Computers & Education 81 (2015) 123–132

Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

What if pupils can assess their peers anonymously? A quasi-experimental study

Ellen Vanderhoven [a, b, *], Annelies Raes [a], Hannelore Montrieux [a], Tijs Rotsaert [a], Tammy Schellens [a]

[a] Department of Educational Studies, Ghent University, Henri Dunantlaan 2, BE9000 Gent, Belgium
[b] iMinds, MICT, Ghent University, Belgium

ARTICLE INFO

Article history:
Received 13 April 2014
Received in revised form
16 June 2014
Accepted 2 October 2014
Available online 8 October 2014

Keywords:
Peer assessment
Anonymity
Computer-assisted learning
Secondary education

ABSTRACT

Peer assessment has proven to be a promising assessment form, but there is only limited research about how to decrease the undesirable social effects that are inherent to the process, such as peer pressure and fear of disapproval. In previous research, anonymity has proven to be an important factor in peer assessment in higher education. In the current research, peer assessment was studied in secondary education and classroom response technology (CRT) was introduced as a tool that enables anonymity within face-to-face settings. A quasi-experimental study was set up in four classes to compare traditional non-anonymous peer assessment (raising score cards) with anonymous peer assessment (giving scores using CRT). It was questioned whether students felt more positive towards anonymous peer assessment, and reported to feel less negative social effects. Subsequently, the hypothesis that anonymous peer assessment would be a more valid methodology is verified. Finally, teachers' experiences with both peer assessment interventions were studied. Although some concerns were raised about the validity of anonymous peer assessment, it has been found that pupils felt more positive towards peer assessment and experienced less peer pressure and fear of disapproval when scores were given anonymously using CRT. Teachers reported that using CRT was an objective way of assessing but raised some concerns with regard to the control of the teacher, and the classroom characteristics. In this regard, implications for future research are discussed.

1. Introduction

The so-called 21st century skills are a list of skills that aim to prepare students for complex professional tasks in increasingly complex workplaces (Dumont & Istance, 2010; Scardamalia, 2001). To satisfy these 21st century needs, contemporary education aims at self-directed and collaborative learning with active participation of the learner (see e.g., Boud, Cohen, & Sampson, 1999). Following this evolution, the notion of assessment became important as well, as literature has indicated that student learning can be positively influenced by the manner in which assessment practices are introduced in the classroom (e.g., Biggs, 1996; Birenbaum, 2003; Black & Wiliam, 1998; Sluijsmans, 2002). Van Gennip, Segers, and Tillema (2010) state that assessment has the potential to inform students about their strengths and weaknesses and to indicate the next steps one should take in the learning process in order to perform better in subsequent performances.

In the context of this learning approach inspired by social constructivism, this evolution in evaluation entails different innovative forms of assessment like self, peer and co assessment (Fastré, van der Klink, Sluijsmans, & van Merriënboer, 2013; Harris & Brown, 2013; Raes, Vanderhoven, & Schellens, 2013). Yet, both teachers and students need to adjust to these new assessment forms and this is especially the case in assessment practices in which students get the responsibility to evaluate each other, such as peer assessment, and where interpersonal variables might influence the procedure (Van Gennip, Segers, & Tillema, 2009). Research about peer assessment is still in a stage of adolescence (Kollar & Fischer, 2010) and there is a growing interest in the impact of interpersonal variables on the outcome of peer

* Corresponding author. Department of Educational Studies, Ghent University, Henri Dunantlaan 2, 9000 Gent, Belgium. Tel.: +32 9 3310317; fax: +32 9 3310320.
E-mail addresses: ellen.vanderhoven@ugent.be (E. Vanderhoven), annelies.raes@ugent.be (A. Raes), hannelore.montrieux@ugent.be (H. Montrieux), tijs.rotsaert@ugent.be (T. Rotsaert), tammy.schellens@ugent.be (T. Schellens).

http://dx.doi.org/10.1016/j.compedu.2014.10.001
0360-1315/

assessment practices (Hovardas, Tsivitanidou, & Zacharia, 2014; Panadero, Romero, & Strijbos, 2013). While researchers suggest that anonymity might offer a solution for the possible negative impact of these interpersonal variables (Ainsworth et al., 2011), the use of anonymity in combination with assessment is still an understudied issue (Panadero et al., 2013). This study tries to meet these research gaps by setting up a quasi-experimental study in authentic secondary education. In this study it is investigated how undesirable social effects can be reduced by increasing the anonymity using classroom response technology during face-to-face peer assessment in secondary education.

1.1. Peer assessment and its social nature

Peer assessment is an educational setting that gives the opportunity for students to be actively involved in the assessment of their peers (Kollar & Fischer, 2010). This occurs by considering and specifying the level, value or quality of a product or performance of their peers, by means of oral and/or written feedback (Topping, 1998, 2003). Given certain conditions, such as the presence of unambiguous criteria on which to evaluate (Falchikov & Goldfinch, 2000), a training in peer assessment (Sluijsmans, Brand-Gruwel, van Merriënboer, & Martens, 2004; Van Zundert, Sluijsmans, & van Merriënboer, 2010), and the use of rubrics (Panadero et al., 2013) this kind of evaluation has proven to be accurate, with high inter-rater agreements between peers' and teachers' scores (Falchikov & Goldfinch, 2000). In addition, it has been proven that pupils involved in peer assessment perform better, because they have a better understanding of the assessment criteria (Li, Liu, & Steckelberg, 2010; Smith, Cooper, & Lancaster, 2002; Topping, 2003).

However, it needs to be taken into account that peer assessment has a social nature since it occurs in an interactive setting, in which at least two peers need to collaborate (Kollar & Fischer, 2010; Van Gennip et al., 2010). As mentioned before, the development and interplay between interpersonal variables, such as peer pressure and fear of disapproval when giving low scores, can therefore affect the outcomes of the assessment (Barron, 2003; Cartney, 2010; Panadero et al., 2013; Van Gennip et al., 2009). These effects are twofold. First, negative feelings during peer assessment can be considered undesirable since they might undermine the motivation for participation during the procedure (Stepanyan, Mather, Jones, & Lusuardi, 2009). Second, researchers describe reciprocity effects, referring to the bias on the peer assessment outcome caused by interpersonal variables, potentially jeopardizing the validity of the assessment procedure (Strijbos & Sluijsmans, 2010).

According to the social impact theory of Latané (1981), the effects of interpersonal variables can be even stronger in face-to-face classroom settings, as it states that social influence such as peer pressure will increase when others are close-by. This is confirmed by several researchers who have found that students in face-to-face classroom settings do not feel comfortable and can experience stress when publicly evaluating their peers (Pope, 2005; Stepanyan et al., 2009).

1.2. Anonymity within peer assessment practices

As the interplay of interpersonal variables is inherent to peer assessment practices and this process influences the assessment outcome, it has been stated that decreasing negative social effects such as peer pressure is desirable (Harris & Brown, 2013; Raes et al., 2013; Sung, Chang, Chang, & Yu, 2010). Several theories predict that this decrease can be obtained by making the assessment procedure anonymous, enabling pupils to assess each other without revealing their identity (Ainsworth et al., 2011; Deutsch & Gerard, 1955; Latané, 1981). For example, the social impact theory (Latané, 1981) states that identifiability, as opposed to anonymity, would increase social influence and the theory of normative influence of Deutsch and Gerard (1955) predicts that normative social influence upon the individual judgment (e.g., peer pressure when assessing a peer) decreases when people can judge anonymously. In line with these theories, Howard, Barrett, and Frick (2010) found that students who were anonymous when giving feedback in the context of an asynchronous webforum were approximately five times more likely to provide substantively critical feedback than those whose identities were known to the recipients. Moreover, Raes et al. (2013) established that providing anonymity in a face-to-face peer assessment context in higher education is associated with some interpersonal variables, that is with increased feelings of comfort and more positive attitudes towards peer assessment.

1.3. Establishing anonymity by means of classroom response technology

The advent of information technologies and the internet brings new possibilities for peer assessment practices, for example by using wikis within online learning management systems (Gielen & De Wever, 2012; Liu & Li, 2013). This has many advantages, such as the ease of anonymizing the participants by using identification numbers or pseudonyms, while data can be automated and summarized (Liu & Li, 2013). However, as opposed to an online learning environment, a face-to-face classroom setting allows for a more interactive variant of peer assessment, as immediate and synchronous feedback can be provided. Yet, in this context anonymous peer assessment is more complicated to organize (Ainsworth et al., 2011).

Again, new technology offers possibilities. Raes et al. (2013) proposed and investigated the use of classroom response technology (CRT, e.g., the electronic voting system TurningPoint®) to enable pupils to give immediate anonymous feedback even within face-to-face settings and to help students cope with the aforementioned undesirable social effects. A classroom response system is a voting system used in a face-to-face setting to assess students using individual infrared handset transmitters ('clickers'), tablets or mobile phones. The aggregated totals of votes are subsequently displayed on a screen in front of the classroom as immediate feedback.

An extensive literature review shows that CRT is an effective educational tool when used during courses in higher education (Kay & LeSage, 2009) and several studies show that it improves students' engagement and learning (e.g., Han & Finkelstein, 2013). Recent research on the use of clickers in collaborative learning settings in higher education shows that when interactivity is present, students will be more motivated, attentive and participative, and they will be more likely to exchange ideas with each other (Blasco-Arcas, Buil, Hernández-Ortega, & Sese, 2013). Moreover, students report that it is the anonymous nature of the response that encourages them to participate (Bojinova & Oigara, 2011; Brady, Seli, & Rosenthal, 2013; Draper & Brown, 2004). With regard to peer assessment, CRT can