PROFILING AND THE STUDENT PROJECT PEER APPRAISAL PROCESS

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ABSTRACT

Past research on team formation and composition reveals that team member attributes play a role in how students perceive each others' contributions to a team project. Can attribute-based profiling be used during the peer appraisal process so that a holistic-based assessment tool can still provide meaningful feedback to the student being rated? Our study shows that students can develop a profile of the "ideal team member" at the start of the project that is consistent with their overall assessment of a team member's performance at the end of the process.

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INTRODUCTION

The use of group projects in higher education has grown progressively over the years, ostensibly because employers view the ability to work effectively in a team as an essential skill (Holt, et al., 1997). Guzzo and Dickson (1996) stated that one of the ways in which educators assess the effectiveness of student project teams is when the students' experiences provide developmental outcomes for those involved. According to Hartenian (2003), team training and experiences positively correlate with team knowledge, skills and abilities. The opportunity for students to get feedback about their performance in these project teams, therefore, is an essential part of the learning process.

Feedback about individual student performance in teams is often obtained from peer assessments since direct observation by the instructor is usually not feasible. Several studies have shown that given the choice, students prefer to rate their peers using a holistic approach that provides a "big picture" view of their satisfaction with their peers' contribution to the overall team experience and outcome. A category-based peer appraisal approach, however, can provide more meaningful feedback on a student's teamwork knowledge, skills and abilities for developmental purposes. This latter approach, that asks students to evaluate their peers on several criteria at the end of the project, however, have been found to result in lower motivation among students to take the peer appraisal process seriously. This category-based approach is also more difficult when a student's performance within the group is part of the grading process for the course.

This paper discusses the benefits of having a peer appraisal process that combines category-based and holistic-based approaches. It will be shown that a peer appraisal process that asks students to develop an attribute profile of their ideal team member at the beginning of the project can be used to provide feedback about the teamwork skills and abilities of students who receive poor and excellent holistic ratings at the end of the project using data collected for this purpose. The benefits and limitations of this profile-based peer appraisal approach, and possible future research directions are then discussed.

LITERATURE REVIEW

The use of self and peer appraisal in the classroom has been widely reported in the literature (Boud & Falchikov, 2007, Goldfinch, 1994, Goldfinch & Raeside, 1990). During self appraisal, a student judges his or her own performance, while in peer appraisal he or she judges the performance of others (Falchikov & Goldfinch, 2000). In both of these instances, students are applying criteria, standards and making judgments (Falchikov & Goldfinch, 2000).

Peer appraisal is grounded in active learning and adult learning principles (Cross, 1981). McAuley and Henderson (1984) purport that peers can identify personal strengths and weaknesses better than other members of an organization. Peer ratings hold promise for providing accurate assessment of job performance (Borman, 1991). In addition, peer appraisal has benefits in terms of promoting learning (e.g., Falchikov, 1986, Boud, 1988).

A peer appraisal process is often considered as an integral part of student team projects since team members are more privy to the inner workings of the group compared to an external observer (Russell, et al., 2006). The assessment of individual team member contributions has a practical value to the instructor since it is used as reference when determining the students' grades on the project. However, students have reported that the use of peer appraisal also encourages team cooperation, commitment and increased engagement among team members (Willey & Gardner, 2009). These outcomes are critical since social loafing can lead to lower student satisfaction with the teamwork experience (Schultz, et al., 2010).

There are two common formats generally used to assess team member contributions. A holistic-based approach lets a student give an overall appraisal of a team member's performance. This method is most convenient when used as basis for assigning an individual grade for the student's contribution to the project. A category-based approach, on the other hand, affords a student the opportunity to rate a team member on several criteria that are deemed as important for effective teamwork. This format has been found to improve team member performance (Erez & Somech, 1996), increase commitment (Willey & Gardner, 2009) and reduce social loafing (Brooks & Ammons, 2003). Lejk and Wyvill (2001) suggested that a category-based assessment process is useful in generating feedback about teamwork skills for developmental purposes.

Friedman, Cox and Maher (2008) found, however, that students prefer the holistic-based approach to the category-based approach. They concluded that an overall rating of team members at the end of the project gives the rater more flexibility in distributing a team member's contribution to those criteria that they considered as relevant. The students' higher motivation to rate holistically can also be driven by the convenience of a shorter assessment form, especially when done toward the end of the term.

Russell, Haritos and Combes (2006) suggested that there is a need to establish clear evaluation criteria that can guide student appraisers even if a holistic approach to assessment is used. If evaluation criteria are an essential part of an effective peer appraisal process, can it be used to interpret the holistic assessments provided by team members at the end of the project? Such an assessment process, thus, can incorporate the developmental benefits of a category-based format and the practical advantages of a holistic approach.

A PROFILE-BASED APPROACH TO PEER APPRAISAL

This study tested an assessment method that combines category-based and holistic-based approaches to student team peer appraisal. The method employs a two-stage process that first asks students for the attributes of their most ideal team member from a list provided by the instructor at the start of the project. The student is then told to provide a holistic rating of his or her team members according to their

contributions to the project at the end of the term. Allowing students to establish a profile of an ideal member sets the stage for interpreting the holistic ratings they give to their teammates at the end of the project. An instructor-guided but student-defined profile is also beneficial if they are to take this assessment seriously (Goode & Teh, 2005). Having students develop the profile at the start of the project process and holistic ratings at the end also optimizes the rise and fall of student motivation levels during the project process as discovered by Friedman, Cox and Maher (2008).

The attributes used in forming the profile are derived from the list developed by Connerley and Mael (2001). Their study tested fifty-one team member attributes that could matter to students when selecting and assessing team members. The thirty attributes that were included in the list provided to the students in this study were those found to be significantly correlated with student satisfaction with a team member. These attributes were also deemed by the instructors as relevant to the context of their courses. The attributes represented five conceptually defined dimensions: academic attitudes, abilities and relevant experience, intrapersonal temperament, interpersonal and work preferences (refer to Table 1).

Students are asked to specify the importance of each of these attributes to their profile of an ideal team member before they actually selected team members. Levine and Moreland (1990) suggested that students selecting their own teams often choose team members based on friendships and convenience. Letting students develop a profile before they select team members can reduce the chance that the criteria they select will be tailor-fitted to the composition of their team. Tailoring the profile to selected teammates can eliminate potential feedback on deleted attributes that could otherwise be essential for an "ideal team member."

This appraisal method then asks the students to rank team members according to their contributions to the project. It is expected that the students will use the profile they developed during the first stage when ranking their team members at the end of the project. The holistic-based ranking can then be interpreted in light of the profile developed by each rater. Each student can then receive feedback on their performance in each criterion without having students rate each other on each attribute at the end of the project when their low motivation to do so could render their assessment meaningless.

METHODOLOGY

To test the validity of this approach, the authors modified the second stage of the process by asking the students to rate their team members along the same attributes as those presented at the start of the project. Those team members that were adjudged to have contributed the most to the project should score highly on attributes that were deemed to have the largest positive impact on team performance. Those who were deemed to have contributed the least should score poorly on the same attributes.

The sample consisted of 187 junior and senior-level college students at a mid-sized regional university. The students were enrolled in either one of two different courses that each required a semester-long team project. Students formed their teams made up of three to five members each.

Data were collected in two stages. During the first stage, each student was asked to express his or her opinion on the extent to which thirty attributes of his or her *ideal* team member should contribute to team performance (-2 = very negative contribution, -1 = negative contribution, 0 = no contribution, 1 = positive contribution, 2 = very positive contribution). This survey was administered before students formed their teams. To match their responses with those taken during the second stage of data collection, students were asked to provide identification codes. The second stage of data collection consisted of a survey that was administered after completion of the project and before the project grades were released. Each respondent was asked to evaluate the contribution of the team member who contributed the *most* and who contributed the *least* along the same thirty attributes using the same scale as the first survey. Respondents

did not have access to their responses collected at stage one. Their responses were then matched with those from the first stage using the identification codes provided earlier. Item means were calculated for each attribute and compared across the two stages of data collection.

RESULTS

Table 1 shows the mean response to each attribute as it relates to the team member that contributed the *least* to the project, the *ideal* team member, and the member that contributed the *most*, respectively. Table 1 also shows the results of t-tests between these means to see if their differences are statistically significant. The data suggested that as a group, students in our sample gave those they deemed to have contributed the *most* with higher ratings than their *ideal* team member along 29 out of 30 team member attributes. The only attribute that did not show any significant difference related to the team member's *Dependability to show up at meetings*. It is noteworthy that this attribute had the highest mean score for the ideal member suggesting that this is the most important attribute for the students sampled.

Table 1: Sample Means and Results of t-tests

Attribute of a team member	(a) Mean response about team member who contributed least to the project	(b) t-statistic Difference between (c) and (a)	(c) Mean response about the ideal team member	(d) t-statistic Difference between (c) and (e)	(e) Mean response about team member who contributed most to the project
Academic attitudes					
Major	0.64	-3.198***	0.34	-11.445***	1.20
Importance placed on team assignment	0.65	5.557***	1.13	-9.734***	1.60
Attitude toward school in general	0.56	3.397***	0.88	-8.423***	1.38
Attitude toward this class	0.49	4.665***	0.89	-7.204***	1.34
Attitude toward hard work	0.65	7.377***	1.34	-5.607***	1.62
Importance placed on grades	0.67	6.570***	1.22	-7.556***	1.61
Desired grade in class	0.80	8.592***	1.50	-2.791***	1.65
Ability and relevant experience					
Ability to express written thoughts	0.57	10.077***	1.35	-5.429***	1.64
Ability to communicate orally	0.72	10.710***	1.58	-2.661***	1.72
Resourcefulness	0.57	9.652***	1.42	-3.098***	1.57
Ability to brainstorm	0.75	7.219***	1.32	-3.210***	1.51
Experience conducting research	0.68	3.638***	1.00	-7.055***	1.45
Creativity	0.61	5.296***	1.08	-6.398***	1.47
Writing skills	0.45	5.972***	1.01	-9.216***	1.58
Fluency in English	1.22	0.218	1.24	-9.744***	1.84
Previous team experience	0.80	-2.142**	0.64	-13.034***	1.48
Intrapersonal temperament					
Dependability to show up at meetings	0.74	9.721***	1.74	-0.535	1.76
Ability to be self-motivated	0.65	8.074***	1.36	-6.469***	1.67
Friendliness	1.23	-2.131**	1.05	-10.880***	1.69
Ability to work under pressure	0.71	5.868***	1.20	-6.608***	1.62
Sense of responsibility	0.59	10.402***	1.49	-4.219***	1.70
Attitude toward early versus last minute	0.53	5.675***	1.04	-4.406***	1.37
Interpersonal					
Ability to work well in groups	0.95	8.538***	1.56	-2.292**	1.68
Ability to get along with others	1.21	2.122**	1.34	-8.462***	1.77
Attitude toward carrying own workload	0.56	7.682***	1.29	-8.474***	1.72
Ability to compromise	1.00	2.546**	1.21	-5.918***	1.50
Personality (shy or outgoing?)	0.90	-2.461**	0.63	-11.832***	1.48
Desire to voice opinion in group	0.82	1.957*	0.99	13.633***	1.67
Work preferences					
Ability to work late nights with group	0.59	1.780*	0.72	-8.594***	1.33
Willingness to work weekends	0.62	-0.114	0.62	-9.427***	1.30

*The students were asked to assess their ideal team member and actual team members along the thirty attributes (organized into five dimensions) indicated on the left column. The means responses to each attribute of the student sample are indicated in columns (a), (c) and (e) using the following scale: -2 = very negative contribution, -1 = negative contribution, 0 = no contribution, 1 = positive contribution, 2 = very positive contribution. The t-statistics resulting from a paired sample test of differences between means are shown in columns (b) and (d). The significance of each t-statistic is indicated at the 1, 5 and 10 percent levels with ***, ** and *, respectively.*

Although significant differences existed between the sample means for the ideal member and the member who contributed the most, are these differences significant within-subjects? Each student's response as to how his or her ideal team member fit a particular attribute and how the member who contributed the most to the project scored on each attribute were tested for any significant differences. There were significant within-subject differences at the .05 level for all attributes except one: *Dependability to show up at meetings*. This is the same attribute where there was no significant difference found between subjects.

The student sample gave significantly lower ratings to those who they perceived to have contributed the *least* along 24 of the 30 attributes. The only attributes where this pattern did not occur are those related to the team member's *Major, Fluency in English, Previous team experience, Friendliness, Personality,* and *Willingness to work weekends*.

When differences within-subjects were tested between ideal team member attributes and those related to the member who contributed the least, the differences on four of the 30 attributes were not significant at the .05 level: *Fluency in English, Desire to voice opinion in group*, *Ability to work late nights with group*, and *Willingness to work weekends*. The ideal team member profile listed the last three attributes as having low mean values.

CONCLUSIONS

This paper presented a peer appraisal process that combines category-based and holistic-based approaches. This peer appraisal process asks students to develop an attribute profile of an ideal team member at the beginning of the project that can be used to provide feedback about the teamwork skills and abilities of students who receive poor and excellent holistic ratings at the end of a project. To test the validity of this method, data were collected in two stages. During the first stage, each student was asked to develop an attribute profile of his or her ideal team member. At the second stage of the process before final project grades were given, students rated their team members along the same attributes as those presented at the start of the project.

The findings suggested that attribute-based profiling could be used to provide feedback to students. The higher ratings that students gave to those that contributed the most to the project compared to the ratings for the ideal member and the lower ratings given to those who contributed the least in most of the attributes attested to the validity of this two-stage appraisal process. The proposed method is user-friendly since it takes advantage of the students' propensity to develop a profile of the ideal team member at the earliest stage of the team project process to complement the more convenient and course grade-friendly holistic-based peer appraisal method at the end of the process.

There are limitations, however, to this method. First, the conceptually defined dimensions and thirty attributes used in this study may not fit other contexts and courses. Second, the method is subject to one of the weakness of any holistic-based approach – it is most useful at distinguishing between poor and excellent performers. It is less robust when assessing average performers whose ratings across attributes may have subtle variations. Third, an appraisal process that allows for open-ended comments about team members may provide richer feedback information. However, this is still subject to the willingness of students to engage in this labor-intensive activity and the instructor's ability to assign a quantitative value to these comments. At the very least, the peer appraisal method proposed in this paper can be used to supplement any comments provided by students and ensures a more comprehensive alternative to a sentence or two about a student's teamwork abilities.

Teamwork is not confined to management education. Future studies could consider the application of this methodology and the peer appraisal process to other disciplines that will allow cross-disciplinary analysis and comparisons.

The relevance of team member attributes such as *friendliness* and *fluency in English* in this peer appraisal method is limited by the context of the study. The students in the sample selected their team members creating team composed of members with a bias in favor of this attributes. Samples that include more diverse groups of students with less experience with each other such as those found in online classes deserves further investigation. The method can also be tested with teams whose members are assigned.

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