

MULTIPLE PERSPECTIVE ASSESSMENT TO MANAGE FREE RIDERS IN GROUP WORK

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ABSTRACT

Construction Management programs are expected to train their graduates in evolving new skills, an expectation that has variously stemmed from the rapid recent changes in the construction industry, the need to stay competitive in the education market and to sustain professional accreditation. The need for development of these skills, for immediate employability of graduates and to satisfy the stringent university quality assurance systems, has demanded change in course delivery methods. Among the graduate skills, the ability of students to work in teams has gained momentum in construction education. Developing and assessing team-working skills presents many challenges that need to be given careful thought before engaging. The ‘free rider’ problem, which occurs when one or more team member(s) does not contribute passably in terms of comprehension or learning process in a group project, causes serious concerns about the quality of graduates. If group work assessment is not carefully designed the two main objectives of an assessment system, namely to foster student learning and knowledge accreditation, may not be attained. This paper identifies the issues associated with group work design and assessment, and propose two alternative multiple perspective assessment methods, ‘peer evaluation/meeting log’ and ‘peer review’, to combat the free riding problem.

Keywords: Group Work, Assessment, Peer Review, Free Riding, Knowledge Accreditation.

INTRODUCTION

There is an increasing pressure on Australian Universities to produce quality graduates who are equipped with appropriate skills and knowledge to face the future. The concept of core skills and competencies in tertiary education has long been identified as an issue to be addressed. Construction Management programs are expected to train their graduates with evolving new skills, which has stemmed from the rapid changes in the construction industry, to stay competitive in the education market and to sustain professional accreditation. Professional bodies expect graduates to demonstrate a range of attributes appropriate to their profession. Among these

various skills, the ability of the students to work in teams is considered crucial by most university curricula at present. This was triggered by the demand from the Professional Institutes (which are also accrediting agency of university programs), reflecting the expanding culture of teamwork in the industry. In the building industry both the Australian Institute of Building (AIB) and Australian Institute of Quantity Surveyors (AIQS) demand the development of team-working skills during university education. In order to cater for this requirement an increasing emphasis is placed on training the students to learn and work in teams by the university courses. Moreover, the essence of collaborative learning and student centred learning in higher education are now being increasingly emphasized in educational literature (e.g. Colbeck et al. 2000; Goldfinch et al. 1999; Michaelsen 1999). The literature also suggests that this change has raised opportunities for innovative teaching, while posing challenges in assessing this work (Strong 1990; Fisher 1994; Comer 1995; Brooks et al. 2003).

Is team-work just about forming students into groups and asking them to produce an assignment, or does it demand diligent thought and planning before engaging in group-based project work? This paper looks at the issues and factors that need to be considered before embarking on group-based learning and assessments. It also outlines an assessment system implemented to provide students with fair grading reflecting their capacities as an effective team member. In achieving, fairer assessment processes, the methodologies, defined in this paper a framework for supporting student learning in the practices and processes of team work.

GROUP WORK: OPPORTUNITIES AND CHALLENGES

Group work in perspective

Group learning has many positive aspects including improving the overall quality of the student. Students' engage with others in the group to articulate and test their knowledge while concurrently developing a sense of responsibility to the group. Group work also helps develop specific skills, including teamwork, leadership, collaboration, time management, that are sought by employers. From a teaching point of view, group work may reduce the workload involved in assessing, grading and feedback (James et. al, 2002). In large classes, group work allows the assessor to give quality feedback. Moreover, communication abilities, conflict management, and delegation are all important learning experiences gained from team-work, that enable students' to succeed in the workforce (Blowers 2003). Group work also leads to improved interpersonal skills, understanding of diverse perspectives, use of colleague as learning resource, and resultant increased attractiveness in the job market (Clair 2002).

Group learning also has some drawbacks, the major concern is being the equity of marks received by the individual team members. This problem is known as Free Riding (Brooks, 2003; Boorks 2003; Harkins, 1987) and occurs when group assessment practices do not fairly assess and reward an individual's contribution. It is noted that many hard working students dislike group work as they feel it impede their

potential to obtain higher grades. Group assessments, in many instances, fail to recognise student's efforts, but reward free riders by giving an average grade for the whole group. Free riding will have a serious impact especially when group work is assessed summatively¹. On the other hand, diligent students may not mind group learning when it is assessed in formative² way, as it does not impact upon their final grade.

Group work paradigms

The first paradigm is introducing group or team work for the purpose of teaching students the core skills associated with teamwork whilst they are in the context of a team activity. In this situation the focus of the assessment is not only on the product of the team's efforts but also the processes associated with the team activity itself. In this situation the team skills of management, communication, decision making task development, analysis and synthesis, are the skills that would all receive feedback and mark allocation.

The second paradigm is when group work is introduced as an educational environment for the delivery of content skills and knowledge. In this situation even though the team is the environment of learning students are still expected to take on board skills predominantly from outside of the context of the group activity. An example would be that the students will develop skills in the application of the "MS Project" software. In this paradigm it would be expected that all students do the activity of developing a project management plan using "MS Project". In this situation it is important to put in place the processes which will support each student achieving the outcomes of the course. It is a temptation in this situation for students to distribute work among themselves and therefore not gain all the skills associated with the activity. In this situation assurance of the student's work is critical as students are able to manage themselves out of the learning experience.

The objective of the course will determine which paradigm is the prime focus and then the assessment will capture the learning out. In some courses it is essential that both paradigms are addressed well.

Group formation and assessment

An important element that drives student satisfaction/dissatisfaction of group work are the 'group formation method' adopted, that is, whether the group memberships are chosen by the students themselves or nominated by the lecturer and group work assessment method. Blowers (2003) discusses the issues of random and non-random group selection processes. Deckert (1995) has highlighted three methods of group

¹ Summative assessment - events contribute to the final mark or grade in a course. The event serves the primary purpose of assessment i.e. "motivating, directing and enhancing student learning".

² Formative assessment - aimed solely at facilitating learning. The assessment events are designed and offered during a course to guide students in their learning and to allow them to find out how well they are doing it.

formation- self-selection, random assignment and teacher assignment. The strengths and weakness of these methods are discussed below, by Bacon et al. (1999).

Self-selection offers higher initial cohesion, which has been linked to increased student team performance. Moreover, self-selected teams become more productive, more quickly and take ownership of the group problems, especially managing the interpersonal conflicts. In general self-selected teams would have worked in groups in previous instances and have already set their norms, which encourage more effective engagement. The limitations of self-selected teams are the tendency to be homogeneous and their lack of diverse views or skills. These teams are also not representative of the real-world workplace which is primary consideration of this methodology.

Although randomly assigned groups are generally seen as being fairer, some suggest that this results in an unfair assignment of grades for students. Moreover, this method also could lead to unbalanced skills or diversity among groups. Generally random selection tends to result in negative group working experiences (Bacon 1998). However, from an industry perspective random groups, which reflects the real life environment, will give students more positive learning experience to overcome conflicts and to manage the assignment in a professional context. In this instance the negative experience is valuable learning experience to be an effective member in a constraint situation. It is also noted that self selected groups, which have been functioning for some time, may become complacent and compromise quality of the work. Finally, teacher assignment is considered to be difficult to implement and thus not widely used.

The selection of the team structure and consistency is a major consideration in the preparation of the teamwork methodology. Group work requires careful planning and structuring, and students need to be prepared to undertake group assignments.

GROUP WORK DYNAMICS

It is evident from past group work submissions (first year and third year Construction Management program at University of Newcastle) that most groups tend to delegate separate sections to each team member to research and to write their parts of the report. At the end these sections are put together for submission. Some groups communicate effectively during this process and integrate these individual sections well (paradigm 1), while others submit segments of un-coordinated writing, an outcome of poor coordination and group management. From a collaborative learning perspective, in the latter practice, students do not engage in setting targets to deliver coordinated work and fail to learn from each other. From a knowledge acquisition point of view, if the information sharing does not take place among the team, each team member learns only a particular component of the content and fails to gain adequate understanding of other components (paradigm 2). This was raised in the reflective journals of students in the in 2001. Comments in the reflective journal of

diligent students echoed the drawbacks of group work raised in the literature. They are:

- **Paradigm 1 related Issue-** Some students in the group did not contribute adequately and hindered others obtaining good marks
- **Paradigm 2 related Issue-** As students worked with divided sections, they did not gain adequate knowledge of other parts of the assignment.

With regard to the first issue Albanese et al. (1985) indicated that team members generally free ride when they perceive that their rewards are greater than the benefits they may get from putting fair share of work. Therefore, it is essential to design assessment schemes to block such perceptions to reduce free riding. Peer evaluation is the predominant technique employed to penalise free riders.

The second issue is not explicitly addressed in the literature. If a student passes a subject with only partial understanding of the concepts and principles of that subject, he/she is not meeting the accreditation requirements. Therefore, it is essential that the assessment criteria address this serious graduate quality issue.

PILOTING GROUP ASSESSMENT TO TACKLE FREE RIDING

Educational assessment has two main objectives – to provide a system of knowledge accreditation and to foster student learning (James et. al. 2002). The group assessment should help students to learn working in teams (paradigm 1) and consistently perform to the objectives of the course (paradigm 2). Students need to understand clearly both the assessment system and the expectations of the assessment output. Criteria for assessment should be detailed, transparent and valid. James et al. (2002) highlighted the need for decisions about the assessment of group work to be focused around the factors listed below:

1. What is to be assessed (final product of the group work or the process of the group work, or both (and if the latter, what proportion of each)?
2. What criteria are employed to assess the aspect(s) of group work (and who will determine these criteria – lecturer, students or both)?
3. Who applies the assessment criteria and generates the marks (lecturer, students – peer and/or self assessment or a combination)?
4. How will the marks be distributed (shared group mark, group average, individually, combination)?

To address the above mentioned two group work issues, in 2003 two different approaches to group work assessment were employed in two different courses.

ADDRESSING PARADIGM 1 RELATED ISSUE

A peer evaluation and meeting log technique was introduced in a first year course, 'Land Subdivision Feasibility'. This involved a real industry problem, assessing the viability of a plot of land for development. The class size was 46 students and the course was 4 weeks in duration. Groups were *random formed* with the view that traditionally, the construction industry also formed teams randomly, as a result of competitive tendering strategy. This course gave the students the opportunity to manage a project with industry standard tools. This enables to track the student learning on group communication and group management processes.

Students were asked to:

1. Evaluate their peers, with a five-item questionnaire with 1-5 rating, half way through and at the end of the course. Mid-course evaluation was formative and the final evaluation was summative.
2. Maintain comprehensive meeting logs, using a standard template, throughout the course.

With the final report, students were required to submit peer evaluation sheets and meeting logs, which contributed to the final grade.

In this assessment method the following assessment criteria were applied:

1. What was to be assessed? Final product of the group work (including self assessment, reflection and oral presentation) = 90% of final grade and the process of the group work = 10% of final grade.
2. What criteria were employed to assess the aspect(s) of group work? Peer evaluation and meeting logs (Peer evaluation assessed by students and others items by the lecturer).
3. Who applied the assessment criteria and generated the final mark? The lecturer- assessed all of the submission products, leaving the students to assess their peer's contribution.
4. How were marks to be distributed? A group average was generated by the lecturer for the 'report' and meeting logs, leaving reflection and peer evaluation to generate unique marks for each individual (also calculated by the lecturer).

ADDRESSING PARADIGM 2 RELATED ISSUE

Peer review technique, as used in publication reviews (for journal and conference papers), was employed in a third year course, 'Civil Engineering Construction', with a real industry problem - tendering for a Civil Design and Build infrastructure project. The class size was 55 and course was 5 weeks in duration. Students were asked to form into *self-selection* groups, reflecting the view that, with the advent of Design and Build and partnering procurement systems, project teams are increasingly self-formed. This enables to track the student learning on content of the course.

Students were asked, at the end of the first week, to do the following:

- Form into three to four member groups.

- Formulate an action plan to tackle the assignment.
- Identify each team members role, assigning responsibility for different parts of the report

With the final group report students were asked to submit a one-page 'peer review' (of academic content) for each of the sections written by the other team members. The marks were distributed as below:

1. Final report- 50%
2. On line engagement- 5%
3. Peer review – 15%
4. Oral presentation 10%
5. Self assessment – 10%
6. Reflection – 10%

In this assessment method the following assessment criteria were applied:

1. What was to be assessed? The final product of the group work, including peer review, self assessment, reflection and oral presentation =100%. The final product was expected to reflect some element of group work , however it was not explicitly assessed.
2. What criteria were employed to assess the aspect(s) of group work? The peer reviews were assessed by the students.
3. Who applied the assessment criteria and generated the marks? The lecturer assessed all of the submission and factored in the peer review marks.
4. How would the marks be distributed? A group average was assigned for the 'report' and individual marks awarded for reflection and peer review.

This assessment scheme eliminates the free riding problem and ensures the knowledge acquisition of each student passing the subject. The 'peer review' reveals the student's understanding of the concepts and principles that they may not have had the opportunity to deal in depth in their report. This review concurrently provides an indication of how involved the student was in contributing to the overall group performance in this project and whether he/she has an overall understanding of the subject. This assessment scheme gives the opportunity for capable students to increase their marks, since the marks are split 50/50 between the group report and the remaining individual activities..

EXPERIENCE FROM THE PILOT ASSESSMENT

The experience gathered in implementing these two assessment systems was valuable and lessons were learned for more effective employment of these techniques in the future.

Experience in addressing paradigm 1 Issue - Peer evaluation and meeting log

The main problem in the assessment was the group formation technique adopted. As the groups were formed randomly from the enrolment list, it took until the end of first

week for some groups to ensure that all the members of their groups were indeed active participants on the programme. Some groups lost members who withdrew from the course in the first week of the course. Three students withdrew from the course after the groups were formed, and two students did not attend classes till second week. Reassignment of one or two member groups took place during the middle of second week by then the subject was half way through. This affected the groups' confidence and morale in delivering quality report due to the limited time for them to work as a group. This strongly suggests that, especially in short duration subjects, randomly selected teams do not gain a positive learning experience.

Experience in addressing paradigm 2 Issue - peer review

The main concern with the 'peer review' assessment was that the students were not very clear of what was expected even after an 'introduction to assessment' session. Students were struggling to draw up an action plan to tackle the assignment during the first week as they did not have much idea how the process was going to be managed and the report to be structured. As this requirement was too demanding it was decided that in the final report, the roles of the members along with the sections handled by each student would be clearly identified. This enabled assessors to identify the free riders and the contribution each member made to the team. It was felt that the 'Peer review' technique strongly tackled plagiarism-related concerns at group level.

Some groups highlighted they were working collaboratively and it was difficult to divide the report along the lines of individual sections handled by individual members. As a consequence they were therefore unable to review the work of others. This indicated a positive learning experience of group work and as such groups were healthy entities. These groups were told that although the discussions and decisions were collaborative, during the report writing each member's domain would need to be identified and based on these sections, peer review of their work would be undertaken. The review would allow them to indicate their contribution and how decisions were made to proceed in the chosen direction.

Most groups had four members with a small number with three groups. The peer related issues in this group exercise was minimal. Nevertheless, the major problem was the quality of the 'peer reviews'. Although, there were a few well-conceived reviews, the significant majority were bad reviews and not reaching the expectations of this level of coursework. Some reviews were too subjective, commenting on the work rate and contribution of the person, rather than objective supporting statements on academic issues. According to student feedback this occurred due to lack of clarity of expectations of peer review. Some students felt that the potential to award up to 15% for a three page review was disproportionately weighted, indicating that they failed to understand the purpose of this review - to reward the capable students.

This method offers an advantage in managing and tracking plagiarism issues. In general when plagiarism is detected in group work all students are penalised. Plagiarism could have happened due to a free rider and in most instances good students

could be penalised for blunders that they were not responsible for. In this case, since each student is given the responsibility to review, they are given an opportunity to identify plagiarism in the work of others. However, things could be more subtle if a good work was duplicated from past years: a fellow student may not have much clue in detecting this type of plagiarism. However, the clear demarcation of areas of work penalisation of only those group members who plagiarised..

LESSONS FOR FUTURE

The pilot studies have given good insight into the design and assessment of group work. Both assessment systems have strengths and weaknesses. The peer evaluation and meeting logs are strong in assessing the group work process and aligning group working with industry practice. However, it may not explicitly assess the knowledge acquisition of individual group members in terms of course objectives. On the other hand, 'Peer review' technique is weak in explicitly assessing the group management process but allows the explicit assessment of student knowledge acquisition. From these experience the following lessons have been learned for the future-

1. Groups will be formed using the Self-selection method, especially for shorter courses.
2. Clear training will be given to students on 'peer review' and 'peer evaluation' techniques.
3. More explicit documentation of what is expected in these assessments.
4. Stressing plagiarism accountability of each member in course documentation

CONCLUSIONS

Australia universities are under pressure to produce quality graduates who are equipped with appropriate skills and knowledge to face the future. In order to stay competitive in the education market and to maintain the accreditation, Construction Management programs need to consider change in the delivery methods to reflect the current industry environment. One of the student attributes demanded by the industry is team-working skills. The group work provides good learning experience when 'free riding' is not present. Free riding raises two issues, namely grade discrimination due to unequal work and knowledge accreditation. Two alternative methods to facilitate group working, 'peer evaluation' and 'peer review', were piloted in two separate courses that utilised random group formation and self-selection group formation respectively. This research has found that both exercises have provided valuable learning experiences and suggested improvements for the future, specifically, encouraging self-selection group formation and providing detailed documentation explaining clearly what is expected in the assessment.

REFERENCES

- Albanese R et al. (1995), Relational behavior in groups: The free-riding tendency, *Academy of Management Review*, 10(2), 224-255
- Bacon D. R. et al. (1999), Lessons from the best and worst student team experiences: How a teacher can make the difference, *Journal of Management Education*, 23(5), pp 467-488
- Blowers P., 2003, Using student skill self- assessments to get balanced groups for group projects, *College teaching*, 51(3), 106-110
- Brooks C M et al., (2003), Free riding in groups projects and the effects of timing, frequency, and specificity of criteria in peer assessment, *Journal of Education for Business*, Vol 78, 5, 268-272
- Clair L. (2002), When and Where? Facilitating Group work beyond the borders of classroom, *Journal of management Education*, 26(4) pp 449-461
- Colbeck C. L. et al. (2000) Grouping in the dark, *Journal of Higher education* 71, pp 60-83
- Comer, D R, , 1995, A model of social loafing in real work groups, *Human Relations*, Vol. 48(6), 647-667
- Decker, R., 1995, Management team formation for large scale simulations, Overvy J D & Patz (eds), *Developments in Business Simulation and experiential services* 128-129.
- Fisher, C. D, et al. (1994), Problems in Project Groups: An anticipatory case study, *Journal of management Education*, 18(3), pp 351-335
- Gibbs, G., (1995), Assessing Student Centred Courses, The Oxford Centre for Staff Development, Oxford Brookes University, Oxford.
- Goldfinch et al (1999), Improving group working skills in undergraduate education through employer involvement. *Assessment and evaluation ins higher education*, 24, 41-55
- Harkins S. G. et al. (1985) The role of evaluation in eliminating social loafing, *Personality and Social psychology Bulletin* 11(4), 457-465
- James, R., et al. (2002) Assessing Learning in Australian Universities, www.cshe.unimelb.edu.au/assessinglearning
- Klecker B. M. (2003) Formative classroom assessment using cooperative groups: Vygotsky and random assignment, *Journal of Instructional Psychology*, 30 (3), 216-219

Lerner L. D. (1995), Making Groups work, *Journal of Management Education*, 19 (1), 123-125

Lovie-Kitchen, J. (1997), Use of Reflective Journals for Assessment in Problem-Based Learning. Research and Development in Problem Based Learning, Vol 4, Newcastle, The Australian Problem Based Learning Network.

Mello J A (1993), Improving individual member accountability in small work groups setting, *Journal of Business Education*, (17(2), 253-259.

Michaelsen L. L et al. (1999), Making learning groups effective, *Selections*, 16, 28-35

Strong J T et al. (1990), Free riding in group projects: Control mechanisms and preliminary data, *Journal of marketing education* , 12 (Summer) 61-70