



Peer versus expert feedback: An investigation of the quality of peer feedback among secondary school students



Tasos Hovardas, Olia E. Tsivitanidou, Zacharias C. Zacharia*

Department of Educational Sciences, University of Cyprus, P. O. Box 20537, Nicosia 1678, Cyprus

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ABSTRACT

Few studies have focused on peer assessment at the secondary school level. Consequently, we know very little about the quality of the feedback secondary school students can produce and its potential usefulness. This study was implemented in the context of reciprocal online peer assessment of web-portfolios in a secondary school science course. We evaluated both quantitative (grades) and qualitative (written comments) feedback on student science web-portfolios to assess the quality of peer feedback. We further investigated whether either peer or expert feedback led peer assesses to revise their work in any way. Participants (28 seventh-graders) anonymously assessed each other's web-portfolios on designing a CO₂-friendly house. Peer assessors and an expert assessor used the same pre-specified assessment criteria. Peer assesses made revisions as they saw fit after reviewing the feedback. The data sources were: the feedback produced, screen capture and video data and questionnaires. The quantitative feedback was found to differ between peer assessors and the expert and also between peer assessors assessing the same web-portfolio, which resulted in low validity and reliability. Qualitative written feedback from student and expert assessors appeared similar in its structural components. It differed in that students placed less emphasis on peer assesses' skills, provided fewer suggestions for changes, provided more positive judgments, and provided more negative/critical judgments that were not accompanied by evidence. Finally, we found that the majority of changes proposed by peer assessors were scientifically accurate and assessee groups employed decision-making strategies to screen and process peer and expert feedback. These findings yield a number of implications for practice and policy. The mere explanation of the assessment criteria or prior experience with peer assessment procedures is not enough; teachers, researchers and policy makers should focus on the type of training and scaffolding that peer assessors need in order to produce high quality feedback.

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1. Introduction

Recent developments in the field of assessment stress the importance of formative approaches, where attention is redirected from the summative evaluation of student performance toward the use of assessment during the learning procedure in order to support the improvement of learner outcomes (Bell & Cowie, 2001; Pellegrino, Chudowsky, & Glaser, 2001). An interesting innovation in the design of formative assessment has been the active involvement of students themselves in assessing peer work, known as peer assessment (Cestone, Levine, & Lane, 2008; Falchikov, 1995; Topping, 1998; Van Gennip, Segers, & Tillema, 2010). In peer assessment students assess their fellow students' performance by providing feedback (peer feedback), which could be quantitative (i.e., grades; ratings across assessment criteria) and/or qualitative (written or oral comments) in nature (Topping, 1998).

Peer assessment requires students to use their knowledge and skills to review, clarify, and correct others' work (Ballantyne, Hughes, & Mylonas, 2002). These tasks are cognitively demanding and, as they actively engage students with new knowledge, have the potential to reinforce and deepen the understanding of the student assessor (McDowell, 1995; Topping, 1998). Thus, peer assessment encourages students to be critical, independent learners as they become more familiar with the application of assessment criteria and develop a clearer

* Corresponding author. Tel.: +357 22 892957; fax: +357 22 486999.

E-mail addresses: hovardas@ucy.ac.cy (T. Hovardas), tsivitanidou.olia@ucy.ac.cy (O.E. Tsivitanidou), zach@ucy.ac.cy (Z.C. Zacharia).

concept of the material being reviewed (Falchikov, 1995; Searby & Ewers, 1997). Additionally, implicit in the design of peer assessment is the assumption that students will be accurate and fair when assessing their peers. This, it is claimed, encourages students to develop responsibilities and a sense of ownership for their peers' learning (Dochy, Segers, & Sluijsmans, 1999; Orsmond, Merry, & Reiling, 1996; Topping, Smith, Swanson, & Elliot, 2000).

Studies covering several subject domains have documented a number of benefits that peer assessment could offer to a learner (Topping, 1998, 2003). First, participants view more peers' work than in traditional teacher assessment settings, which expands the informational resources available to a learner when working on his/her own learning tasks (Liu, Lin, Chiu, & Yuan, 2001). In addition, greater exposure to peers' work enables students to view and critique a range of writing styles, techniques, ideas, and abilities, thus encouraging them to learn from both the mistakes and exemplary performance of their peers (Race, 1998). Second, when writing feedback, students have more opportunities to engage in important cognitive activities, such as critical thinking (e.g., deciding what constitutes a good or poor piece of work), planning, monitoring, and regulation (Lin, Liu, & Yuan, 2001), and may reach a more accurate self-assessment (Topping, 1998). Third, receiving adequate peer feedback was found to be correlated with more effective learning (Bangert-Drowns, Kulick, Kulick, & Morgan, 1991; Topping et al., 2000). Fourth, peer assessment improves students' learning by encouraging students to consider the objectives and purposes of the assessment task as well as of the course itself (Topping et al., 2000). Fifth, peer assessment takes the mystery out of the assessment process, thereby enabling students to appreciate why and how marks are awarded (Brindley & Scofield, 1998) and provides students with a better understanding of what is required to achieve a particular standard (Hanrahan & Isaacs, 2001).

Despite these benefits, few science education studies have focused on peer assessment (Crane & Winterbottom, 2008), especially at the primary (Harlen, 2007) and secondary school levels (Tsivitanidou, Zacharia, & Hovardas, 2011). As a result, we know very little about what primary and secondary school students can do in a peer assessment context, especially in terms of the quality of the feedback they can produce and whether it could be useful for them and their peers. Such information is important, because peer assessment is gaining grounds in participative inquiry-based science learning environments, especially computer-supported inquiry learning environments (e.g., de Jong et al., 2010, 2012). According to researchers, the fact that we have moved toward a more participatory culture, in which learning is viewed as a participative and collaborative activity (e.g., Barab, Hay, Barnett, & Squire, 2001), renders peer assessment an indispensable feature of today's classrooms (Kollar & Fischer, 2010).

However, several researchers have emphasized the fact that the enactment of peer assessment is a rather complex undertaking (Sluijsmans, 2002), especially for primary and secondary school students (Harlen, 2007; Tsivitanidou et al., 2011; Tsivitanidou, Zacharia, Hovardas, & Nicolaou, 2012). It requires the individual to have an understanding of the goal(s) of assessment, the ability to apply assessment criteria, and the skill to make judgments about learner products in relation to assessment criteria (Cho & MacArthur, 2010; Topping, 2003; Tsai & Liang, 2009; Tsivitanidou et al., 2011). The same researchers have argued for the need to investigate the skills required for enacting peer assessment and to determine the point at which students across the primary and secondary school grades have developed/acquired these skills, as well as to explore what level of feedback (e.g., content-related, appearance-related) students can provide to their peers in a science context and the relative quality of that feedback. They have further argued that information on how peer feedback is perceived by students and whether they utilize it in any way is also necessary. Overall, this is an area that calls for further research in several directions, with the ultimate goal being always the identification of what the students can do on their own or with the provision of certain scaffolds when assessing a peer's work, and what further support they need in order to improve the quality of the feedback they produce and the effectiveness with which they use the feedback they receive (Tsivitanidou et al., 2011).

The purpose of this study was to contribute to these research efforts. Specifically, we sought to compare the peer feedback produced by secondary school students (peer assessors) to the feedback produced by an expert for the same student science web-portfolios and using the same assessment criteria, in an attempt to determine the relative quality of the quantitative and qualitative feedback secondary school students can produce (Research question 1). By quantitative feedback we mean the marks or grades assigned to someone's product/work and by qualitative feedback we mean the accompanying written comments on the same product/work. To check the quality of the quantitative peer feedback, we followed prior research techniques that involved the calculation of two indices, namely validity and reliability (Hafner & Hafner, 2003; Kocakulah, 2010; Tsai & Liang, 2009). The literature was not that enlightening about how to check the quality of the qualitative feedback. Basically, there is no framework portraying how to determine the quality of the qualitative feedback. The only suggestion in the literature regarding this issue is that qualitative feedback should include the relevant structural components of written feedback, namely judgments (positive or negative/critical) and suggested changes wherever needed (Prins, Sluijsmans, Kirschner, & Strijbos, 2005; Tsai & Liang, 2009; Tsai, Liu, Lin, & Yuan, 2001). In our view, the mere presence of these structural components is not enough to determine the quality of the qualitative feedback, which led us to suggest more aspects that need to be evaluated before reaching conclusions about the quality of the qualitative feedback (for more details, see below).

Moreover, we aimed to investigate whether either type of feedback, peer or expert, led the web-portfolio student owners (peer assesseees), who were themselves engaged in the initial phase of this process as peer assessors and have an idea of what peer assessment is about, to revise their web-portfolio in any way (Research question 2). In particular, we wanted to check whether peer assesseees (a) spent different amounts of time on reviewing feedback from their peers and from expert assessors, (b) revisited feedback from their peers and from expert assessors, and (c) perceived the usefulness of feedback from their peers and from expert assessors differently. Additionally, we wanted to investigate if the feedback that peer assesseees had themselves produced when acting as peer assessors and assessing the peer group they were to assess (henceforth called 'own' feedback), affected in any way their decisions about adopting any changes from the peer and/or expert feedback received. Finally, we wanted to determine whether peer assesseees adopted any changes from the peer and/or expert feedback received.

In order to answer these research questions, we also examined whether there were different typical profiles or patterns of student behavior when students undertook the assessor role and the assessee role (typical assessor and assessee responses/actions) that affected in a different way the quality of the feedback they produced or the changes they adopted when revising their web-portfolio, respectively.

Given these research questions, we needed a study design in which the same participant takes on the roles of both the assessor and the assessee; hence, we implemented reciprocal peer assessment, because it is the only mode of peer assessment that offers this opportunity.

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