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A COMPARISON OF ONLINE PEER ASSESSMENT AND FACE-TO-FACE PEER ASSESSMENT

Ufuk Güven,
Düzce University, Turkey
ufukguven75@gmail.com

Joseph Kush,
https://orcid.org/0000-0001-9614-6351
Duquesne University, USA
kush@duq.edu

Behlül Bilal Sezer,
0000-0003-1977-6426
Düzce University, Turkey
ufukguven@duzce.edu.tr

Abstract. *The main objective of this study was to compare students’ face-to-face and online peer assessment grades. In the first phase of the study, each student presented their work within a traditional classroom setting. The other students and the instructor provided grades based on a predefined rubric. In the second phase of the study, the same students presented their work within the same traditional classroom setting, however this time students and the instructor provided grades with their smartphones through a Web 2.0 tool. The study used student grades as the independent variable and grading method (face-to-face and online) as the dependent variable. Students’ peer assessments were also compared with the instructor’s grades to see in which assessment environment students gave instructor-like grades. Several paired t-tests were computed to compare groups. The results indicated that the students’ grades in face-to-face format was significantly higher than the students’ grades in online setting as well as the instructor’s face to face grades. In contrast, students provided instructor-like grades in online peer assessment setting. The study concluded that students give higher grades in face-to-face assessment setting. The most likely reason for this result is the peer pressure that exists in traditional classroom environment.*

Keywords: *Online peer assessment, Face-to-face peer assessment, Objective assessment, Peer grading.*

Introduction

Assessment is a key element of every instructional practice and effective instructors constantly assess students for a variety of pedagogical purposes. The constructivist learning approach suggests that instructors should not only be the assessor of student work but rather, students themselves should participate in the assessment process. The integration of constructivism in education has created a new mode of assessment termed “alternative assessment”. One particular example of this alternative assessment method is peer assessment. Peer assessment incorporates the practice where students assess other students based on a predetermined criteria, such as a rubric (Falchikov, 1995). Peer assessment encourages students to assess their peers based on the amount, level, value, worth, quality or success of their products (Topping, 1998). Peer assessment also increases student-student and student-instructor interactions and it has been found to improve students’ understanding during the learning experience (Falchikov 1995; LeMare & Rubin 1987; McGourty, 2000). The number of empirical research studies examining peer assessment methods has increased dramatically over the past two decades (Cheng & Warren, 1997; Crooks, 1988; Sadler, 1989; Stiggins, 2002; Temizkan, 2009) with a recent focus examining the value of online peer assessment.

With the advent of the Covid epidemic and post-Covid curricular adjustments,

online peer assessment has become more widespread (Draves, 2000; Lawrenz, Huffman & Welch, 2001; Robles & Braathen, 2002; Tseng & Tsai, 2007; van Popta et al. 2017) and has become widely used by teachers for a variety of instructional purposes, including involving students in assessment procedures, providing immediate feedback, reducing teachers' workloads and expanding student responsibility. While the application of online peer assessment requires the utilization of digital tools, the main goal stays the same as when done in a face-to-face environment. However, online peer assessment tools incorporate some unique features. For example, online peer assessment tools can anonymise student names, which may produce more honest and objective feedback. Online peer assessment tools can also save significant time for instructors and students by providing immediate feedback. An additional advantage of online peer assessment is the possibility to increase student motivation and participation in teaching and learning activities. Since digital native students routinely use their phones and tablets, they are likely more prepared to participate in online peer assessment activities and will also likely be more comfortable. Because online peer assessment also involves students in the assessment process (Rosa, Coutinho, & Flores, 2016) it will likely lead to expanded student-student, student-instructor and student-content interactions by constructive feedback.

Further, online assessment is convenient and comfortable for students and instructors. In some research, students were found to be more comfortable when asked about their ideas with regards to online exams and they expressed themselves better than face-to-face assessment (Dermo, 2009). Online systems also allow instructors to observe the online activities and progress of students more intimately (Lin et al. 2001). Online peer assessment does not come without challenges, however. Students may not have access to devices to participate in online instructions. Similarly, a lack of the internet connectivity can also prevent students from participating in online peer assessment. Online peer assessment tools also will necessitate training for both teachers and students which will require additional time and effort.

1.2. Peer Assessment Methods

1.2.1. Face -to-Face Peer Assessment

Peer assessment is an important aspect of any teaching and learning system (Benson, 2003). Peer assessment is more often used in face-to-face educational settings (Malik, 2013) and has been shown to be a widely used assessment method in the process of learning (Caulk, 1994; Richer, 1992; Topping, 1998). Peer assessment has been found to increase a student self-confidence during the assessment phase of the teaching process (Temizkan, 2009), allow students to develop a critical perspective (Noonan & Duncan, 2005) and motivate non-superficial, deep learning (Brindley and Scoffield, 1998; Cassidy, 2006; Topping, 2005). Studies have also shown that peer assessment not only strengthens fair scoring but also positively impacts both students and teachers by the resulting increase in learning (Olğun, 2011). Peer assessment is a process that allows students to make various decisions about the nature of these studies by interpreting the work of their peers through the use of feedback in which success can be evaluated (Bostock, 2009). Peer assessment can be done with an individual and well as groups of students (Temizkan, 2009). For the most part, previous research examining face-to-face peer assessment has resulted in positive conclusions (Cheng & Warren, 1997; Haaga, 1993; Morahan-Martin, 1996; Saito & Fujita, 2004 Stefani, 1994). However, face-to-face peer assessment has been shown to produce negative aspects. For example, face-to-face peer assessment can lead to conflicts between students (Ellington, Earl, & Cowan, 1997), for example, students who are less skilled than their peers may not be able to accept the feedback given by their peers (Falchikov, 1995) and the overall assessment practice may cause apprehension (Topping, 1998).

1.3.Online Peer Assessment

As in other parts of instructions, online tools can be readily incorporated in the assessment process. There are many tools that empower instructors to integrate online peer assessment methods in their teaching activities, especially as researchers (Bartlett, Reynolds, & Alexander 2000; Farmer 2005; Gül, 2012) have identified crucial advantages of online systems: students have faster access to results, grades can be entered into the electronic grade book immediately, assessment fosters a student-centred learning environment and online systems allow for measuring learning more accurately. In contrast to face-to-face assessment, peer assessment on online platforms has been shown to be a more stable and reliable method (Calvert & Waterfall; 1982, Olsen, Maynes, Slawson, & Ho, 1986). Online assessment is more than just testing students; it can be seen as a system for assessing student academic achievement (Robles & Braathen, 2002). Further, there is more interaction between instructors and students with online learning than with traditional face-to-face instruction (Drave, 2000). Other benefits of online assessment include rapid formative feedback to students, reducing workload for staff and being closer match between the assessment and learning environments (Brown et al., 1999). Of course, online assessment is not without limitations. Two of the biggest drawbacks of online assessment include the lack of students' ability to use computers at the same level and individual differences in approach to lecture (Riding & Read, 1996). Online peer assessment may not produce the same results for all ages of students; for example, Bahar (2014) found that undergraduate-level students noted that reading questions was more difficult and produced more fatigue.

Online systems have produced countless benefits in almost every aspect of education and training in today's post-COVID-19 classrooms. Across the globe, most countries have necessarily moved quickly to a distance learning model to address this issue. While numerous studies have demonstrated the benefits of distance education (Algahtani, 2011; Hiltz & Wellman, 1997; Kaya & Önder, 2002), to date, no studies have directly compared the pedagogical advantages and/or limitations of face-to-face peer assessment when compared to online peer assessment. For this reason, the goal of this study was to analyse student performance in face-to-face and online peer assessment environments. Specifically, this study directly compared face-to-face peer assessment with online peer assessment in the production of reliable grades. As a result, the two primary research questions were:

1. Does face-to-face peer assessment method students produce grades that are more aligned with instructor grades than does online peer assessment?

2. Is there a difference in grades between face-to-face peer assessment and online peer assessment?

Methodology

2.1 Research design

The current study utilized a quantitative, experimental research design to compare peer assessment grades between face-to-face and online peer assessment methods. The study compared students' peer assessment grades in face-to-face and online peer assessment formats as well as with instructors' grades, to determine which peer assessment method provided the most reliable information. Specifically, student grades represented the independent variable, and grading environment (face-to-face grading and online grading) served as the dependent variable. Instructor grades were used only for comparison purposes. Before initiating the study, researchers obtained ethical committee approval from Scientific Research and Publication Ethic Committee at Düzce University with E-78187535-300-12940 approval number.

2.2. Sample

This study was conducted with two groups of primary school teacher candidates that were studying in a public university located in northwest Turkey. The study was carried out within an Instructional Technology and Material Development course with 82 students in their second year of undergraduate education. Education students at this university generally have a middle-class family background and students are admitted by nationwide standardised

tests. Although the study was initiated with 82 students, only 73 students completed all aspects of the study and comprised the final sample. Fifteen of these participants were male while 58 were female.

2.3. Setting

The Instructional Technology and Material Development course was a mandatory, four-hour course for primary school teacher candidates. In this course, students are required to develop teaching and learning materials that includes physical and digital materials. Each student was also required to present their materials to their peers and the instructor. Once students had presented their work, the researchers asked students to provide a grade for their peers by applying the material development course rubric. All of the participant students had a smartphone and internet access to join in online peer assessment activities. For the face-to-face peer assessment phase of the study, the students and the instructor were asked to assign grades for each presenter student. Students were assured that their names and grades for their peers would not be shared, to maintain anonymity. For the online peer assessment phase of the study, the students and the instructor were asked to provide a grade through the Poll Everywhere tool. Students' names were not visible to presenter students and this was clearly explained to the participants before the study. Before grading, it was also explained to the students that peer grades wouldn't affect final grades to maximize objective peer assessment.

3. Data collection and analysis

3*.1. Data Collection Tools*

Information from the instructor's gradebook was used to determine face-to-face peer assessment grades. Students also wrote down the grades for their peers. Gradebooks of the instructor and students were used as data collection tool for the face to face assessment setting. Additionally, the researchers used a web 2.0 tool, Poll Everywhere, to collect the students' and the instructor's grades for online peer assessment. Subsequently, all grades were imported into SPSS for data analyses.

3.2. Data Analysis

The study utilized a series of paired t-tests to determine if there were significant difference between face-to-face and online peer assessment. Additionally, the study also used paired t-tests to determine which peer evaluation method students best aligned with scores from the instructor.

4. Findings

The first analysis compared student evaluations of peer performance in the face-to-face and online, classroom settings. Table 1 indicates that students' average peer assessment scores in the face-to-face setting was statistically, significantly higher than peer assessment scores in the online setting.

Table 1. Paired sample t-test statistics comparing student face-to-face peer assessment grades and student online peer assessment grades.

	n	x̄	sd	t	p
Face-to-Face Students	73	93.60	4.31	22.95	**.00**
Online Students	73	77.86	4.95		

The second analysis compared student evaluations of peer performance in the face-to-face, classroom setting with comparable evaluations by the instructor. Table 2 indicates that students' average peer assessment scores in the face-to-face setting was statistically, significantly higher than was provided by the instructor.

Table 2. Paired sample t-test statistics comparing student face-to-face assessment grades and instructor face to face assessment grades.

	n	x̄	sd	t	p
Face-to-Face Students	73	93.60	4.31	22.95	**.00**
Face-to-Face Instructor	73	79.45	5.17		

The third analysis compared student and instructor evaluations of peer performance in online classroom settings. Table 3 indicates that instructors' average peer assessment scores in the online setting was not statistically, significantly different than ratings provided by the students. Although the average grades provided by student peer assessment grades was two-points lower than those provided by the instructor, the results are not statistically significant when the Bonferroni correction procedure is incorporated.

Table 3. Paired sample t-test statistics comparing students online assessment grades and the instructor online assessment grades.

	n	x̄	sd	t	p
Online Students	73	77.86	4.95	-2.25	.02
Online Instructor	73	79.17	4.16		

Finally, Table 4 compares instructor grades in both face to face and online settings. Results indicated that there was no statistically significant difference between the grades provided by the instructor across the two assessment settings.

Table 4. Paired sample t-test statistics comparing instructor grades in face-to-face and online assessment settings.

	n	x̄	sd	t	p
Face-to-Face Instructors	73	79.45	5.17	0.58	.55
Online Instructors	73	79.17	4.16		

To summarize, instructor's grades were comparable between face-to-face or online assessment settings however results indicated that students provided higher peer grades when assessment was done in face-to-face settings, and significantly lower peer grades in online assessment settings. Additionally, there were no differences between the grades provided by the instructor across the two assessment settings and instructors' average peer assessment scores in online settings were comparable to ratings provided by students.

5. Conclusion

The primary goals of this study were to compare peer assessment of student performance in traditional and online settings to determine if differences exist, and to

ascertain which peer assessment method provided grades that were most aligned with grading completed by the course instructor. The results indicated that students and instructor evaluations were most aligned when the evaluation of work was completed in an online setting. Further, students gave significantly higher grades in face-to-face peer assessment setting than instructor as well as in online peer assessment setting. There is evidence to suggest that anonymous peer assessment is advantageous because assessors are more likely to be honest in their feedback (Rotsaert et al. 2018). Within the present study, the anonymising of student names may have created a more "honest" environment, where students did not know the names of peers that give low scores for their projects. Even though students did not see their peer's grades for their projects in face-to-face setting, they still gave higher grades for their fellow students.

This finding is likely the result of peer pressure among students which leads to them giving inflated scores to their peers when the feedback is face-to-face, and is consistent with previous findings (Xiao & Lucking, 2008). Van Popta et al. (2017) have argued that the similar cognitive processes are involved in peer assessment across online and offline environments, however, the social processes involved in peer assessment are likely to be substantively different. For example, students may feel their friendship might be compromised when they give low grades in face-to-face peer assessment (Llado, et all., 2014). Instructor modelling of student expectations, prior to the assignment, coupled with the direction to provide as specific as possible feedback, are two examples of best practices,

Relatedly, grades in online peer assessment were found to be more compatible with instructor's grades. This result indicates that online peer assessment may be more effective than face-to-face peer assessment because students get instructor-like grades in an online peer assessment method. It is possible that students do not give grades based on the quality of the assignments but rather based on their personal relationships (Çakır & Carlsen, 2013). In order to avoid peer pressure during peer assessment activities, instructors should consider online peer assessment tools that hide student names or assign codes for each student. However, in cases where online peer assessment is not applicable, face-to-face peer assessment can be modified to minimize peer pressure in classrooms. While this study was conducted in face-to-face classroom environment, online peer assessment can easily be integrated into online classroom environments even into virtual classroom software as these tools are widely used among universities (Durak, Çankaya & İzmirli, 2020).

It is well established that students make a positive contribution to their learning processes no matter what method of peer assessment is used (Bozkurt & Demir, 2013; Cheng & Tsai; 2012; Falchikov, 1995; Hanrahan & Isaacs, 2001; Kılıç & Güneş, 2016; Koç, 2011; L'hahi Bouzidi & Jaillet, 2009; Lui & Carless, 2006; Lu & Law, 2012; Lu & Zhang, 2012; Özan & Yurdabakan, 2008; Sluijmans & Prins, 2006; Temizkan, 2009; Topping, 2009; Willey & Gardner, 2010; Zhao, 2014). Results from the present study demonstrate that online peer assessments are more objective than the face-to-face peer assessments, meaning that students will receive better feedback in online peer assessments from peers, which may lead to better learning outcomes. However, as the study was conducted in undergraduate level, the results cannot be generalised for every school level. More research in different school levels (e.g., K-12 and graduate-level, higher education) is needed to expand these preliminary findings. Although results of a recent meta-analysis (Double, McGrand & Hopfenback, 2020) have shown the effectiveness of peer assessment to be quite robust across a range of classroom environments, future research should attempt to replicate and expand the current findings by conducting additional research examining the effects of peer assessment in different disciplines and courses.

Despite the current finding that online peer assessment provides more objective grading than face-to-face peer assessment, there remains some limitations. For example, the tools that are used for online peer assessment may not be easy to use. Instructors and students will require training to effectively integrate those tools into assessment procedures. Moreover, while technological resources continue to expand, a lack of internet connection and not having handheld devices may prevent integrating online peer assessment methods.

Additionally, students are quite motivated to use web 2.0 tools in learning. Providing additional training in the best practice approach to using these tools may enable an effective implementation of online peer assessment as other web 2.0 tools. In addition, teachers and instructors can modify face-to-face peer assessment methods to have objectivity of grading. In this regard, teachers should consider individualized peer reviews based on background features such as gender, achievement, and preferences (Tsai 2009).

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