



The role of formative feedback in improving group work outcomes

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This paper describes a deliberate strategy to focus on improving group work through attention to formative feedback to teams during the process of undertaking major group work assessment. The strategy employs a range of activities built around *SPARK* (Self and Peer Assessment Resource Kit (<http://www.educ.dab.uts.edu.au/darrall/Sparksite>), an automated program for online, confidential self and peer assessment. This study involves a threefold collaboration between the lecturer, an experienced *SPARK* developer and an academic learning and teaching adviser. The impetus comes from students in the Faculty of Economics and Business at the University of Sydney reporting strong views in regard to their group work experiences. In the 2005 student survey across all courses, 10% of students' qualitative comments on the best aspect of their course experience related to group work. Yet, another 10% of the qualitative comments identified group work as the aspect most in need of improvement. In response, the Faculty recently developed significant resources (<http://groupwork.econ.usyd.edu.au>) to help students and staff engage in improved group work practices. In the short paper that follows, the summative and formative assessment literature in relation to group work is first discussed. The formative use of *SPARK* in the study site is then outlined. Finally, student responses to a questionnaire are analysed and the implications for formative use of this online self and peer assessment tool drawn out.

Assessment and group work

Summative assessment and group work

The critical role of assessment in motivating learning is undeniable. In fact, Ramsden (2003, p.182) argues that 'from our students' point of view, assessment always defines the actual curriculum'. Summative assessment is most obvious because it is used to grade students. Students often fear its outcome because errors equate to punishment thus arousing 'passion, resistance and subterfuge' (Biggs 2003, p.142-143). The problem with summative assessments is often exacerbated with group projects. These are commonly incorporated in Economics and Business units to motivate students to develop generic graduate attributes such as teamwork and interpersonal communication skills. While there is the added benefit of reducing the number of assessments academics need to mark, there are significant challenges with group work that is designed to be completed primarily out-of-class. Fink (2004) notes two problems; namely, the existence of free-riders and students dividing up the work to submit something akin to a collection of individual assignments. This latter temptation is not surprising given the challenges of finding mutually-convenient meeting times to complete group work projects: Australian students are typically commuters and also need to work in part-time jobs given increasing levels of student fees. Fink (2004) argues that a divide and conquer strategy defeats the purpose of the group work task. One solution to these problems is to engage students in self and peer assessment which Hanrahan and Isaacs (2001) argue is an effective method for promoting the development of life long learning as well as facilitating teamwork. First, to optimise engagement, Biggs (2003) recommends actively involving students in the development of the assessment criteria and the decisions about what constitutes good evidence. Second, students can be involved in judging their own or their peers' performance using marking criteria like their tutor or workplace expert might. Freeman (1995) provides an example of peer assessment impacting summative outcomes where student groups peer assessed presentations by other groups. Further, Leach, Neutze and Zepke (2001) note that non-conventional assessment can provide students with an empowered role.



As well as involving students in self and peer assessment of group work for summative purposes, Goldfinch (1990) and Goldfinch and Raeside (1994) document a process of applying self and peer assessment to adjust summative group work results into individual summative marks for team members by considering team processes. Self and peer assessment is a particularly useful method to adjust marks because it is difficult for the lecturer to know what individual contribution has occurred outside class time even when meeting minutes are kept. Team members have more information than the lecturer. Individual contributions to achieving the team outcome are rated by all students in a team and used to calculate an adjustment factor for each individual member. Interestingly, Lejk and Wyvill (2001) find more able students rate their own performance lower than do their peers. Freeman and McKenzie (2002) extend Goldfinch and Raeside's approach by developing a confidential online template for facilitating the easy calculation of a self and peer assessment adjustment factor for every student. *SPARK* has three main benefits according to Freeman and McKenzie (2002): it solves most of the administrative issues associated with paper-based approaches (i.e., data collection and analysis); students can confidentially make their ratings, and re-rate if necessary, online at any time during a rating period following completion of a project or project stage; and multiple assessment criteria relating to different team processes and group tasks can easily be used to minimize the likelihood of the most recent task dominating perceptions of who did the work and how well it was done.

Formative assessment and group work

Formative assessment is perhaps more critical to learning than summative assessment because students inevitably develop misconceptions in the process of constructing their knowledge. Biggs (2003) argues that when making such errors does not have a grading impact, students feel freer to make them. Employing instruction, correction and feedback formatively can then assist students (and teachers) to identify what needs to be the focus of their future efforts.

Developing a supportive environment in which to facilitate students feeling free to make mistakes, and learn from them, is important for design and implementation. Academics can optimise the formative learning opportunities by maximising students' awareness of their knowledge construction. Such awareness is developed through learning activities which can be teacher-directed (e.g. feedback from a tutor in a tutorial), peer-directed (e.g. peer assessment and feedback on a class presentation) or self-directed (e.g. optional use of self-paced online quizzes with auto-marked feedback). Self and peer assessment, discussed above in a summative context, can also be used for formative assessment purposes. Implementation shortcomings however, such as sarcastic comments or ratings from a peer about a team member's mistakes can easily undo any clever tool or activity designed to encourage reflection, formative feedback and learning. Other group work design features may facilitate a positive climate for feedback. According to Michaelsen, Knight and Fink (2004, p.30), permanent teams are more likely to nurture productive interaction and feedback patterns over time and 'membership diversity ...becomes a clear asset when members have worked together over an extended period of time' (Watson, Kumar and Michaelsen 1993), despite initial inhibition of group processes and performance. Freeman and McKenzie (2002) report one application of *SPARK* used formatively prior to summative assessment. In their study, the ratio of self assessment to the average of peers' assessment for each individual, generated by *SPARK*, was used to facilitate self-critical reflection of individual contribution.

The formative assessment study

This study is based on a pilot application of *SPARK* in a core unit in the Master of Business with 41 students enrolled in Semester 1 2006. This unit has group assessment tasks to enable students to develop and demonstrate that they meet the University and Faculty learning goals to:

- communicate effectively in verbal, written and group contexts to a professional standard;

- lead and participate in teams (including members from diverse cultural backgrounds); and
- manage, persuade and influence others.

Free-riding has not been a major problem with group work in this and similar units taught by the lecturer, perhaps in part because they are postgraduate units, although students also have known that free-riding could be penalised through the moderation of group marks. The lecturer’s greatest challenge in this unit has been to encourage students to begin to work collaboratively as a team rather than to ‘divide and conquer’ (Fink 2004). Assessment and class activities have been structured to provide students with the maximum opportunity to develop team skills. To provide a context for group members to learn each other’s strengths and to establish inclusive and collaborative practices, each group has been required to complete two relatively straightforward oral seminar presentations prior to a major written assignment. The assignment, submitted at the end of the semester, has been designed so that it cannot readily be divided into a set of individual tasks. Yet most group assignments have continued to show a lack of cohesion and consistency in approach and content, indicating that groups have persisted in trying to apply the divide and conquer strategy rather than collaborate. In part, this may have been because there was little effective, practical guidance for students on how to develop team skills. The lecturer has attempted to encourage team work through specifying team processes criteria for self and peer assessment. However, using a manual self and peer assessment system, students had to aggregate the quality and quantity of task effort together with team process criteria, to make a single overall assessment of their own contribution and that of each of their peers. This aggregation, and the way students have undertaken the self and peer assessments, has reduced the incentives for team work. The lecturer, prior to moderating group marks, has routinely examined a range of additional evidence of group contributions to group projects including students’ written qualitative explanations of their peer ratings, drafts of work submitted by individuals to their groups, answers to an examination question on the group assignment, and interviews with students. This additional evidence has supported the view formed by the lecturer that most of those students rated poorly by their peers have genuinely tried to contribute and have generally understood the material. Most commonly, their poor rating has been due to the poor quality of their written draft work. By dividing the work into equal tasks for individuals to conduct rather than drawing on the strengths of each group member, those group members who did not produce acceptable drafts were rated poorly, despite the multiple criteria for assessing peer contributions.

SPARK was piloted in this unit to address these issues. First, students participated with the lecturer in developing the contribution criteria for their *SPARK* ratings. The criteria for the oral seminar presentations included three related to team processes and three to group tasks, as shown in the *SPARK* screenshot, in Table 1 below.

Table 1. *SPARK* screenshot showing assessment criteria and mock ratings



Please fill out all fields in the self and peer assessment form and then click on submit at the bottom of the form.

Criteria	Bob	Mark	Diane	Lesley
	Bartells	Freeman	Hutchinson	Treleaven
TEAM PROCESSES:				
Helps plan and create coherent team seminar presentations	2	2	1	3
Helps group function as a team when working on seminars	2	2	2	3
"Professionalism (responsible, reliable in meeting deadlines)"	1	3	3	1
GROUP TASKS:				
Well prepared for group discussion	1	2	3	1
Performance of other allocated group seminar presentation tasks	2	2	3	2
Actively participates/communicates with group on seminars	2	2	3	2



In week 7, using *SPARK*, students undertook formative self and peer assessment of their contribution to their initial group seminar presentation. At the end of semester, they undertook summative assessments of contributions to both the two seminar group presentations and the written group assignment. The decision to use *SPARK* for formative as well as summative ratings was due in part to the ease with which ratings could be carried out on several occasions, once the student accounts were created on *SPARK* for the summative assessments. But it was also expected that formative assessments would make a positive contribution to group work. First, the formative assessment emphasised to students that team processes were an important component of their group work since criteria related to team processes comprised half the total marks. The formative assessment was also intended to provide students with critical information about their relative contribution to their group generated by *SPARK* from their ratings. The SAPA factor is the ratio of their self assessment to the average of their peers' assessment of their contribution. The SPA factor is the aggregate of their relative contribution incorporating both self and peer ratings. Class time was set aside for groups to discuss these formative *SPARK* factors and to consider ways in which they might improve their individual and team performance. To evaluate the students' perceptions of the effectiveness of *SPARK*, and in particular the formative assessment process, the lecturer organised a survey of students during class in Week 11. The questionnaire, using both 5 point rating scales and short open-ended responses, asked students to reflect on the role of group work in this unit of study, the formative assessment process, its impact on the group work and the impact of *SPARK*. Students had 30 minutes to answer the questionnaires which were returned by a student to the Faculty's Office of Learning and Teaching in a sealed envelope. Not all students responded to all questions. The lecturer, who remained outside the classroom while students completed the questionnaire, is not able to explain the non responses, other than to say that 30 minutes appeared to be ample time. Those students who arrived late may have been selective about which questions they answered. Overall, the students seemed genuinely eager to provide feedback and some of their qualitative responses were very detailed.

Findings on formative self and peer assessment and group work

The role of group work in the unit

The first question asked students to explain what they perceived as the role of groupwork in their course. All 34 students who responded to this open-ended question indicated that they understood the value of group work. Their understandings were consistent with the Faculty's stated generic graduate attributes, especially in communication ('learning how to function as a team', 'improve group work skills' and 'group decision making', 'cope with possible conflict'), research and inquiry ('exchanging ideas', 'learn more from each through idea sharing') and diversity ('producing a superior presentation by utilising team strengths', 'learning how to deal with different people').

The formative assessment process

Students seem to have taken the self and peer assessment process seriously – of the 39 students who responded, 77% stated that they thought about their ratings before they logged on to enter their individual and group rating, with only 10% of students indicating that they did not consider at all how they would evaluate individual and group performance prior to logging on. Further, only 13% logged back on to change their initial ratings, including some who said they had not thought about their initial ratings before first logging on. The students were asked what they learnt from engaging in the formative assessment process. Their answers provide evidence that formative assessment helped give some students confidence in the peer assessment process ('I could see the group valued my contribution') while others said the process showed them how their marks would be adjusted ('group mark will be adjusted in relation to your contribution'). At the very least, the formative assessment enabled students to be better informed about the use of *SPARK* for peer assessment and moderation of group marks, reinforcing the incentive effects of the process. Of note is the learning that students derived from peer feedback. The Johari Window (Luft 1970), which has been used

extensively in group work, provides a useful framework to examine the students' reflections in the questionnaire. Their comments demonstrate that they gained insight into aspects of their performance that were not known previously to them ('some were oblivious to their contribution', 'sometimes you punish yourself, sometimes the others show you that you are not as good as you think') and also insight into the awareness of others ('some thought they worked harder than perceived by their peers', 'the evaluation of my contribution to the group was rated higher by the group than myself'). Other students came to understand that performance ratings 'can depend on factors such as confidence and self deprecation'.

The impact of formative assessment on group work

A quarter of the students (9/34) stated that they changed their approach as a result of the formative assessment process. Their qualitative explanations of these changes included improved communication or explanation of work contributed to the group ('I indicated my findings more obviously for all the group to know'), thereby helping the group to make better summative assessments. Some students also pointed to changes in the way the group behaved, more explicitly working towards the team processes criteria ('my approach to group work assessment has changed in terms of the criteria to look at'), indicating that for some students formative assessment did help to reinforce the need for co-operative work. Such comments as 'good to monitor the contribution of each group members and signals for each group member to contribute their best' were indicative of a pre-emptive approach that discouraged 'free-riders' while emphasising that 'group mark will be adjusted in relation to your contribution'. Perhaps one of the most telling comments was about learning to give prospective rather than retrospective feedback to group members: 'group giving direct suggestions rather than use computer evaluations'.

The formative *SPARK* factors did not vary widely within or across groups – most groups rated their group members as making an average contribution. Self and peer assessment is used here in a relative way: students rate themselves and each other in relation to the average performance within their team. This may be why most students (74%) stated that they did not change their approach as a result of the formative factors, but rather saw it as an opportunity to 'confirm what I was doing was on the right track'. The survey analysis thus indicated that some groups were reassured by formative assessments that showed each group member contributing at an average level for their group. However, where that average is at a low performance level, it is necessary to convince these students of the importance of raising their performance, and especially of continuing to build their team skills.

The impact of *SPARK*

The use of *SPARK* was identified by 42% of students as helping their groups to function better, with qualitative comments such as *SPARK* 'reduces free-riding', 'knowing that our group would self assess motivated individuals and group', 'members realise their responsibilities and roles', and 'it assists to improve marks'. Nevertheless, more students (48%) responded neutrally. This apparently ambivalent response may be due to the pre-emptive effect on free-riding of using a transparent peer and self assessment process to moderate group marks, especially when *SPARK*'s role was reinforced through the formative assessment process. Interestingly, one student commented that *SPARK* 'doesn't help students much but the teacher gains understanding of student collaboration.' To some extent this comment is valid: *SPARK* enabled the lecturer to gain knowledge of group members performance which would not otherwise have been available.

The lecturer's view is that the overall quality of the group assignments improved, with fewer assignments that were simply a collation of individual contributions, compared to previous years. She acknowledges that it is difficult to be precise about the impact of *SPARK* on this result but believes *SPARK* provided a number of advantages. It was transparent. It allowed multiple criteria to be assessed, sending clearer signals about the importance of team processes than had been the case previously when students made a single aggregated assessment. It ensured that all the criteria were



rated due to the automation feature. It was also readily used for formative assessment. While it is true that these same formative and summative assessments could have been manually collected and calculated, as once done in the less-busy past, the administrative costs would have been prohibitive for multiple assessment criteria.

Benefits and further challenges

This study has focused on the role of formative feedback in improving group work outcomes. Whilst the importance of assessment in motivating students is well established, it is arguably formative assessment which provides opportunities for students to learn from feedback without penalty, especially in group work, that can potentially enhance learning outcomes. Formative self and peer assessment is one way of increasing feedback on group work, particularly when multiple assessment criteria are used. In our pilot study, *SPARK* afforded the use of multiple criteria for rating self and peer contributions to group presentations and a written group assignment. By employing criteria for both group tasks and team processes and actively engaging students in developing these assessment criteria for moderating group marks, the lecturer was able to establish better understandings of the importance of students engaging in collaborative efforts and developing team skills. The learning outcomes in this semester were encouraging in terms of students going beyond the divide and conquer strategy of splitting group assignments up and re-assembling the parts as the collective sum of individual tasks. *SPARK*'s features proved valuable both as an administrative tool for calculating self and peer assessment ratings and allocating group marks between members and as a means of improving the quality of group work and team skills. The challenge now is to maximise the full benefit of *SPARK* for formative purposes. A more structured process for facilitating group discussion of the formative assessment results is planned for future research iterations in order to further enhance team skills development and group learning outcomes. The implications of this pilot study for academics in higher education extend beyond the Economics and Business context within which it was conducted. The development of team skills to enhance team outcomes is a crucial graduate attribute of focus in almost all university contexts.

References

- Biggs, J. (2003) Teaching for quality learning at university. 2nd ed. Oxford. The Society for Research into Higher Education and Oxford University Press.
- Fink, L.D. (2002) Beyond small groups: Harnessing the extraordinary power of learning teams. In L.K. Michaelsen, A.B. Knight and L.D. Fink, (Eds) *Team-based learning: A transformative use of small groups*. Westport, CT: Praeger Publishers, 3–26.
- Freeman, M.A. (1995) Peer assessment by groups of group work. *Assessment and Evaluation in Higher Education*, **20**(3), 297–306.
- Freeman M. and McKenzie J. (2002) SPARK: A confidential web-based template for self and peer assessment of student teamwork: Benefits of evaluating across different subjects. *British Journal of Educational Technology*, **33**(5), 551–569.
- Goldfinch, J. (1994) Further developments in peer assessment of group projects. *Assessment and Evaluation in Higher Education*, **19**(1), 29–35.
- Goldfinch, J. and Raeside, R. (1990) Development of a peer assessment technique for obtaining individual marks on a group project. *Assessment and Evaluation in Higher Education*, **15**(3), 21–31.
- Hanrahan, S.J. and Isaacs, G. (2001) Assessing self- and peer-assessment: the students' views. *Higher Education Research and Development*, **20**(1), 53–70.
- Leach, L., Neutze, G. and Zepke, N. (2001) Assessment and empowerment: Some critical questions. *Assessment and Evaluation in Higher Education*, **26**, 293–305.
- Lejk, M. and Wyvill, M. (2001) The effect of inclusion of self-assessment with peer assessment of contributions to a group project: A quantitative study of secret and agreed assessments. *Assessment and Evaluation in Higher Education*, **26**, 551–561.
- Luft, J. (1970) *Group processes: An introduction to group dynamics*. 2nd ed. Palo Alto, CA: National Press Books.
- Michaelsen, L.K., Knight, A.B. and Fink, L.D. (Eds) (2002) *Team-based learning: A transformative use of small groups*. Westport, CT: Praeger Publishers.
- Ramsden, P. (2003) *Learning to teach in higher education*. (2nd ed). London. Routledge.

Watson, W.E., Kumar, K. and Michaelsen, L.K. (1993) Cultural diversity's impact on group process and performance: Comparing culturally homogeneous and culturally diverse task groups. *Academy of Management Journal*, **36**(30), 590–602.

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