The Evolution of a Peer Assessment Method for use in Group-based Teaching of HCI

G.E. Burnett and T.J. Brailsford

School of Computer Science and IT, University of Nottingham

Email: [gary.burnett | tim.brailsford]@nottingham.ac.uk

Abstract

Group-based learning-while-doing is widely used in the teaching of HCI and other related areas, and has a number of distinct benefits. However, in assessing students there is a basic need to identify the contribution of an individual. In this respect, we have developed a variant of a peer assessment technique, in which students rate each of their fellow group members according to specific criteria. This paper describes our implementation and gives some recommendations as to its use in conjunction with other assessment methods.

Keywords

Assessment methods, Group-based teaching, HCI education, Peer assessment.

1. Introduction

As an issue-oriented subject, Human-Computer Interaction (HCI) lends itself to a learning approach whereby students work in small groups and discuss relevant topics. Apart from the various learning advantages offered by this approach [5], from a practical perspective the use of groups also has the distinct advantages of reducing a large class to smaller units, and ensuring, via peer pressure, that plagiarism is extremely unlikely to occur (assuming allocation to groups is imposed, rather than self-directed). Computer Science departments have been particularly affected by the difficulties arising from increasing student numbers, together with the threat of plagiarism [2, 4]. However, a range of difficulties exist with respect to the use of groups, in particular how to identify an individual's quality/quantity of contribution from which to make a decision regarding grading.

2. Use of Peer Assessment

The use of peer assessment, in which students rate each of their fellow group members according to their perceived contribution, has been widely used as a means of establishing an individual's contribution [3]. It has generally been found that peer assessment by students produces very similar results to assessment by lecturers [6], and has the added benefit of promoting a sense of responsibility and involvement in the work [7]. Nevertheless, various potential biases exist in student's ratings [1]:

- Ratings that reflect the wider (non-academic) issues in relationships within the groups, e.g. friendships, loyalties
- Collusion, and conversely, retribution strategies
- Students being unsophisticated in their judgments, e.g. by providing higher ratings to opinionated extrovert individuals and lower ratings to quieter introvert personalities

As a means of combating these issues, Brown and Knight [1] encourage the use of peer assessment systems that encourage students to consider carefully both the evidence and criteria upon which they are making their judgments. Dochy et al. [3] note how this focus ensures that peer assessment is more than just a procedure for grading students, it forms part of the learning experience in itself.

3. A Specific Implementation

Central to our current use of the peer assessment technique is a form in which students rate their fellow group members according to a set of six criteria (research and information gathering, creative input, co-operation, communication, quality of individual contribution, attendance at meetings). These criteria were chosen to be generalisable, and to reflect our particular views on the important elements of a student's input within a group. In our implementation, each of the criteria was also weighted based on our perception of their relative importance.

Early use of rating scales established that numerical scales

	None		Adequate		Excellent
Research & information gathering					
Creative input					
Co-operation within group					
Communication within group					
Quality of individual contribution					
Attendance at meetings					

Figure 1. Extract from student form. Each student fills out one of these tables for each other member of the group, by ticking the appropriate box for each category.

(e.g. giving a mark out of 100) led students to perceive that providing a mark to a fellow student of less than 100 was a particularly negative outcome (a 'reducing' mark). Therefore, we now utilise a five-point scale with three semantic anchors of 'Excellent', 'Adequate' and 'None' – see Figure 1.

Students' ratings made against the criteria listed above are used to derive a weighting factor for each individual – this is subsequently applied to the mark awarded to the group as a whole (e.g. for a group report on an interface design exercise) to give an individual mark.

In addition, to minimise potential biases in students' ratings, the module convener allocates students to groups based on a range of factors, in particular prior performance in related modules and native language.

4. Validation

Figure 2 shows a distribution of students' marks for a group work interface design report prior to (i.e. based purely on the marks given to the group reports) and following peer assessment. What is evident is that peer assessment can widen significantly the dispersion of marks, whilst maintaining the same value for central tendency.

In addition, we have found that our particular implementation of this peer assessment technique produces results that correlate positively with other means of assessment (e.g. exams, individual essays).

Perhaps most importantly, results have also been found to agree with the opinions of those involved in teaching the modules (i.e. lecturers, teaching assistants).

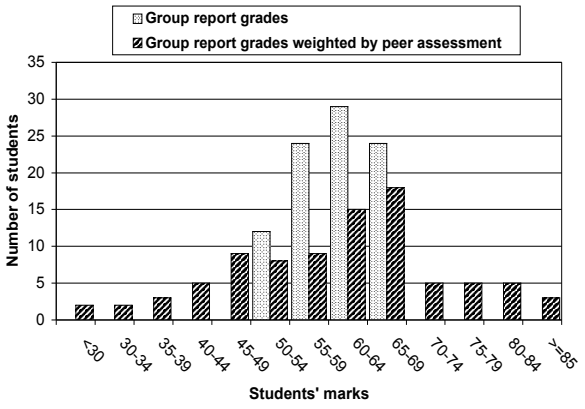

Figure 2. Frequency distribution of marks for group work (89 students in 15 groups), grades being with and without weighting by peer assessment.

5. Overall assessment issues

It is important to note that peer assessment should not be relied on as a sole means of grading individuals. Rather it should be used in conjunction with other assessment methods based purely on a student's specific work, e.g. essays/reports, exams [1]. In particular, we have found it to be extremely useful for students to write short reports which describe their personal experience of working within a group (e.g. what was your role? what did you learn? and so on). Such reports not only encourage students to reflect on their experiences, but also provide valuable information to support peer assessments.

6. Conclusions

Based on several years experience in teaching large-scale HCI-related modules, we have developed our own implementation of a peer assessment method as a means of grading students working on group-based assignments. We have found it to be a valuable tool for use in assessment in conjunction with other methods, and expect that such a method is widely applicable to many group work scenarios.

7. References

[1] Brown, S. and Knight, P. (1994) *Assessing learners in Higher Education*, Kogan Page: London, UK.

[2] Court, S. (2001) Reaching for 50% participation: sustainable growth in higher education, Association of University Teachers: London, UK

[3] Dochy, F. Segers, M. and Sluijsmans, D. (1999) The use of self, peer and co-assessment in Higher Education: A review, *Studies in Higher Education*, **24(3)**, 331-350.

[4] Evans, J. (2000) The new plagiarism in higher education: From selection to reflection, *Interactions*, **4(2)**

[5] Jacques, D. (1989) *Learning in groups*, Helm: London, UK.

[6] Orpen, C. (1982) Student versus lecturer assessment of learning: a research note. *Higher Education,* **11**, 567-572.

[7] Weaver, W. and Cotrell, H.W. (1986) Peer evaluation: a case study. *Innovative Higher Education,* **11(1)**, 25-39.