students, split into 2 teams.

Col. H: Completed – Shows whether student completed the assessment(=1) or not (=0).

Col. I-J: First Question Set – Shows the individual peer average (P-02) received by each student on the first question set (P-02). And the percent possible is calculated as the average divided by the number of points in the scale (col. J).

Col. K-L: Second Question Set – Pair of columns summarizing the second question set. If there are more quantitative question sets, these will displayed in further pairs of columns.

Feedback Assessment Report

The Feedback Assessment Report captures responses to the open-ended questions—in this case, 1 Peer Assessment and 3 Team Assessments. All the responses that one student wrote to their team and team members are displayed on one page. Student pages are sorted by author name.

This report is designed to scan and/or evaluate all qualitative feedback authored by each student. (Use the Student or Instructor reports to view all of the qualitative feedback received by each student.) If you wish to evaluate and grade the quality of constructive feedback written by each student, feel free to adapt the [sample rubric](#) I prepared. It can be used to assess and guide students to provide higher quality, more “constructive”, feedback to their team members.

Wendy Turner - Blue Team
Feedback Assessment Report

NURSING 300 - 002 (Rob Anson) Fall 2018
Assessment #1

Feedback Statements By Wendy Turner to Team Members and Team

QUESTION: (P-03) Team Member Feedback - Please comment on specific areas he/she can improve and areas they are doing very well. Please make your comments constructive, helpful, and specific. Please make it a long comment.

- Duncan Daniels: Duncan had some problems that made him late with his participation.
- Paul Baxter: Paul did a lot of work right at the beginning. He got us started and moving along.
- Amy Parker: A great team member. She took on a lot of work and nearly did the whole project herself.
- **Wendy Turner:** I already have a lot going on in my life being a single mom and going to school. I try to give what I can while trying to have a work and life balance.

QUESTION: (T-03) Team Strengths, Weaknesses, Actions - Considering how your team works together, what things does your team do particularly well?

- Team: We had a great planning session right at the beginning. That planning session allowed us to identify what work needed to be done and to divide it among the team members.

QUESTION: (T-03) Team Strengths, Weaknesses, Actions - All teams experience some difficulties. What particular challenges has your team recently faced?

- Team: A few of us have busy working lives. It is hard to keep up with school work, a full time job, and raising a family.

QUESTION: (T-03) Team Strengths, Weaknesses, Actions - Considering how your team works together, what things does your team need to improve?

- Team: n/a

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