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Methods for Deriving Individual Marks From Group Work

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Methods for deriving individual marks from group work



Abstract:

Group assessment is a valuable teaching and learning method (Springer et al., 1999). This has been comprehensively demonstrated in the teaching and learning literature both in general (Johnson et al., 1991) and in specific contexts. This assessment practice promotes questioning, discussion and debate and encourages students to become active team players (DIT, 2013). However, when using this form of assessment, it is important to recognise that it is ‘individuals who graduate and gain qualifications’ (Gibbs, 2009, p4).

The problem of ‘freeloading’ has been identified and one of the suggested methods of reducing this is to incorporate individual assessment into the marking mechanism (Gibbs, 2009).

From our review of the literature, we identified six possible methods of assessing the contribution of individuals within groups. However, it is evident from our research that there are benefits and challenges associated with each method. Particular methods are more applicable to specific subject areas, student levels, and class size and instructor resources. Based on these findings, we have produced an artefact to assist instructors in selecting and applying the method deemed most appropriate for their teaching context.



References:

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Johnson, D. W., Johnson, R.T. & Smith, K. (1991) Co-operative learning: increasing college faculty instructional productivity. ASHE-ERIC Higher Education Report No. 4 Washington DC: The George Washington University School of Education and Human development.

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Literature Review

The various methods available for deriving individual marks from group projects has received significant attention in the literature in recent years [(Lejk and Wyvill 1996, Millis & Cottell (1998), Willis and Millis (2004), Felder and Brent (2001), Gibbs (2009)]. From our review of the teaching and learning literature, we identified six methods to address the individual assessment challenge faced by instructors when using group project work. These methods are discussed in detail below. Furthermore, we detail the benefits and challenges of using each method and determine the best practice in implementing each, as supported by academic studies.



Methods:

1. Including an individual assessment component e.g. individual tasks/assignments /exam questions
2. Instructor moderating the group mark for each individual on the basis of special knowledge about the individual
3. Students moderating each other's group mark on the basis of their knowledge about that individual
4. The use of peer assessment
5. The use of student self-assessment
6. The use of online resources for peer and self-assessment (for example CATME, Sparkplus, WebPA)



Method 1 : Including an individual assessment component

- This method involves assessing individual group members based on how they perform in an individual assignment, task or exam question.



Tips for use

- May involve allocating specific tasks to individual group members, setting an assignment based on the group work (to be completed on an individual basis), or setting an exam question.
- This method of assessment would form only a part of the overall assessment of the group and not be the only assessment method used. Otherwise it can decrease students motivation to collaborate. 50% group 50% individual is a good balance.
- Take care in designing the individual assessment/task/exam question, to ensure that high marks are only achievable by students who have fully participated in the group project.
- For further details and recommended reading please refer to the accompanying booklet.

Method 1 : Including an individual assessment component.

This method has several possible variants outlined in the literature, as follows:

A. Group outcomes assessed based on individual component only:

The first method involves setting a group project, with formative feedback being given, but no mark/credit allocated. The students are then individually assessed on their learning in the group project through an individual assignment/task/exam question, with all marks being allocated on an individual basis (Hindle, 1993).

Benefits :

May increase interest in the project - students may be more motivated to learn about the work of their fellow group members.

Higher marks achievable for students who demonstrate a knowledge of all aspects of the group project
Students may ignore the group project in order to study for the exam/prepare the report etc.

Challenges :

May not be effective - students may be able to complete the individual assessment simply by proofreading the group project report

May undermine the motivation for students to collaborate and may lead to a perception that students may not necessarily benefit from the effort they expend by collaborating with others.



B. Group project mark moderated based on individual assessment

The second variant on this method involves moderating the group mark for each individual member based on an individual assessment (Comins et al. 1999).



Benefits :

All members have the ability to earn extra credit (unlike peer assessment where usually some members gain marks at the expense of others)

Students may be less likely to ignore the group project and focus all attention of the individual assessment



Challenges :

May mean additional work for instructor who has to mark the group project as well as the individual assessment.



C. Dividing the group task between individuals and allocating some or all of the marks to component tasks

This method involves allocating specific tasks to individuals within the group and assessing them based on their performance of these tasks. This reflects suggestions by the DIT Assessment Handbook (2008) for instructors to “assign individual responsibilities and assess each member on the degree to which they have met their individual contracts.”



Benefits :

Group dynamics may be enhanced when responsibility for each component is clearly identified
Students may perceive this to be a more 'fair' method of marking as there is more transparency



Challenges :

May mean additional work for instructor – in dividing the project into individual components (however Gibbs (1995b, 1995c) provides some useful exercises and guidance to assist students in performing this task themselves)

May result in a decrease in the motivation to collaborate (Earl 1986 suggests instructors allocate 50% of the marks for the quality of an individual's task/component, and 50% for the quality of the overall group project to minimise this effect)

Only possible for projects that lend themselves to being broken up into separate identifiable tasks

When using this individualised approach to assessing group work, previous studies indicate that it is very important to take care in designing the individual assessment/task/exam question. The instructor should ensure that high marks are only achievable by students who have fully participated in the group project (Gibbs 2010, Lejk et al 1996). Also, this method should not be the only method used to assess the group work. It has been suggested that an appropriate split may be to allocate 50% of the overall marks to the individual assessment component, and the other 50% to the quality of the overall group project (Earl 1986).




Method 2 : Instructors moderating marks

- This method involves instructors moderating the group mark for each student on the basis of their special knowledge of individual.



Tips for use

- Only suitable for observable classroom activities. Instructor must be able to monitor contributions and participation of individuals.
- All work undertaken should be thoroughly documented in journals or 'log books' to detail individual contributions.
- Instructor must develop a clear and transparent grading system to assess individual contributions.



Method 2 : Instructors moderating the group mark for each individual on the basis of special knowledge about the individual.

Informal observation as a methodology may be sufficient where group work is supervised, with individuals rated through a common set of scales concerning contribution to different components of the work (Gibbs 1995a). However, such methods may prove incomplete and potentially unfair to some group members. Additional grading methods suggested to ensure fairness include: Team members keeping an assessable 'project log' to show individual contributions; Students separately present and answers questions on project specifics to receive +/- percentage points.



Benefits :

Simple format easy to implement and monitor in class



Challenges :

Potentially unfair to students where work is completed outside of observed class time

Relies on full buy-in and full attendance from group



Method 3 : Students moderating marks

- This method involves students moderating each other's marks, from an overall group mark assigned by the instructor.



Tips for use

- Set clear guidelines for peer to peer feedback. eg use of appropriate language and criticism.
- Sanctions in the form of % reductions may be imposed by group if individual contributions do not meet minimum expectations. These may be rescinded if improvements occur.
- Use of formative only peer to peer assessment has been reported to improve both involvement and quality of outcomes in group projects.
- For further details and recommended reading please refer to the accompanying booklet.



Method 3 : Students moderating each others' group mark on the basis of their inside knowledge about that individual.

The “Knickrem method” (Maranto and Gresham, 1998) involves the instructor making an expert academic judgement about the quality of the product with students peer reviewing contributions to that product. Many writers*claim this method produces a better spread of marks than an instructor allocated group mark only. Students also perceive this method to be fair, though there is less evidence on students' perceptions of fairness than on the impact on student behaviour. Habeshaw et al, (1993) propose a variation on the method of group members using specified ratings to moderate each other's' mark from a group mark. This method involves the instructor allocating a group mark and multiplying it by the number of students in the group. This pool of marks is then distributed amongst its members as they see fit.

A simpler method involves students allocating sanctions against group members if contribution falls below an agreed standard. Sanctions may be rescinded during the project if contributions improve. Gibbs (1995c) suggests that formative feedback on group functioning and behaviour may alleviate the need for such sanctions.

*(Goldfinch and Raeside (1990), Conway et al (1993), Goldfinch (1994), Lejk et al (1996), (Cheng and Warren, (2000); Li, (2001); Sharp, (2006), Freeman and McKenzie, (2002)



Benefits :

Freeman and McKenzie (2002) claim this method produces a better spread of marks than an instructor allocated group mark only.

Students perceive this method to be fair as they can contribute to the final grades allocated

Students have the opportunity to develop critical skills while engaged in self and peer assessment



Challenges :

Complexity of grading methodology and set-up time for instructor

Lack of evidence supporting student perceptions of fairness of methodology

Use of formative only assessment has been reported to improve both involvement and quality of outcomes in group projects. (Freeman and McKenzie (2002) Falchikov (1995)



Method 4 : Peer Assessment

- Peer assessment is assessment that is undertaken by a student to assess the contribution of peers to group work.



Tips for use

- Strive to ensure anonymity as best you can.
- Students must be familiar with the criteria and framework for assessing their peers
- Develop peer assessment forms that adopt a holistic approach rather than a category-based approach - focus on participation and engagement.



Method 4 : Peer Assessment

The use of peer assessment as part of assessment of groups is one approach to addressing the individual assessment challenge faced by instructors when using group project work. Peer assessment can play a role in both formative and summative assessment. Defined by the DIT Assessment Handbook (2008, p.21) as the ‘assessment of the work of others of equal status and power’, it shifts full or a proportion of the assessment responsibility to the student. Although recognised in the teaching and learning literature as a useful tool for promoting effective learning through giving and receiving feedback (Gielen, Dochy, Onghena, Struyven, & Smeets, 2011; White, 2009), this project will focus on the reliability of this assessment method for instructors assessing the contribution of individuals within groups. Peer assessment can be used by instructors to assign individual marks to students for their contribution to group work by mapping the single holistic group mark to individual marks using the peer assessment scores.

The value to the instructor with using peer assessment as a part of the assessment of groups relates to whether the assessment mechanism can be trusted (Gibbs, 2009). In this section, we will present our findings from the review of the literature on best practice with using peer assessment as part of the assessment of groups. Firstly, peer assessment marks are more reliable when they involve marking a global judgement rather than several dimensions (Lejk, & Wyvill, 2002). Furthermore, this approach is more likely to resemble instructor assessments (Falchikov and Goldfinch, 2000) and student familiarity with the criteria that are used improves the trustworthiness of their judgements (Falchikov and Goldfinch, 2000).

In addition, peer assessment should assess academic products and processes, rather than professional practice and should adopt a holistic approach rather than a category-based approach (Lejk, & Wyvill, 2002; Falchikov and Goldfinch, 2000).

Secondly, multiple peer assessments do not sufficiently improve the reliability (Falchikov and Goldfinch, 2000). Furthermore, peer assessment marks are not affected by the gender of the assessor (Tucker, 2014; Falchikov and Magin, 1997). The main issue is that students are committed to the process which is influenced by the learning environment the instructor has created (Yan and Kember, 2003).

Thirdly, peer assessment marking should be conducted anonymously to increase reliability. Lejk and Wyvill (2001) found that secret peer assessments where a student did not know which student or students gave which marks led to a higher spread of individual marks within the group than the agreed assessments. Drawing on our review of the literature on peer assessment, there is no evidence that peer assessment is more or less reliable in different subject areas or on advanced or introductory modules (Falchikov and Goldfinch, 2000). However, there are several benefits and challenges to using peer assessment as a way to allocate different marks to individual students.



Benefits :

Peer marks are not affected by the gender of the assessor

No need for multiple peer assessments as they do not sufficiently improve the reliability (Falchikov and Goldfinch, 2000)

Assessment practice is applicable to all subjects and programme levels



Challenges :

Ensuring anonymity may be difficult to achieve

Development of peer assessment form that adopt a holistic approach rather than a category-based approach may be time consuming



Method 5 : Student Self-Assessment

- Self-assessment is assessment that is undertaken by a student to assess their own contribution to group work.



Tips for use

- Works well for **STEM** (Science, technology, Engineering, Maths) subjects.
- Spend time in early sessions training students to self assess reasonably.
- Use for low stakes assessment

Method 5 : Student Self Assessment

Self-assessment is fundamental to the concept of self-directed learning and the maintenance of professional competence (Ward et al, 2002). Many studies have considered whether students can carry out self-assessment in a reasonable way without awarding themselves over-generous marks (Gibbs, 2009). The results of these studies are mixed, however, certain trends have emerged. In general, it is found that more experienced students and higher ability students tend to award themselves a lower mark than their teachers would. The opposite is true of less experienced and lower ability students with these students overestimating their marks compared with the judgement of the teacher (Boud & Falchikov, 1989). Students in STEM courses tend to assess more accurately than other students, perhaps due to the objective nature of these subjects. It has also been found that when the self-assessment counts towards an overall grade students tend to overestimate their marks, whereas in low stakes assessment their marks agree more frequently with their teachers'. Sadler & Good (2006) recommended that teachers should train their students in self-assessment and should monitor students for accuracy. They found that when used responsibly student-grading can be highly accurate and reliable. In this study, self-grading appeared to further student understanding of the subject matter being taught.

Benefits :

- Accurate and reliable form of assessment if student's are guided initially
- Particularly applicable to STEM
- Has been shown to deeper understanding of subject matter

Challenges :

- Time required to train students to self assess reasonably.
- Additional work for instructor
- May be difficult to implement in the humanities/arts due to subjective nature of assessment in these areas



Method 6 : On-line Assessment Tools

- On-line assessment tools to assist instructors in gathering information from students and provide feedback to individuals within groups.
Three most common online systems - CATME, SPARKplus, and WebPA, each with a different range of tools and structures.



Tips for use

- Be aware of the restrictions with each system:
WebPA - Maximum 8 students
SparkPlus - Many website links don't function
CATme - Set-up takes time
- CATme provides the most comprehensive on-line tools and tutorials and is free to use.
- Be aware of the hype! Each on-line system promotes itself.
Impartial comparative assessment of on-line tools is in short supply.
- For further details and recommended reading please refer to the accompanying booklet.



Method 6 : On-line Assessment Tools

Online resources for peer and self-assessment (for example CATME, Sparkplus, WebPA)

In a search for more effective group assessment strategies a number of on-line assessment tools have emerged in recent years. The three most popular of these are CATME, SPARKPLUS, and WebPA which are outlined briefly below. Table x provides an overview of the benefits and challenges with using each of the online tools to allocate different marks to individual students. As these are all commercial applications (to varying degrees), we found it difficult to find impartial research on the tools. Each application promotes literature on their respective websites that is largely positive.

CATME (<https://www.catme.org>), which refers to 'Comprehensive Assessment of Team Member Effectiveness', is a free set of tools designed to help instructors manage group work and team assignments more effectively. First released in 2005, it comprises of a range of tools available such as CATME Team-Maker, CATME Peer Evaluation, and CATME Rater Calibration. The tool was developed by a group of professors across several universities within the United States. CATME takes away much of the administrative burden that instructors face when trying to organize and manage teams, communicate with students, and facilitate effective peer evaluation. The tool requires a faculty log-in (requiring faculty wide sign up). The two main functions of the tool are team maker and peer assessment with the later function specifically useful to inform the allocation of different marks to individual students.

SPARKPLUS (available at <http://sparkplus.com.au/factors>) was the second on-line tool that we reviewed. It is a useful assessment tool as it provides students with the opportunity to make self and peer assessment within the context of group work. The use of SPARKPLUS can provide instructors and students with information on the strengths and weaknesses of group members as evaluated by their group peers. SPARKPLUS supports the provision of constructive feedback to students (Wu, Chanda, & Willison, 2010). In addition, the on-line tool allows students to track their attributes development and demonstrate their competence to group work and enhance students' engagement in group work (Wu, Chanda, & Willison, 2010). However, Wu, Chanda, & Willison (2010) found that the value of the tool to teaching and learning

can be misinterpreted by students who viewed it as a mechanism to justify adjustments in the group mark to an individual mark at the end of the assessment. From our review of the tool, a number of challenges to an instructor adopting the tool were identified. These include the inactivity of several website links and few research studies on the value of the self and peer assessment tool. Furthermore, the tool seems predisposed to 'detecting free riders', 'over-raters' and 'saboteurs'.

WebPA, the third tool that we reviewed, is an online automated tool that facilitates peer moderated marking of group work. The WebPA tool was originally developed at Loughborough University (UK). The project ran from October 2006 through to March 2009. WebPA is just one of the open source systems and online shared services that has been designed and developed at the Centre for Engineering and Design Education at Loughborough University for the benefit of sector. The online tool allows students to carry out a group task set by the instructor and include peer moderated marking of the performance of the group. A 'weighting factor' is generated for each individual group member, which is derived from each student's input against defined criteria. Based on the total mark given to the group task, assessed and allocated by the academic tutor in the usual way, the weighting factor is then used to moderate marks providing an individual mark for each student.



Benefits : CATME

Free to use

Peer assessment function facilitates the allocation of different marks to individual students.



Challenges : CATME

Requires faculty log-in and verification

Time consuming to set up

Faculty log-in (requiring faculty wide sign up)

Prior to faculty account set up, it is unclear the data that is returned to the lecturer



Benefits : Spark PLUS

Provides students with the opportunity to make self and peer assessment within the context of group work
Provides instructors and students with information on the strengths and weaknesses of group members as evaluated by their group peers



Challenges : Spark PLUS

Website difficult to use and missing on-line links
Value of the tool to teaching and learning can be misinterpreted by students (Wu, Chanda, & Willison, 2010)
Tool seems predisposed to 'detecting free riders', 'over-raters' and 'saboteurs'.



Benefits : WebPA

Clear, informative and well-structured website
Facilitates peer moderated marking of group work



Challenges : Spark PLUS

Unclear if there is an initial cost
The maximum allowable group size is 8 students

