

Teaching Tip

Peer Review to Support Student Assessment in Teams

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ABSTRACT

Group projects are common in many Information Systems courses. This approach to syllabus delivery helps students to understand the mechanics and implications of working in teams. Peer review is integral to this teaching method. However, there is argument in the literature that students may be unable to objectively assess the progress of themselves and their peers. This paper documents a structured approach to assessing students in peer contexts and discusses the application of this approach in the context of a project management course.

Keywords: peer review, information systems projects

1. INTRODUCTION

Over the past decade, there has been increased focus on the skills, particularly "soft" skills, of graduates entering the workforce. Surveys have consistently shown that employers place greater emphasis on these skills relative to academic performance. This is reflected in the recruitment process where these skills are identified as essential selection criteria. ACNielsen Research Services (2000) found that academic learning ranked tenth, in terms of relative importance to employers, on a list of skills and competencies. This highlights the significant changes that the corporate environment has undergone over recent years.

At the same time, group project work is deemed an important part of the tertiary learning process (McCloskey 2004). These projects may involve system development, analysis or academic research (Mustafa 2004). The use of teams, such as project teams, in the corporate environment is also becoming more common. Maiden (2004) reported a survey by The Australian Chamber of Commerce and Industry in which teamwork was identified as one of eight key attributes sought by employers. As part of the debriefing process on completion of a project, team members may be required to carry out a peer review or assessment, on both their own and their colleagues' performance. Also, many organisations implement peer reviews as part of a broader staff performance evaluation process. Saunders (1992) notes the demand by future employers for students to evaluate their own strengths and weaknesses as well as being aware of their personal and academic development.

It is, therefore, critical that students acquire or develop these skills as part of their tertiary experience; that they have the opportunity to work in groups and experience the behavioural and managerial processes taking place in the organisational environment. This is particularly the case when an individual spends much of their working day involved with groups. (Humphreys *et al.*, 1997, Vecchio 1995).

Some peer review processes can be open to bias and validity problems (Thompson 2001). Student assessments of *their own* performance can be inflated as their self-opinion increases (consistent with John and Robins 1994) or as they lack the ability to accurately gauge ability (Kruger and Dunning 1999). Also, some students may feel as though the peer assessment method is tied to their assessment, and will hence introduce signalling bias into their reviews (consistent with Sindre *et al.* 2003). Despite this, Boud and Falchikov (1989), in a critical review of 48 quantitative studies in the self-assessment literature, found no consistent tendency to over- or under-estimate classroom performance.

This presents an interesting opportunity for additional work in the area. On the one hand, teamwork is important for modern learning. In this vein, there is a need for some type of peer review to guide and measure teamwork. On the other hand, a key problem with peer review is the concern that some students may offer inflated or otherwise biased opinions of themselves. This paper presents a method for conducting weighted peer reviews within student groups for

the purpose of assessment and feedback. Importantly, the method allows for individual mark moderation in order to at least partially counter the effects of Kruger and Dunning's (1999) "inability to gauge ability".

2. PEER REVIEW

The concept of peer review means that participants (such as students) can review their own performance in an activity (Newell 1998). This review may then subsequently contribute to the participant's grade in the activity. The use of peer reviews is not new. Indeed, peer review methods have been found to have reliability and validity (Hollander 1957, Love 1981) and are highly effective in small group situations (Persons 1998). It requires students to be part of the learning process; they take responsibility for their academic and personal development. Further, the peer review process can expose students to circumstances similar to those in the "real world" where individual performance may be gauged by colleagues over the lifetime of the project, and is not only conducted at the point of submission. There is evidence that such approaches assist students in understanding their assessment and improving their own skills (Mangelsdorf and Schlumberger 1992, Pond and ul-Haq 1997).

Peer review involves both active and collaborative learning. Stefani (1998:339) argues that "it is essential that students are equipped to be flexible, adaptable and prepared to take responsibility for their own learning and their own continuous personal and professional development." It is crucial that students are involved in the assessment process as partners and that "assessment at any level should not be a unilateral activity" (Stefani 1998:340). Sindre et al. (2003) offer similar arguments. In these circumstances, a form of partnership in the assessment process forms between students and their peers.

A structured approach to peer review may serve to alleviate these problems by incorporating controls into the instrument. Appendix A shows the peer evaluation form.

First, furnish students with copies of the peer evaluation form at the project's outset. This may occur at the start of semester, depending on course structure. Staff should pay close attention to student concerns over clarification and meaning of terms in the form. The attached form has been through many revisions in order to clarify ambiguous terms and remove extraneous text. This keeps the form simple and easy to understand. It also reduces the effect of information overload. Staff should also be careful to remind students that their responses will be held in strict confidence and at no time with their forms be made available to anyone else. This confidentiality, as in survey research, serves to improve honesty and accuracy (Dillman 1978).

Students should be instructed to complete and submit their peer review forms on their own (and not in groups) at any time after the project has been submitted. In our experience, those students who submit their forms with the project (ostensibly in the interests of completeness) subsequently

have second thoughts about their judgments. The "cooling-off period" means peer reviews are not biased by the feeling of elation or resistance to "letting go" (Thiry 2004) associated with project completion.

The peer calculation process can be started before all the forms have been submitted. In fact, in the past we have found it useful to undertake the calculations with one form missing – in these cases, the final form, once submitted, can act as a control (and should be roughly in line with the calculations that have already been made).

1. Gather sheets from students and collect them into the appropriate student groups.
2. Note how many people are in each student work group. Convert each group size into an expected proportional percentage. For example, if there are four people in the group, we would expect each person to do 25% of the work. If six people are in the group, we would expect each person to do 16.6% of the work.
3. For each person, add and take the average of each cell in Section 1. Multiply this by ten to convert the figure into a percentage. This renders a proportional percentage of perceived effort put into the project for each group member.
4. Compare the percentage level obtained from Section 1 with the levels of contribution listed in the first two cells of Section 2. These should be roughly similar.
5. If the two are not equivalent, then it is possible that the student is omitting important feedback and review information. In these cases, staff can moderate the figures by comparing them to the third cell ("Overall Contribution") in Section 2.
6. Compare the final percentage from Step 4 with the expected percentage obtained in Step 2. Use this difference to moderate the group members' marks accordingly. This may mean that team members' marks will go up or down. Students will, in effect, receive more direct benefit for the work their put into the project by obtaining marks ordinarily allocated to 'free-riders'.

3. DISCUSSION

This method has been used for the last three years in a final year project management course and a major Australian university. The feedback obtained on the project and the evaluations is predominantly positive. Students generally found the exercise and working in groups a learning and rewarding experience. Student feedback on their peer review forms supports this, and gives substantial insight into how these teams performed and behaved. Some of these comments follow. Team names are substituted for confidentiality purposes. The designation at the end of each quote (such as "A1") represents the team (A) and member (1). Some comments include:

Overall, all team members in Team A worked well together. There was good communication and we had

a team environment where we could discuss anything, even when we had different opinions. (A1)

Our team worked effectively together. we managed the project very well and kept on track with tasks. (A2)

Team B worked very well together, faced a lot of challenges together but always managed to keep a calm and level head. I am very proud to be a part of this group. (B1)

This was most definitely the most positive group work experience I have ever had. We all worked very well together and are still talking to each other! Even though the project didn't go to plan, we still learnt a great deal from this. (B2)

The project also highlights the approaches adopted by the teams. A number of them nominated team leaders or project managers to oversee the project. Students recognise the variety of experience and skills that each member brings to the team. Some comments include:

One thing that has become apparent in group/project work is the importance of everyone's varying skills. (C1)

Most of the work was done as a team, and there was no stand out team member who contributed significantly more than any other, and at the same time no one did significantly less. (D1)

Generally work done was fairly even. I felt [Team Member 1] certainly contributed the most. (D2)

[Team Member 1] was a good team leader, constantly pushing the group along and ensuring deadlines were met. (D3)

[Team Member 1] was an excellent team leader and I enjoyed working with him. (D4)

Comments, such as those received from team D above, indicate that students are aware and capable of making objective evaluations. It also provides evidence that exercises such as these provide opportunities for students to acquire or develop leadership skills as they experience and recognise some of the qualities associated with good leadership. Students who assumed leadership positions recognise the burden and responsibilities expected of them as leaders. Some of their comments include:

Being Project Manager, I felt that the hardest part was to actually get everyone come together and do what they are supposed to. Managing people is definitely harder than the project itself. (E1)

Being team leader of Team F was a challenging task, simply because I was working with people if such contrasting/conflicting personalities. (F1)

Being the head 'technical' member of the team I became the 'de facto' project manager. It also meant that I had to integrate everything. Unfortunately, in my leading role I was a relatively poor delegator, leading to unbalanced workloads in the group. (G1)

Students also encountered difficulties. As with any group task, the potential exists for some team members to 'free ride'. The relative inexperience of some students with

working in teams is evident, particularly in resolving conflicts and disagreements within the team. Some comments include:

The group was not united enough and thus, there was poor communication within the group. (H1)

Everyone has different ideas and opinions. Clearly, there was lack of cooperation and responsibility within the group as well as poor management. (H2)

My team didn't know the meaning of team work. (I1)

On certain occasions, the addressing of issues were poorly handled by the team leader. (I2)

4. CONCLUSIONS

The case raises a number of interesting points for practice. First, students appear to benefit substantially from the teamwork process, and the peer review method presented in this paper assists in developing and moderating this teamwork. Whereas group consensus may not necessarily imply grade accuracy (as in Thompson 2001 and Kenny 1994), we have generally found that this review method works well. Importantly, students have been pleased with its outcome, even in circumstances where outcomes grades have been severely detrimental.

Second, as all feedback mentioned in the case was confidential and related to the course administrators only, the comments suggest that students are developing good objective analysis skills. The peer review method discussed in this paper appears to support this skill development and allows the course facilitator to witness the learning process in action. Should course facilitators require finer assessment of individual student progression, they could consider running this peer review process several times throughout the course. Peer review and self-assessment are skills that need to be practiced and developed over a period of time. As the process is repeated, students become better skilled in teamwork and reflective practices. While this may introduce a learning effect whereby students are able to collude over, or otherwise mask, their understanding, these effects can be alleviated through refinement of the peer review process.

In this study, given that the course is at a third year level, the team project used a relatively broad-based set of evaluation criteria, which are not specifically defined in the evaluation form. It is expected that students at this level of their study should be able to evaluate the quality of their work. However, it is apparent from the peer review and comments submitted that there are variations in student perception of the four criteria used in Section 1 of the form. To facilitate more accurate and realistic peer review, it is evident to the authors that clear criteria are set and that the review is performed against these criteria. For example, the 'timeliness of submission' may be assessed based on meeting pre-set targets with minutes kept to demonstrate their achievement. An improvement to the peer review process adopted would be to establish clear evaluation criteria in collaboration with students.

A third point for practice is that the method has also allowed students to feel more involved in the grade determination process. While students appear to benefit from unorthodox teaching and learning methods in project management courses (consistent with McCloskey 2004), and group work is an important part of work life, the peer review process presented here means students can feel cushioned from the effects of poorly performing team members. Further, it allows better skilled students to continue their development in team work and leadership, lesser skilled students also benefits from their interaction with these individuals as they observe and experience the qualities of 'good' leadership.

While the process detailed in this paper has seen application and refinement over several years, the method could benefit from a number of improvements and changes. First, although the method appears to work best when implemented at the conclusion of the course, it may be possible to further develop the peer review process in order to incorporate ongoing or more continuous assessment. With periodic debriefing taking place, students have more opportunities to develop their skills. Second, the peer review process presented is predominantly quantitative. It may be developed by including more qualitative factors such as self-reflection. The importance of acquiring and developing skills in reflective practices is evident in the workplace. The use of reflective practices is a natural extension to the peer review process to provide students with the opportunity to develop this skill. The addition of a work diary, in this regard, may prove useful to both students and educators.

There may also be a problem with anonymous (or even pseudonymous) form submission. Currently, the form requires students to supply their names and those of their team members. While students are advised that their forms will be held in strict confidence and not given or shown to any third party, students may still reserve their opinion just in case their form is seen by other group members. There may be scope, in this regard, for improvement of the form to mask student identity.

The next stage of this paper consists of a pilot study to measure deviation between actual and signalled performance. This method will involve statistical analysis and comparison of student performance in these project management courses.

5. REFERENCES

- ACNielsen Research Services. (2000). Employer Satisfaction with Graduate Skills: Research Report. Canberra: Commonwealth of Australia.
- Boud, D. J., Falchikov, N. (1989). "Quantitative Studies of Student Self-Assessment in Higher Education: A Critical Analysis of Findings", *Higher Education*, Vol. 18, 529-549.
- Dillman, D. A. (1978). *Mail and Telephone Surveys: The Total Design Method*, New York, John Wiley and Sons.
- Hirsch, M. L., Gabriel, S. L., (1995). "Feedback Strategies: Critique and Evaluation of Oral and Written Assignments", *Journal of Accounting Education*, Vol. 13, No. 3, Summer, 259-279
- Hollander, E. P. (1957). "The Reliability of Peer Nominations Under Various Conditions of Administration", *Journal of Applied Psychology*, 41, 85-90.
- Humphreys, P., Greenan, K., McIlveen, H. (1997). "Developing Work-based Transferable Skills in a University Environment", *Journal of European Industrial Training*, 21(2), 63-70.
- John, O. P., Robins, R. W., (1994) "Accuracy and Bias in Self-Perception: Individual Differences in Self Enhancement and the Role of Narcissism", *Journal of Personality and Social Psychology*, Vol. 66, 206 - 219
- Kenny, D. A. (1994), *Interpersonal Perception: A Social Relations Analysis*, New York, Guilford Press
- Kruger, J. M., Dunning, D. (1999). "Unskilled and Unaware of it: How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-assessments", *Journal of Personality and Social Psychology*, Vol. 77, 1121-1134
- Love, K. G. (1981). "Comparison of Peer Assessment Methods: Reliability, Validity, Friendship Bias, and User Reaction", *Journal of Applied Psychology*, 66, 451-457.
- Maiden, S. (2004, 10 June). "Graduates 'Failing the Uni of Life'". *The Australian*, p. 5.
- Mangelsdorf, K., Schlumberger, A., (1992) "ESL Student Response Stances in a Peer-Review Task", *Journal of Second Language Writing*, Vol. 1, No. 3, September, 235-254
- McCloskey, D. W., (2004) "Adding Realism to the Formation, Management and Evaluation of Project Teams", *Journal of Information Systems Education*, Vol. 15, No. 1, 9 - 11
- McIsaac, C. M., Sepe, J. F., (1996) "Improving the Writing of Accounting Students: a Cooperative Venture", *Journal of Accounting Education*, Vol. 14, No. 4, Winter, 515-533
- Mustafa, Y., (2004) "A Systematic Framework for Conducting Research Projects in Under-graduate Courses", *Journal of Information Systems Education*, Vol. 15, No. 1, 35 - 40
- Newell, J. (1998), "The Use of Peer-Review in the Undergraduate Laboratory", *Chemical Engineering Education*, Vol. 32, No. 3, 194 - 196
- Persons, O. S. (1998). "Factors Influencing Students' Peer Evaluation in Cooperative Learning", *Journal of Education for Business*, 73, 225-229.
- Pond, K., ul-Haq, R. (1997). "Learning to Assess Students Using Peer Review", *Studies in Educational Evaluation*, Vol. 23, No. 4, 331-348.
- Saunders, D. (1992). "Peer Tutoring in Higher Education". *Studies in Higher Education*, 17(2), 211-218.
- Sindre, G., Moody, D., Brasethvik, T., Solvberg, A., (2003) "Introducing Peer Review in an IS Analysis Course", *Journal of Information Systems Education*, Vol. 14, No. 1, 101 - 117
- Stefani, L. A. J. (1998). "Assessment in Partnership with Learners". *Assessment and Evaluation in Higher Education*, 23, 339-350.
- Thiry, M., (2004), "'For DAD': a Programme Management Life-cycle Process" *International Journal of Project Management*, Vol. 22, No. 3, 245-252
- Thompson, R. S., (2001), "Relative Validity of Peer and Self-Evaluations in Self-Directed Inter-dependent Work

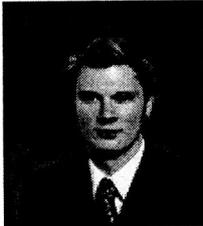
Teams”, Proceedings of the 31st ASEE/IEEE Frontiers in Education Conference, 9 - 14
 Vecchio, R. (1995). Organisational Behaviour, 3rd Ed., Fort Worth: Dryden, USA

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APPENDIX A

TEAM MEMBER PEER EVALUATION FORM

Name: _____ Team Name: _____

The following evaluation should reflect your considered professional judgement. Your answers will be held in strict confidence.

1. Rate each group member (including yourself) using a scale of 0 - 10 (0 is very poor quality, 10 is excellent):

	1. Yourself	2.	3.	4.	5.	6.
The quality of work performed (0-10)						
The timeliness of submissions (0-10)						
Level of effort expended (0-10)						
Willingness to work with the group (0-10)						

2. Estimate the percentage contribution of each member to the overall project:

Labour / effort contributed (%)		+	+	+	+	+	= 100%
Intellectual input contributed (%)		+	+	+	+	+	= 100%
Overall contribution (%)		+	+	+	+	+	= 100%

3. Please provide any comments you believe are pertinent to this evaluation:

Signed: _____ Dated: _____



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