

ASSESSMENT OF INDIVIDUAL STUDENT PERFORMANCE IN ONLINE TEAM PROJECTS

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ABSTRACT

The use of team projects has been shown to be beneficial in higher education. There is also general agreement that team efforts should be assessed and that the grading ought to represent both (1) the quality of the product developed jointly by the team, as well as (2) the degree of participation and quality of contribution by each individual student involved in the group process. The latter grading requirement has posed a challenge to faculty, so the question addressed in this paper is, “How should individual team members in online courses be assessed for the extent and quality of their contributions to the group project?” To answer this question, four common team member evaluation practices were reviewed and compared to seven criteria representing positive attributes of an assessment practice in an online learning environment. Whereas the *Peer Assessment* practice received the greatest support in the literature in face-to-face courses, this study considered the perceptions of graduate faculty and students and recommended the *Faculty Review* practice as the default assessment practice in online courses because of its overall cost-effectiveness in this learning environment.

KEYWORDS

Individual performance measurement, team projects, collaborative tools, collaborative group work, assessment

I. INTRODUCTION

The introduction of collaborative tools into course management systems has paved the way for the use of team projects in online courses. Many online courses in higher education include small group projects in which teams of students work together on a common assignment and produce a shared response for assessment by the instructor. The assignments might involve responses to a case study, the development of a project plan, creation of a product design, or merely answers to open-ended questions requiring application of course content. The project could be scheduled over a few days, several weeks, or the entire semester. Teams of students work together and complete these projects using typical course management tools such as electronic discussion forums, shared whiteboards, synchronous chats, collaborative documents, and wikis. The students may never come face-to-face, but in some cases supplement the collaborative tools with email messages and video or telephone conferencing.

The benefits of team projects in higher education have been discussed in numerous journal articles [1]. For example, group projects have been found to foster deep learning since new ideas are rarely accepted uncritically in diverse groups [2]. New ideas are often challenged for their underlying meanings and, perhaps, modified so the ideas can be linked to known concepts. Group deliberations lead to deeper understanding and long-term retention for application of learned concepts to problem-solving in unfamiliar contexts. A second benefit for collaboration among students online is that the group response to the assignment is usually better than any of the individual student responses. Collaboration taps into the notion of the “Wisdom of Crowds.” According to James Surowiecki, for certain types of problems,

the solution posed by a group of reasonably informed and engaged people is almost invariably better than any one person's answer [3]. By being exposed to the *wisdom* of the group, team members learn more than if they had been assigned to work on the same task individually. Lastly, collaborative projects prepare students for the Information Age workplace where much of the work is now accomplished collaboratively in cross-functional teams with customers, suppliers, partners, and employees of other divisions [4, 5]. The collaborative group work is often accomplished, at least in part, with online tools.

II. NEED FOR ASSESSMENT OF TEAM MEMBERS

Since group projects typically require an extensive amount of effort by students in a course, general agreement exists among faculty that the team effort should be assessed, graded, and feedback provided [6, 7]. With some exceptions, there is further accord that grading ought to represent both (1) the quality of the product developed jointly by the team as well as (2) the degree of participation and quality of contribution by each individual student involved in the group process [8]. Different faculty and institutions might stress the relative weight of the common product and the individual contribution dissimilarly in the assessment, but both components are typically factored into each student's grade.

The assessment of the team's final product tends to fall within the typical task requirements of most faculty. In virtually all ways related to assessment, a paper produced by a group is indistinguishable from a paper authored by an individual student. Faculty members are quite experienced in the application of stated project requirements or criteria and the use of grading rubrics to assign a score to the final group product. On the other hand, the assessment of each team member's contribution to the final group product poses special challenges to the course instructor.

The individual members of student teams typically contribute to the group project in a variety of ways. They post comments to discussion boards, send email messages, submit documents they created, and may take part in team chat sessions. They might participate in telephone conversations or teleconferences or even meet face-to-face with team members who are located in the same general vicinity. The question addressed in this paper is: "How should individual team members in online courses be assessed for the extent and quality of their contributions to the group project?"

III. COMMON TEAM MEMBER ASSESSMENT PRACTICES

Four methods of assigning grades to team members are discussed in the literature:

A. Shared Team Grade

In this scenario, all members of the team receive the identical grade based on the score assigned by the faculty member to the product of the team effort. If a team project is given a score of 88.5 by the instructor, each member of the team receives a score of 88.5 for grading purposes. This score is independent of the volume and depth of contributions by individual team members. Differences in performance by individual students may be noted and commented on, but they are not formally factored into the summative evaluation. They all receive the same grade. In actuality, this practice excludes the assessment of the degree of participation and quality of contribution by each individual student involved in the group process.

This practice is not unusual and justification can be offered [1, 6]. A team, after all, is considered a single coherent unit and its members should share equally in the rewards and punishments stemming from its common performance. It can be argued that this practice emulates the "real" world [9]. All members of a winning Olympic team receive the same medal; the entire orchestra shares in the standing ovation; the sales team, as a whole, loses its bonus when the customer cancels the contract. The quality of individual performances may be recognized and remarked about, but the formal consequences of the team

performance are often equally shared.

B. Faculty Review of Records

In courses delivered face-to-face, where several teams of students simultaneously meet at tables in the classroom, in lounges around campus, in coffee shops or private residences after hours, it is virtually impossible for the faculty member to observe directly the contributions of individual students. However, in online classes, the learning management system typically provides trace records of the participation of individual team members. Faculty can review individual performance in online team projects by directly observing these trace records.

With this approach, the faculty member has the arduous task of tracking down and reviewing the sum total of contributions by individual students in order to assign a grade to their involvement in team deliberations. The instructor can access the contents of shared whiteboards and documents used by the team for its deliberations with individual contributions made clearly visible. A wiki workspace typically contains an historical record of exactly what each student submitted and when he or she did it. Team discussion forums are accessible by the instructor and a posted transcript of team chats can be made a requirement of a group project. Some course management systems support this effort by displaying a portfolio view of all student contributions to the system. Since private communications among team members such as email messages, teleconferences, and local meetings are difficult to track down, they may have to be discouraged by course policy (e.g., if it doesn't show up in a shared course workspace, it never happened from a grading perspective).

This approach is used in a graduate-level course on "Measurement of Organizational Performance" taught by the author at the iCollege of National Defense University in Washington DC. This fully online course is conducted using the BlackBoard course management system over a 12 week period with a major end-of-lesson assignment due each week. In the grading rubric for the course, these weekly assignments count 25 percent of the course grade. Students can earn five points for each weekly assignment provided that the final submission is on time and meets the stated requirements for the given task. Five of the 12 weekly assignments are team projects involving groups of four to six students based around the world. The team projects usually involve the creation of plans for dealing with a particular performance measurement requirement or the analysis of a case study. The teams use a private discussion board to deal with administrative issues such as how the project work will be scheduled and a wiki for creating and editing the team response to the assignment. To earn the maximum score for the team projects, the final submission by the team must satisfy the given requirements and each individual team member must provide value-added substantive contributions to the team deliberations—they cannot just agree with what others are saying. The instructor makes this determination by reviewing postings to the threaded group discussions and contributions to the wiki as viewed in the History file for each page. The History file provides access to each subsequent edited version of the wiki page with the modification from version-to-version highlighted in color and the name of the person listed who made the change, as well as the day and time that the revision took place. The faculty member can conveniently determine the quantity and quality of contributions by each team member and rate that performance accordingly. If, in the judgment of the instructor, a team member provided substantive value-added contributions to the final team submission, that student receives full credit for the team project. On the other hand, if the judgment is made on the basis of trace records that a particular student did not substantively add to the team project work, that student earns no credit. Students in this category are offered the opportunity to submit their own complete response to the team assignment in order to earn some credit for the week; however, the amount of points that can be earned under these conditions is reduced by a penalty for insufficient contributions to the team activity. With these consequences, it is rare that a student does not participate actively in team projects. On some occasions where a student's work or personal situation precludes

participation in a team project that week, he or she can opt to complete the entire team assignment individually and absorb a penalty for non-participation in the team effort.

C. Faculty Review of Student-generated Portfolio

As an alternative to faculty members tracking down contributions to a team project, students may be asked to create a portfolio that documents and provides evidence of their participation [1, 6]. They prepare a compilation of the work products created during the project and a synthesis of their contributions to the team effort. This may include such items as postings to the group discussion board and contributions to shared documents. It may also include copies of email messages, as well as transcripts or summaries of chat sessions, teleconferences, telephone calls, and face-to-face meetings in which the student engaged as part of the team effort. Besides work samples, students can be asked to include their personal goals and reflections of their experiences in the team project. In this approach, the difficult task of tracking down contributions to the common project is borne primarily by the individual team members and the team. The instructor reviews and evaluates the student's reports and reflections and assigns grades accordingly to individual team members.

In the full-time Immersion Program option in the Instructional Design and Development track of the Instructional Technology Master's program at George Mason University, students engage in a number of small group projects online, each lasting a semester or more [10]. For example, one such project is to develop a CD-ROM-based orientation program for the Senior Executive Service in the Department of Defense. As part of the requirements for the program, students prepare detailed web portfolios that include their personal goals, a compilation of the project work, evidence of their contributions to the team project, reflections on their personal growth as an instructional designer, and their actions in promoting and leading team progress, as well as a synthesis of the team's approach to their assigned task. The instructor assesses individual student performance on the team project using the rubric shown in Table 1 and relies on this portfolio to assign academic grades for individual team member performance.

Portfolio Review Rubric for Exceeding Expectations	
Reflections/ Personal Growth	Reflections demonstrate deep thought about the integration of previous experience, Immersion activities and ID concepts/processes. Listing of individual contributions to projects, learning in other courses, and responsibilities for various project products are meaningfully linked together and included in regular reflections.
Team Contributions	Demonstrated full participation in team meetings, showed exceptional effort on individual tasks, exceeded individual contribution and was instrumental in leading team forward, respectfully acknowledged and integrated all members' skills in project development process.
Skill Sharing	Spent considerable time developing new skills (authoring, graphics, project management skills, etc.) to assist team in reaching project goals and guiding other team members on specific tasks in areas of expertise. Demonstrated strong leadership skills in multiple project areas.
Project Products	Made significant contributions to the development or completion of individual project products (e.g., needs analysis, project Web site, content development, authoring, graphics development, project management

	processes). Documented significant contributions on individual portfolio Web site.
Writing/ Synthesis Products	Demonstrated polished and professional level of writing on all written documents. Evidence provided that paper was peer reviewed. Wrote engaging paper on aspect of ID, modeling literature in the field. Thoroughly synthesizes ID literature producing a Web page related to assigned topics (e.g., task analyses and instructional strategy).
Other contributions	Significant contributions related to the progress of the team, development of processes to move project forward, and development of project. Extra effort demonstrated.

Table 1: Portfolio Review Rubric for Exceeding Expectations

D. Peer Assessment of Team Member Contributions

Peer assessment involves the rating of a student's contribution to the group project by other members of the team. The practice has been used often for team projects in face-to-face classes because of the inability of instructors to observe directly the individual behaviors during team projects [11, 12]. The assessment process has migrated to online courses [4, 9] for a number of reasons including the belief that by participating in the assessment process, students will become more independent learners [7, 13]. Although variations exist in how this process has been put into practice, they each share the characteristic that the members of the team are provided instrumentation for rating the extent and quality of contributions by the other members of the team. Individual students can see the ratings assigned to them by their team members but the identity of the raters is not connected to the ratings – they are anonymous to the students, but not the faculty. The variety in peer assessment practices includes the instrumentation used to collect the ratings, the means by which the ratings are factored into student grades, the timing of the ratings, and whether or not self-ratings are included.

1. Instrumentation

Perhaps the simplest approach to the process of peer assessment is for each member of the team to rate the performance of every other team member on a single linear scale. The scale often ranges from a low of “1” to a high of “5” or “10” with such anchors as “Did none of the work” to “Did all of the Work” or “Poor” to “Excellent” [14, 15]. Williams used a scale from “-1” to “5” where “5” is awarded for an Outstanding Contribution, “0” means No Contribution, and “-1” indicates a “Hindrance to the Team” [4]. Kennedy investigated a process in which each student was instructed to assign a percentage score to represent the proportion of the work accomplished by that member of the team, where a score of 100% represents an average share of the work [16]. Team members receiving scores higher than 100% accomplished more than their share while those assigned scores below 100% accomplished less. The scores assigned by each student to the total of his or her teammates had to average out to 100%.

The instrumentation in other peer assessment systems require students to rate their teammates on a set of criteria rather than a single linear scale. For example, Table 2 lists the criteria for peer assessment used in an undergraduate course in the Business School of Loughborough University in the United Kingdom [17]. In this case, each member of a team is rated by every other member of the team on the five criteria on an ordinal scale, say from 1 to 10. Each student receives an average rating from his or her teammates on each criterion and as a composite score across all criteria representing the student's overall performance on the team project. The particular criteria used for the peer assessment can vary based on the nature of the team project, the subject-matter of the course, and the particular values of the university, the program, and the

faculty. For example, the Engineering School at Loughborough University used criteria for peer assessment of group projects that were somewhat more technical in nature than the Business School [9].

Sample Criteria used for Peer Assessment

Cooperation	Attendance at meetings, contribution to meetings, carrying out of designated tasks, dealing with problems.
Communications	Effectiveness in meetings, clarity of work submitted to the group, negotiation with the group, communication between meetings and providing feedback.
Enthusiasm	Motivation, creativity and initiative during the project.
Organization	Skills in self-organization and the ability to organize others. Also planning, setting targets, establishing ground rules and keeping to deadlines.
Contribution	Overall effort put in by an individual during the semester.

Table 2: Sample Criteria used for Peer Assessment

Table 3 displays the criteria used in the peer assessment of information systems group projects in a South African University discussed by Scott, Van der Merwe, and Smith [7]. In this situation, students are rated by their teammates on each of five criteria (e.g., *Ability to work with the group*, *Amount of effort*,...) on a 5-point scale using the verbal anchors for each criterion stated in the cells of the Peer Assessment Sheet.

CONFIDENTIAL PEER ASSESSMENT SHEET					
Please rate each of the members in your group (excluding yourself) with regard to their contribution to your project on a scale of from 1 to 5 using the following criteria matrix. Further comments can be added on the reverse side.					
	Ability to Work with the Group	Amount of Effort	Dependability	Intellectual Contribution	Overall Contribution to Project
1	Was disruptive of the group process	Minimal	Almost never turned in anything	Almost never offered anything	Very small
2	Participated, but wanted to go in a different direction than the group	Less than what was expected	Got things done, but usually late	Occasional input	Minimal
3	OK	About what was expected	Usually got things done on time	Was helpful	Average
4	Always participated, made sure everyone had a chance to participate.	Above what was expected	Almost always got things done on time	Strong contribution	Above Average
5	Helped get the group	Did the	Always got	Provided lots of	Spot on

	moving without dominating it	whole thing	things done on time	thoughtful, meaningful suggestions	
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Table 3: Peer assessment criteria

2. Determination of Final Grade

Regardless of the criteria used, the ratings are provided to the instructor who inserts the scores into a matrix or spreadsheet and calculates the average rating for each member of the team. Using the example above discussed by Kennedy in which team members were assigned a percentage score representing the proportion of the work they accomplished, the instructor or an automated system creates a table of the type shown in Table 4. The rows display the ratings assigned by each student to every other student while the columns represent the ratings received by each student. Note that in this example, a score of 100 was assigned to all team members in the rows for students 15 and 17. Student 17 assigned the same score of 100 to all team members. Student 15 did not turn in a rating form and the instructor or the system, if automated, assigned the score of 100 to each of that student's team members.

TEAM 2											
Student	11	12	13	14	15	16	17	18	19	Avg	St.Dev.
11		97	97	97	97	97	97	97	121	100	8.5
12	110		100	100	90	100	90	100	110	100	7.6
13	110	100		100	100	90	80	100	120	100	12.0
14	112	100	100		95	95	90	100	108	100	7.2
15	100	100	100	100		100	100	100	100	100	0.0
16	120	95	95	100	100		95	95	100	100	8.5
17	100	100	100	100	100	100		100	100	100	0.0
18	115	100	100	100	95	95	90		105	100	7.6
19	125.6	96.5	96.5	96.5	91.5	96.5	100.5	96.5		100	10.6
Avg	111.6	98.6	98.6	99.2	96.1	96.7	92.8	98.6	108.0		
St.Dev	8.9	2.1	2.1	1.5	3.9	3.5	6.8	2.1	8.6		

Table 4: Matrix of peer assessment

The average scores are fed back to the individual students and used by the instructor in assigning the portion of the team grade based on individual performance. For the example shown in Table 4, the grade for each team member is derived by multiplying the grade assigned by the instructor to the shared team product by the average peer assessment rating score for each student. If the grade for the team product was 88, Student 11 receives an overall grade of 98.2 (i.e., 88×1.116) while Student 17 receives a grade of 82.7 (i.e., 88×0.928). These grades reflect the combination of the scores for the team product and their individual contribution to the product as viewed by the other members of the team. In some peer assessment processes, students are asked to provide comments justifying their ratings that are provided to the team members along with their average rating. In the example discussed by Kennedy, student ratings above 110 or below 90 must be accompanied by a short written justification.

In many other cases, a matrix of ratings is created, but the grades are not calculated mathematically. Instead, the grades for team performance are assigned by the faculty member after a review of the peer assessment ratings. Grading is accomplished qualitatively. In other cases, the averages scores from the

matrix are adjusted by the faculty members based on insights they possess from their own review of individual team member contributions or from insightful comments by the students [4, 7].

3. Timing of Ratings

Most instances of peer evaluation appear to occur at or near the end of the team project or the course for use in assignment of summative grades. For example, Williams describes a course in which peer assessment is mandated for all team assignments and students have three days after the team project to provide their peer assessments [4]. Several authors recommend that the peer assessment process be conducted several times during the period of the project [7, 17]. They propose that peer assessment initially occur in the early developmental stages of a team project solely for the purpose of formative evaluation. That is, the results of this peer assessment do not influence project grades, but are used to help facilitate the group dynamics and build a more cohesive team. Instrumentation with multiple criteria and the requirement for clarifying comments by team members support this purpose. Other advantages cited for earlier and more frequent peer assessments include allowing faculty to monitor team morale over the course of the project and preparing the members of the team to make more accurate summative assessments at the end of the project when the ratings do influence grades [15, 7].

4. Self-Assessments

Many of the peer assessment systems discussed in the literature elicit an evaluation of the student's own performance in the group project along with the assessment of his or her teammates. This is despite the general belief that most such assessments are inflated when compared to peer assessments, particularly among exceptionally strong or weak students [17]. In some cases, self-assessment ratings are requested from each team member but they are excluded from the calculation of the project grade [9]. Self-assessments are considered useful for reflection of the students' own performances on the group project to help them recognize areas where they can improve [18].

In other instances, the self-assessment ratings are factored into the final grades because it is felt that the combination of peer and self-assessments provides a more accurate indicator of the individual team member's performance on the team project than peer assessments alone. Willmot and Crawford conducted a test in which a mentor assigned to each team was positioned to directly observe the activities and contribution of all members of the team [9]. At the end of the group project, the mentors completed the same multi-criterion scaled rating form on each team member that was used in the peer and self assessments. For each student, the mentor ratings tended to be higher than the peer ratings, but lower than the self ratings. In fact, the score that combined both peer and self-assessments for each student correlated highly with the ratings by the mentor.

IV. EVALUATION OF COMMON PRACTICES

A. Method

The literature discusses multiple factors when describing the positive and negative attributes of the various methods for assessing individual student performance in team projects. A proposed set of criteria for evaluating the four common practices derived from the literature is shown in Table 5.

Proposed Criteria for Evaluating Common Practices

Validity of Grades	The scores assigned to individual team members resulting from the assessment process accurately reflect the degree of participation and quality of contribution by the student. [15, 16, 17, 12, 6, 9]
Ease on Students	The assessment process can be undertaken without undue burden on the workload and capability of the members of the team. [16, 17, 12]

Ease on Faculty	The assessment process can be undertaken without undue burden on the workload and capability of the course faculty. [1]
Encouragement of Active Participation	The knowledge and results of the scoring process promote a greater degree and depth of contribution by team members, especially those with tendencies to contribute little to the team process (i.e., free riders). [15, 1, 17, 7]
Perception of Fairness	The assessment process is viewed by all students as being complete and unbiased, whose execution yields scores that truly represent their meaningful contributions rather than irrelevant factors. [16, 19, 1, 17, 7, 13, 9]
Utility for Formative Feedback	Although the primary purpose of the team assessment process is summative evaluation (i.e., assignment of academic grades), the process suggests ways by which individual contributions to the team effort can be improved. [7]
Impact on Group Dynamics	The assessment process supports and does not detract from the ability of the group to work together harmoniously. [1, 17, 7, 18, 6, 4]

Table 5: Proposed Criteria for Evaluating Common Practices

Faculty and students of the Information Resources Management College (iCollege) of National Defense University (NDU) were surveyed to obtain their views on how well each of the four common team member assessment practices stack up against each of the seven criteria listed in Table 5. A description of the respondents is shown in Table 6. The vast majority of respondents had a year or more experience with online education, with most having more than three years experience. All but one of the students had experience with team projects in online courses. A much higher proportion of faculty feel positive towards team projects than students—about a third of the students indicated a dislike for them. Almost all of the respondents had experience with the practice of assessment based solely on a *Shared Grade*. The lowest proportion of respondents had experience with the student-generated *Portfolio Review* practice. Overall, the most preferred assessment practice is a faculty *Records Review*; the least preferred method by far for students is *Peer Assessment*. For faculty, the least preferred method is *Portfolio Review*.

Description of Respondents

N		ALL	FACULTY*	STUDENTS**
		73	17	56
EXPERIENCE WITH DL	< 1 year	8 (11%)	1 (6%)	7 (13%)
	1 to 3 years	24 (33%)	5 (29%)	19 (34%)
	> 3 years	41 (56%)	11 (65%)	30 (54%)
FEELINGS TOWARDS TEAM PROJECTS	Like	18 (25%)	7 (41%)	11 (20%)
	Neutral	31 (43%)	6 (35%)	25 (45%)
	Dislike	23 (32%)	4 (24%)	19 (34%)
	No Experience	1 (1%)	0 (0%)	1 (2%)
EXPERIENCE WITH ASSESSMENT TYPE	Shared Grade	68 (93%)	17 (100%)	51 (91%)
	Records Review	43 (59%)	13 (77%)	30 (54%)
	Portfolio Review	22 (30%)	6 (35%)	16 (29%)
	Peer Assessment	40 (55%)	11 (65%)	29 (52%)

PREFERRED ASSESSMENT TYPE	Shared Grade	16 (22%)	4 (24%)	12 (21%)
	Records Review	28 (38%)	7 (41%)	21 (38%)
	Portfolio Review	17 (23%)	1 (6%)	16 (29%)
	Peer Assessment	8 (11%)	4 (24%)	4 (7%)
	None	4 (6%)	1 (6%)	3 (5%)

Table 6: Description of Respondents

*Response rate of faculty who have used team projects in online courses: 57%

**Response rate of students taking online courses in spring 2010: 23%

B. Results

The descriptive results of the survey are shown in Table 7. Overall, *Records Review* and *Portfolio Review* were perceived to be the assessment methods that yield the most valid indicators of student performance in teams. Interestingly, students were much more trusting in the accuracy of the results from a *Records Review* than faculty—the people who conduct the review of records. Faculty and students shared the same relative high perception of the validity of the *Portfolio Review* assessment process. As might be expected, the *Shared Grade* and *Records Review* techniques were judged to place the least burden on students, while the *Shared Grade* and *Peer Assessment* techniques were believed to place the least burden on faculty. Students felt that their role in *Records Review* and *Portfolio Review* is easier to accomplish than the faculty believed. Similarly, they were more optimistic than faculty that the role by faculty in *Peer Assessment* is relatively easy to accomplish.

Mean score on a scale from 1–“Not at All” to 5–“Extremely” for All Respondents, Faculty and Students for each Assessment Practice on Each Criterion

Criteria	Group	Shared Grade	Records Review	Portfolio Review	Peer Assessment
Validity	All	3.1	3.8*	3.8	3.1
	Faculty	3.0	3.1	3.7	3.3
	Students	3.1	4.0	3.8	3.1
Student Ease	All	2.9	3.2*	2.6*	2.4
	Faculty	2.9	2.7	2.1	2.1
	Students	2.9	3.4	2.7	2.5
Faculty Ease	All	3.0	1.9	1.7	2.8*
	Faculty	3.1	1.6	1.4	2.3
	Students	3.0	1.9	1.8	2.9
Participation Encouragement	All	2.7*	3.6*	3.8*	3.5
	Faculty	2.1	2.9	3.4	3.4
	Students	2.9	3.8	3.9	3.6
Perceived Fairness	All	2.8	3.9	3.9	3.1
	Faculty	2.4	3.5	3.9	3.3
	Students	3.0	4.0	3.9	3.0
Formative Feedback	All	2.6	3.6*	3.8	3.1
	Faculty	2.4	3.1	3.7	2.8
	Students	2.7	3.7	3.8	3.2

Group Support	All	3.2*	3.3*	3.3	3.2
	Faculty	2.6	2.9	3.1	3.2
	Students	3.4	3.5	3.4	3.2
Combined Favorability	All	3.2*	3.6*	3.5	3.3
	Faculty	2.9	3.1	3.3	3.2
	Students	3.3	3.8	3.6	3.3

Table 7: Mean score on a scale from 1-“Not at All” to 5-“Extremely” for All Respondents, Faculty and Students for each Assessment Practice on Each Criterion

*Statistically significant at the 0.10 level for Faculty vs. Student Responses

The *Portfolio Review* practice was rated highest for encouragement of active participation by students. Not surprisingly, the *Shared Grade* practice was rated lowest on this criterion. For all practices except *Peer Assessment*, student ratings on encouragement of participation were significantly higher than those of the faculty. With regard to the perception of fairness of the assessment, *Records Review* and *Portfolio Review* had the highest ratings by both faculty and students. These same two practices were also rated highest for providing formative feedback to students on their individual contributions; however, for this criterion, students were more optimistic than faculty that a *Records Review* offers more useful formative feedback. None of the assessment practices were given particularly high ratings in their support for group dynamics. Faculty rated the *Shared Grade* and *Records Review* practices more negatively on this criterion than students.

As shown in Table 7 above, a combined favorability score was calculated for each common assessment practice by averaging the ratings across all seven criteria. The *Records Review* practice had the highest favorability score overall which was driven primarily by student ratings. Faculty had no clear-cut favorite assessment practice but seemed to have a slight preference for *Portfolio Review*.

A linear regression was conducted to determine if any of the descriptive variables concerning the respondents influenced the combined rating score for each common assessment practice. The results are shown in Table 8.

Factors Affecting Combined Favorability Score for Assessment Practices in terms of Correlation where negative values indicate inverse relationships

	SHARED GRADE	RECORDS REVIEW	PORTFOLIO REVIEW	PEER ASSESSMENT
COMBINED FAVORABILITY SCORE	3.2	3.6	3.5	3.3
ROLE OF RESPONDENT				
1-Student	-0.23*	-0.42*	-0.18*	-0.09
2-Faculty				
DL EXPERIENCE				
1 - <1 year	-0.13	-0.08	-0.01	0.01
2 - 1 to 3 years				
3 - >3 years				
FEELINGS TOWARDS TEAM PROJECT	0.40*	0.18*	0.24*	0.25*

0 - No Experience 1 – Dislike 2 – Neutral 3 – Like				
EXPERIENCE WITH ASSESSMENT TECHNIQUE 0 – No 1 - Yes	0.08	0.03	0.18*	0.26*

Table 8: Factors Affecting Combined Favorability Score for Assessment Practices in terms of Correlation where negative values indicate inverse relationships

*Statistically significant at the 0.10 level in a multivariate analysis

Only one of the descriptive variables had a statically significant relationship with the combined favorability score for all four common practices. That descriptive variable was “Feelings towards Team Project” where the more positive the feelings, the higher the favorability score for each assessment practice. The “Role of the Respondent” was related to the combined favorability score for all common practices except *Peer Assessment* with students tending to give higher ratings than faculty to the various criteria. For *Peer Assessment*, the combined favorability score were similar for both faculty and students. Those respondents who had actual experience with *Portfolio Assessment* and *Peer Assessment* tended to have higher favorability scores on those assessment technique than those who did not. This relationship was not true for those who experienced the assessment practices of *Shared Grades* and *Records Review*. That is, those respondents with experience in these practices had no greater or lesser favorability scores than those without such experience. The extent of “DL Experience” had no influence on the combined favorability score of any of the common assessment practices.

V. DISCUSSION

The issue being explored in this paper is “How should individual team members in online courses be assessed for the extent and quality of their contributions to the group project?” Four common practices were considered:

A. Shared Grades

There was little support in the literature for basing a student’s grade in an online team project solely on the quality of the final team product. The vast majority of articles favored practices that included assessment of individual contributions to the team effort, especially to discourage students being “free riders.” In the survey of NDU iCollege faculty and students, respondents were asked, “If given a choice, which type of assessment of individual performance in team projects would you prefer?” Slightly over 20 percent of faculty and students preferred the *Shared Grades* practice. Judging by responses to the survey items rating this practice on the criteria of “Student Ease” and “Faculty Ease,” the people preferring this practice probably placed great emphasis on the lack of burden this practice places on both faculty and students. Conversely, the *Shared Grades* practice scored at the low end on the other five criteria, especially “Participation Encouragement,” “Perceived Fairness,” and “Formative Feedback.” It also had the lowest combined favorability score—the score that averaged ratings across all seven criteria. Students had significantly higher combined favorability scores on this practice than faculty, but that finding was true for all four practices considered. People who tended to dislike team projects in general had particularly low combined favorability scores for the *Shared Grades* practice. Almost all respondents had experience with this assessment practice. Although association between variables does not necessarily imply that one influences the other, it is possible that those students who hold team projects in low regard do so in part because of the extensive use of the *Shared Grades* practice and its low levels of perceived fairness and encouragement of participation by all team members.

B. Records Review

There seems to be little discussion in the literature concerning the assessment practice by which faculty assign grades to individual team members based on a review of trace records in the online collaboration tools. Researchers do make the point of the time-consuming burden placed on the faculty by this process [1]. The faculty and students of the iCollege of NDU shared this position. The *Records Review* practice received close to the lowest rating on the criteria of “Faculty Ease” by both faculty and students. On the other hand, the practice scored at or near the highest rating on the six remaining criteria. In fact, it had the highest combined favorability score of any of the four practices overall, although these positive feelings were due more to the perceptions of students than faculty. After all, the burden of this practice rests primarily with the faculty. Yet when asked directly for their preferred assessment type, the highest proportion of both faculty and students chose *Records Review*. About three quarters of faculty and slightly over half of students had direct experience with this assessment practice. Yet, the relatively high opinion of the *Records Review* practice was independent of direct respondent experience with the practice.

C. Portfolio Review

For this assessment practice, students prepare a portfolio of their contributions to the online team product, and the faculty member assigns a score to each team member on the basis of his or her review of the student’s portfolio. Only one article specifically addressed this practice [1]. Using a similar approach involving a faculty review of team log books and sheets of team minutes, the authors commented on the need for students to be trained in keeping records, a practice that is a learning experience itself since the students must focus on the team process in their record keeping activities. About 30 percent of NDU faculty and students indicated experience with the *Portfolio Review* practice. About a quarter of the respondents also chose this practice as their preferred assessment type. A cross-tabulation of these two variables showed that a slightly higher percent of people having experience with *Portfolio Review* chose it as their preferred assessment type than those respondents without such experience. As might be expected, the respondents felt that this practice was somewhat more burdensome for students than a faculty review of trace records. More surprisingly, the respondents saw this process as being even more burdensome for faculty. This was especially true for the perceptions by faculty. They saw reviewing student portfolios as more burdensome than reviewing the trace records of students. On four of the other criteria involving the efficacy of the assessment practice (i.e., “Validity,” “Participation Encouragement,” “Perceived Fairness,” and “Formative Feedback”), the *Portfolio Review* practice tended to share honors with the *Records Review* practice as the highest or near highest rated practice. With regard to the combined favorability score, the *Portfolio Review* practice had the highest value for faculty and second highest for students.

D. Peer Review

There is a great deal of literature discussing the use and efficacy of *Peer Assessment*, particularly as it relates to team projects in face-to-face classes. The conclusions in most of these articles are favorable to the practice: minimization of “free riders,” improvement of group cohesion, and fair and accurate grading [4, 7, 17]. Yet, some articles question the value of *Peer Assessment*. For example, Kennedy says the evidence raises serious doubts about the accuracy of student assessments of the contributions of their peers and that the burden that *Peer Assessment* places on students and the administration of the course may even detract from the attainment of the course objectives [16]. The survey findings of NDU students and faculty seem to be more aligned with the detractors of *Peer Assessment*. Fewer respondents overall chose *Peer Assessment* as their preferred assessment technique than the other three practices. This was especially true for students where only four of 56 students preferred this practice to the others. *Peer Assessment* was tied with the *Shared Grade* practice for the lowest rating for “Validity” and second to the *Shared Grade* practice for the lowest rating on the “Perceived Fairness” criterion. It was also rated lowest on the “Student Ease” criterion. Slightly over half of the survey respondents reported direct experience with *Peer Assessment*. The percentage of respondents choosing *Peer Assessment* as their preferred

assessment practice and the combined favorability rating for *Peer Assessment* were somewhat higher for people who had direct experience with the practice than those who did not. It is possible that experience with the *Peer Assessment* mitigates negative feelings towards the practice.

VI. SUMMARY/CONCLUSIONS

Online courses present different conditions for assessment of team projects than face-to-face courses. The face-to-face classroom environment, in which in-person team deliberations often occur out-of-sight of the instructor, presents exceptionally difficult challenges for assessment of individual team member contributions. This situation has led to the development of complex protocols for assessing individual team members, such as requiring students to prepare a portfolio of their team contributions for review by the instructor or having all team members assess the team performance of each of their peers using structured tools. Although some argue the extenuating benefits to the learning environment by having students engage in these practices, there is general agreement that these practices place heavy burdens on the students to accomplish effectively and reliably. Faculty also have major administrative roles in these practices for communicating the requirements to students, monitoring the implementation, and analyzing the results. The arduous level of effort associated with the practices of *Portfolio Review* and *Peer Assessment* may lead some face-to-face course designers to avoid the assessment of individual contributions to team deliberations entirely. Instead, a shared grade is assigned to all team members based solely on the final team product. This practice occurs in spite of the almost universal condemnation by authors, faculty, and students because of its inability to discriminate fairly between those students who do the lion's share of the work and those who shirk equal responsibility for the team project.

Course management systems used in online courses allow direct observation of individual team member contributions to team projects. Unlike in face-to-face courses, faculty in online courses can review the trace records that students leave in their team deliberations including email messages, postings to discussion boards, and contributions to shared online workspaces. The practice of assessing these trace records to assign grades representing individual performance in online team projects offers great promise.

The students are unburdened by the process except to assure that all their contributions to the team effort find their way to one or more of the course management collaboration tools. The onus is on the faculty member to review the records left by students by their project work. But the extent of this activity may not be much greater than the requirement to orient and monitor student behaviors associated with preparation of portfolios or the conduct of peer assessment. Some course management systems facilitate the faculty review of student online activities by offering a portfolio view of all their contributions.

The process of faculty review of the recorded contributions of students should be considered as the default practice for assessing individual student performance in online team projects. Other practices might be implemented under special circumstances. For example, if the learning objectives of the course stress personal reflection of their team learning experiences, then assessment of student-generated portfolios would be beneficial. Similarly, if the course objectives include an in-depth study of group dynamics, then the use of peer assessment could be advantageous to support those learning outcomes. But, absent any special learning requirements, the use of the *Records Review* process appears to offer a reasonable balance of efficacy and practicality in assessing individual team member performance in online projects. However, this conclusion is subject to greater empirical study on the effects of this practice in online courses.

VII. ABOUT THE AUTHOR

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