Interpersonal Variables and Their Impact on the Perceived Validity of Peer Assessment in Engineering PBL

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ABSTRACT

Intra-team peer assessments have become the norm for performance and attribute assessment in problem and project based learning activities. However, research on the effects of interpersonal variables on these assessment practices is limited. This study examined the relationship between interpersonal variables and student perceptions on the validity of peer assessment. In order to understand the relationship between social interaction and its effects on peer assessment, four interpersonal variables were identified in this study: psychological safety, value diversity, interdependence, and trust. Fifty five undergraduate engineering students working in teams of 5 to 6 participated in a survey after having completed their first formative peer assessment. Preliminary findings from this study and evidence from other studies support the view that interpersonal variables have the potential to affect peer assessment and influence the learning outcomes.

Keywords: Interpersonal Variables, Learning Outcomes, Peer Assessment, Problem Based Learning (PBL)

INTRODUCTION

Engineers need to work efficiently in a multi-disciplinary, multicultural, and multinational environment (Engineers Australia, 2011; Stage One Competency Standards 1.5, 3.2, 3.6). In order to prepare engineers for such environment, two student-centred learning activities that are commonly used in engineering education are Problem Based Learning (PBL) and Project Based Learning (PjBL) (Shi, 2010). Within these PBL and PjBL type team projects, peer assessment is commonly used by engineering academics to provide fairer assessment by allocating individual student marks (Johns-Boast & Flint, 2009; Willey & Gardner, 2010).

DOI: 10.4018/ijqaete.2014040101
The primary approach of PBL is the development of skills that allow the student to work in groups, solve complex ill-defined problems, and think critically. Wee Keng Neo and Kek Yih Chyn (2002) stressed that PBL develops technical expertise and skills in problem solving, self-directed learning and team work skills, therefore the major focus of PBL assessment should be the assessment of these skills. The following are four principal areas that need to be addressed when assessing students in group projects; group work, individual contribution, project deliverables, and the course success (Mitchell & Delany, 2004).

Of these four areas, three generic skill groups can be associated directly to the graduate attributes relevant to engineers namely group work, individual contribution and project deliverables. Several assessment techniques can be used to assess those three skills including peer assessment, the focus of this paper. Research on peer assessment (Mitchel & Delany, 2004; Uden & Beaumont, 2006; Sluijsmans et al., 2001) suggests that the most effective approach to assess generic attributes such as analytical thinking, problem solving and interpersonal skills is formative feedback, namely peer assessment.

The term peer assessment is used to describe the process undertaken by students to assess their own performance and their peers, in relation to group work (Evans, 2013). Peer assessment forms the basis of a process whereby students judge a peer’s performance quantitatively by providing a grade or score, or qualitatively, by providing written or oral feedback (Evans, 2013; Topping, 1998). Peer assessment has been studied extensively in higher education, however, research on the effects of interpersonal variables on the outcomes of this process is limited (Evans, 2013). Dahlgren and Dahlgren (2002) reported that learning through group work involves students collaborating and interacting on a social level. This involves coordinated mutual engagement by the team members which has been described as a requirement for solving engineering design problems (Dym et al., 2005). Educational theory holds that everything we learn takes place in a social context. Vygotsky (1995) for instance, proposed that understanding is shaped not only through adaptive encounters with the physical world but also through interactions between people in relation to the world. Engaging in peer assessment enables students to explore different assumptions about their involvement in a team when completing a task and share their perceptions on what constitutes quality work.

Two distinct types of peer assessment have been described, peer assessment of a product and peer assessment of individual performance (Falchikov, 1995). Product assessment involved students peer assessing a piece of work undertaken as a team, this could be formative in nature when undertaken as milestone assessment, or summative when applied to the finished artefact. Peer assessment of individual performance has an important social dimension. Van Gennip, (2009) stated that “peer assessment is fundamentally a social process whose core activity is feedback given to and received from others, aimed at enhancing the performance of each individual group member and/or the group as a whole” (p.41). Within this social process, interpersonal factors are likely to influence the outcome of the peer assessment process, which may have a positive formative impact for the team and individuals in the team, for example, enhancing collaboration. Interpersonal factors such as lack of acceptance by individuals of another’s contribution or performance could negatively impact peer assessment processes and outcomes. It could also have a detrimental impact on student performance, self-perception, team cohesion, and ultimately on students perception of the validity and perceived validity of peer assessment itself.

Four interpersonal variables have been identified as relevant to understanding how interpersonal interactions affect learning associated with peer assessment (Stanier, 1997; Van Gennip, 2012). The four interpersonal variables are psychological safety, value diversity, interdependence, and trust.
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