

The use of peer assessment in a regional Australian university tertiary bridging course

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This paper presents the findings from research on peer assessment practice that was specifically focussed on improving the student experience in a tertiary bridging course. The objective of the study was to examine the impact of this assessment approach on student social relationships and the overall assessment experience. The study also examined whether peer assessment provided a valid and reliable method of assessment at the tertiary bridging level and whether students were equipped to be able to engage with this form of assessment. Data were collected from 107 students

enrolled in a tertiary bridging program at a regional university in Australia using a custom designed questionnaire. Four subscales, Task Experience, Feedback, Peer Relationships and Process Understanding, were identified and analysed. The initial results suggest this model of assessment did add value for students in the positive attitude toward the task and the feedback they received from their peers. The participants did not report a preference for peer assessment over other traditional forms. Improvements in the quality of peer relationships were also not identified. It was concluded that, while there are benefits provided by peer assessment in improving the students' understanding of the process of assessment, there were limited benefits in its use in relation to improving the overall student experience.

Keywords: tertiary bridging education, peer assessment, peer relationships

Introduction

There is a current focus in Australia to increase the number of non-traditional students studying at the tertiary level of education (Bradley, Noonan, Nugent, & Scales, 2008). A number of universities in Australia provide tertiary bridging programs that may be accessed by students for the purposes of academic qualification and/or to improve preparedness for tertiary study. Many students entering these programs have been demonstrated to be ill prepared for undergraduate study, with nearly 50% having failed to finish secondary school (Whannell, Allen, & Lynch, 2010). The quality of peer relationships has also been demonstrated to play an important role in student retention during the initial transition into a tertiary bridging program (Whannell, 2013).

It was considered that peer assessment may provide a vehicle through which these factors could be addressed and positively influence the experience of tertiary bridging and mature age students during the initial transition into study at the tertiary level.

The aim of the study was to determine the potential of peer assessment to improve the student experience in a tertiary bridging course by developing innovative assessment tasks that promote social relationships, metacognitive awareness and an appreciation for academic processes. It was also hoped that the use of such an assessment task would facilitate benefits in peer relationships through the necessary interaction involved. The study also examined the validity and reliability of peer assessment for students with a history of poor academic achievement and engagement, such as students enrolled in a tertiary bridging program.

Peer assessment

Peer assessment has been extensively researched over many years with many academic writers supporting its use from as early as the 1970s (Kane & Lawler, 1978). The debate as to its usefulness at the tertiary level of education is a much more recent development (Friedman, Cox, & Maher, 2008).

A number of methods of peer assessment have been described in the academic literature. Early methods included peer nomination, peer ranking and peer rating (Kane & Lawler, 1978). Peer rating involves the ranking of peers against a known external set of criteria, while peer ranking involves a ranking of peers against each other in terms of their ability to perform a behaviour or task. Peer nomination is similar to peer ranking, with the exception that only a limited number of peers are ranked at the top and/or bottom in relation to their performance. While the different approaches to peer assessment are appropriate in differing circumstances, ‘it appears that peer ranking may prove to be the best among the peer assessment methods for achieving discrimination throughout the entire performance range’ (Kane & Lawler, 1978:583). Liu and Carless (2006) have argued that an emphasis on grading in peer assessment reduces the quality of student learning through a reduction in the peer feedback provided.

The use of peer assessment is often resisted at the tertiary level where a lack of reliability and validity is considered to exist (Falchikov & Goldfinch, 2000) or its use is perceived as shifting responsibility from

the academic to the student giving students a much greater role in the assessment process (Searby & Ewers, 1997). Students who are inexperienced in the use of peer assessment also show a lower level of approval in its use (Searby & Ewers, 1997), while student assessment gradings have also been demonstrated to be consistently higher than that awarded by tutors (Langan, et al., 2005). The issues associated with validity and reliability have been tested empirically and have been demonstrated to provide adequate reliability and validity in discriminating student academic performance (Cho, Schunn, & Wilson, 2006; Kane & Lawler, 1978; Stefani, 1994; Topping, 1998) with peer assessment demonstrating positive formative effects which are “as good as or better than the effects of teacher assessment” (Topping, 1998:294). The positive effects of using peer assessment have been enhanced where high quality feedback has been provided (Boud, Cohen, & Sampson, *Peer learning and assessment*, 1999; Liu & Carless, 2006). The validity and reliability of peer assessment has also been demonstrated to be consistent over a range of year levels within tertiary education (Falchikov & Goldfinch, 2000). The reliability and validity of peer assessment has been enhanced where the number of peers involved per assessment group is small, the assessment uses global approaches to marking and students are involved in the development of the criteria used (Falchikov & Goldfinch, 2000).

Peer assessment has a number of advantages associated with its use, including improving the critical faculties of students and giving them a greater ownership of the assessment process (Nulty, 2011; Searby & Ewers, 1997; Tiew, 2010). Students have also been encouraged to become more responsible and reflective in their learning practices through the use of peer assessment (Dochy, Segers, & Sluijsmans, 1999; Nicol & Macfarlane-Dick, 2006; Nulty, 2011). Topping (1998) described a number of disadvantages in the use of peer assessment, including that poor academic performers may not accept the accuracy of peer feedback and that students may not be prepared to accept the responsibility associated with peer assessment.

The practice of having students develop the assessment criteria applied to peer assessment tasks has also been examined. This approach has been found to cause difficulty for students when

discriminating between the marking criteria and to produce different learning outcomes than that obtained by the use of teacher developed criteria (Orsmond, Merry, & Reiling, 2000). For this reason, it has been found that it is important for students to develop ownership of the assessment criteria when implementing peer assessment (Pond, Ul-Haq, & Wade, 1995).

The perception of students towards a student-centred approach to assessment, such as peer assessment, can be a motivating exercise that is more effective than conventional models of didactic teaching (Lea, Stephenson, & Troy, 2003). There is some resistance to this approach where a lack of structure, guidance and support can produce anxiety in the students and a lack of confidence in the outcomes (Lea, Stephenson, & Troy, 2003). Students tend, however, to be favourable towards peer assessment processes (Cho, Schunn, & Wilson, 2006; Falchikov & Goldfinch, 2000; Hammond, Bithell, Jones, & Bidgood, 2010; Kingsley, 2010; Lea, Stephenson, & Troy, 2003; Searby & Ewers, 1997; Tiew, 2010; Vickerman, 2009). Research conducted by Wen and Tsai (2006:27) supported the view that students held positive attitudes towards the activities involved in online peer assessment, but that this approach was “a technical tool to facilitate the assessment process, rather than as a learning aid”.

Gatfield (1999) identified no differences in the level of satisfaction of peer assessment based on age or gender. Gender-based differences in relation to the stress experienced while undertaking peer assessment have been demonstrated (Pope, 2005), where females demonstrate higher levels of stress than males.

There are a number of potential benefits identified for students participating in peer assessment, including the promotion of critical thinking, improved awareness of assessment procedures, development of constructive criticism skills, encouraging self-reflective practices, and the supporting of collaborative learning environments (Nulty, 2011). Given these potentials, peer assessment appears to offer a transformative experience for students, driving a knowledge of academic processes, social interactions and metacognitive awareness (Boud & Falchikov, 2006; Nulty, 2011).

It was Mezirow's (2000) contention that transformative learning is both an outcome and a process that incorporates problematic impasses, self-reflection, and critical assessment of assumptions. Peer assessment appears to offer these opportunities in the early development of tertiary bridging students.

The context of the current study, when considered in relation to the literature reviewed, gave rise to the following research questions:

- Do tertiary bridging students view peer assessment as a valid and reliable method of assessment?
- Is peer assessment an appropriate method of improving peer relationships in a tertiary bridging program?
- What role can peer assessment play in improving tertiary bridging student awareness of the assessment process?
- What influence do demographic factors, such as age and gender, have on the tertiary bridging student experience of peer assessment?

Research method

Participants

Participants for the study were students enrolled in two courses in a tertiary bridging program at a regional university in Australia. Enrolment is available to any person over the age of 17 and there are no academic requirements. The final questionnaire was completed by 107 participants representing a 45% response rate. The participants comprised 72 (67%) females and 35 (33%) males ranging in age from 17 to 56, with a mean age of 30.1. Fifty eight (54%) participants reported having finished secondary school. These demographics were representative of all students who were enrolled in the bridging program.

Peer assessment procedure

A peer assessment task was included in two different courses in the bridging program. One course was a compulsory computer skills course which was completed by all enrolled students, while the

other was an optional humanities course. The process adopted in both courses in relation to the development and completion of the assessment task was the same. The academic rules at the institution where the study was conducted limits peer assessment to a maximum of 10% of the overall course grade. This presented the task as a low stakes item in the overall assessment program.

The assessment task was presented to students using the *Blackboard* learning management system. *Blackboard* includes a variety of assessment tools, including one entitled Peer and Self-Assessment. The tool enabled the anonymous peer review of online submissions by two peers and a self-assessment. The assessment process was conducted in two stages. The first stage required the submission of responses to a number of questions over the first 5 weeks of the semester. The second stage involved the evaluation of responses where students evaluated two peer submissions, as well as their own, marking each question out of ten possible marks based upon a rubric created jointly by students and the academic coordinating the course. Additional space for text that could be used to provide written feedback was also available.

The literature suggests that peer assessment is most productive when students are engaged in the creation of criteria and marking rubrics (Kingsley, 2010; Pond, Ul-Haq, & Wade, 1995; Rust, Price, & O'Donovan, 2003). An in-class activity was utilised in week 2 of the semester where students created the marking rubric by analysing the course outline, assessment description and intended learning outcomes for this assessment task. Students were encouraged to write criteria that reflected their expectations, but also allowed for constructive criticism. A collaboratively developed rubric was used.

Following the finalisation of the grading of the peer assessment tasks, students were given the opportunity to complete the data collection instrument in a tutorial of each targeted course.

Instrument

A custom designed questionnaire was developed comprising an introductory section which obtained demographic and study

behaviour data, followed by a number of Likert-style items. Items were included which addressed the participants' knowledge of the peer assessment procedures, student perceptions of peer assessment and the feedback received, and the relationship to other students in the class. The Likert-style items used a five point scale ranging from Strongly Disagree to Strongly Agree, with the neutral position given as Unsure. A further 3 qualitative items were added to ascertain student ideas to the advantages, disadvantages and potential changes about the peer assessment approach. The questionnaire was trialled by 17 students and examined by a number of academics to ensure face validity of the items.

A Principal Components Analysis using Direct Oblimin rotation and Kaiser normalisation was completed using the Likert-style items to allow for the development of Likert scales for use in analysis. A four factor solution was identified which accounted for 70.4% of the shared variance in the factor items. The four scales comprised a total of 17 items giving a 6.3:1 response-to-item ratio. Factors were named based upon their constituent items and are summarised in Table 1.

Table 1: Questionnaire scales

Scale	No Items	Cronbach's Alpha	Scale Range
Task Experience	4	.858	4 – 20
Feedback	5	.916	5 – 25
Peer Relationships	4	.810	4 – 20
Process Understanding	4	.841	4 - 20

All items loaded on their respective factor with a minimum of .627 with all inter-item correlations for a given factor being statistically significant ($p<0.01$). The Cronbach's alpha values demonstrate a high level of internal consistency for each scale.

The task experience scale included items which described the participants experience such as "I found the peer assessment tasks interesting" and "I enjoyed the peer assessment tasks". The items in the feedback scale referred to the quantity and quality of feedback

received during the task and included items such as “The quality of feedback I received from peers on the tasks was of a high quality” and “The amount of feedback I received on the tasks was appropriate”. The peer relationships scale included items which described the quality of the peer relationships between the participants and his/her fellow students in the course and included items such as “I have good relationships with other students”. The process understanding scale described the participants understanding of the how the peer assessment task was to be completed and included items such as “I understood what was required to complete the peer assessment task/s” and “I understood what was required of me as a marker on the tasks”.

Results

Each of the Likert scales was analysed with the results shown in Table 2. The data distributions were examined using box plots and cases identified as outliers or with missing data were removed from the analysis.

Table 2: Likert scale distributions ($n = 77$ to 104)

Scale	Midrange	Mean	Standard Deviation	Number
Task Experience	12	13.7	3.46	97
Feedback	15	16.3	4.73	86
Peer Relationships	12	16.4	2.85	104
Process Understanding	12	15.1	3.00	99

A number of specific Likert-style items relevant to the student experience of the peer assessment tasks are shown in Table 3.

Table 3: Likert-style item responses ($n = 93$ to 103)

Item Text	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
The peer assessment tasks were helpful to me as a student.	8	13	28	36	12	3.32
I question the reliability of the peer assessment results that I received.	18	22	27	13	13	2.80
I prefer the peer assessment approach to other methods of assessment.	30	22	28	15	9	2.52
I feel that peer assessment gives me a voice in the assessment process.	5	9	34	35	16	3.48
I think it is important that I do not know whose work it is that I am marking in peer assessment.	2	3	13	17	66	4.41
I do not think that students are qualified to mark other student's work.	8	26	22	23	24	3.28
I have gained a greater appreciation of other students as a result of peer assessment.	9	20	35	26	13	3.14

Table 4 shows the Pearson's correlation coefficients between each of the Likert scales, the participant's age and their mean result on the peer assessment tasks.

Table 4: Pearson's *r* correlation coefficients

Scale	1	2	3	4	5	6	7
1. Task Experience	-						
2. Feedback		.306**	-				
3. Peer Relationships			.210*	.109	-		
4. Process Understanding				.368**	.173	.365**	-
5. Age					-.090	-.012	.092
6. Course 1 Result						.248*	.112
7. Course 2 Result							-.435

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed). Sample size scales 1 to 5 was 83 to 104. Sample size scale 6 was 75 to 81. Sample size scale 21 was 27.

The correlation analysis reported in Table 4 indicates that the quality of the peer assessment experience was associated with the quality of the feedback received ($r=.306, p<.01$), the quality of relationships with peers ($r=.210, p<.05$) and the participants' understanding of the process involved in completing the task ($r=.368, p<.01$). A standard multiple linear regression was conducted to determine the relative strength of influence of feedback, peer relationships and process understanding on the level of task experience. Prior to the regression the distributions were examined using box plots and no outliers were identified. The regression model was statistically significant ($F(87,3)=6.441, p<.01$) and accounted for 18% of the variance in the participants' task experience. The quality of feedback ($\beta=0.14, t=1.859, p=.07$) and process understanding ($\beta=0.35, t=2.997, p<.01$) made significant contributions to the model. This result, while only accounting for a relatively low level of variation in the model, indicates that the level of process understanding had the greatest influence of the student experience of the peer assessment task.

Tables 5 shows tests for significant difference for each Likert scale using an independent samples *t*-test. Gender, whether the participant had finished secondary school and whether the participants' age was greater or less than the median age of 28 were used as the grouping

variables. Where a statistical difference was identified, the degree of difference is shown using Cohan's d .

Table 5: Likert scales independent t-test results

Scale	Gender			Age			Finished School		
	<i>t</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>p</i>	<i>d</i>
Task Experience	0.7898	0.4313		0.9979	0.3204		0.3545	0.7236	
Feedback	0.7898	0.4313		0.3822	0.7031		0.4671	0.6415	
Peer Relationships	2.150	0.0336	0.41	0.4475	0.6553		0.5927	0.5545	
Process Understanding	0.9483	0.3449		2.4683	0.0159	0.51	0.6490	0.5176	

The only significant difference identified in Table 5 relevant to the peer assessment experience was the understanding of the peer assessment process based upon age ($\bar{X}_{(Age \geq 28)} = 14.4, s_{(Age \geq 28)} = 2.6; \bar{X}_{(Age < 28)} = 15.9, s_{(Age < 28)} = 3.2; df = 96$), where younger students report a higher level of process understanding.

Discussion

The mean values for each of the Likert scales shown in Table 2, all of which are close to the mid-range for each scale, indicate that the participants did not report a particularly positive attitude in any of these dimensions. The mean for the overall task experience ($\bar{X} = 13.7$) indicates that the participants did not view the peer assessment task with great enthusiasm. The data in Table 3 supports this view with participants as a group ambivalent in relation to the helpfulness of the assessment tasks ($\bar{X} = 3.32$) and failing to indicate a preference for peer assessment in relation to other assessment forms ($\bar{X} = 2.52$). The participants also demonstrated reservations about the reliability of peer assessment results ($\bar{X} = 2.80$), which supports previous research (Lea, Stephenson, & Troy, 2003). This reservation about reliability may be associated with the perception that fellow bridging students are not qualified for the task of assessing other students' work, with only 47 (45.6%) reporting agreement with this view.

The data presented in Table 5 presents an analysis of the differences in the peer assessment experience based upon age, gender and whether the participant had finished secondary school. The only significant difference identified was age on the level of process understanding, where younger participants reported a better understanding the process involved in the task.

The quantitative data analysis indicates that participants were rather ambivalent in their attitudes towards peer assessment following their experiences and did not demonstrate a preference for peer assessment over other traditional forms. The correlational analysis indicates that the participants' experience of the peer assessment tasks was associated at a moderate level with the understanding of the process involved in the task and to a lesser extent with the quality of feedback received. The role of feedback in the positive experience of peer assessment supports previous research (Boud, Cohen, & Sampson, *Peer learning and assessment*, 1999; Liu & Carless, 2006). The multiple regression shows that the principal influence on the overall experience of the peer assessment task was the understanding of the process involved in its completion.

A number of themes were identified in the comments made by the participants which may have implications for the implementation of peer assessment for tertiary bridging students. Students reported that the feedback was of a high quality, understandable, and fair. Conversely though, they questioned the reliability of the results. This could be due to the fact that enabling students are less confident in their knowledge of expectations within academia and therefore, while they reported the feedback to be helpful, they were also unsure of their peer's ability to assess the learning outcomes. It follows that as enabling students, and also as this is an early assessment task, their ability to identify standards and criteria is in the early stages of development; something peer assessment can aid. As Nulty (2011:497) points out such abilities are dependent to a large degree on individuals' ability to be self-reflective and perhaps this is "less well developed in first-year students".

A number of participants who made comments stated that they enjoyed the assessment task and that it was challenging and interesting. Conversely, a number of participants reported that they did not prefer this type of assessment over other methods of assessment. Research suggests that students report to be overwhelmingly supportive of the peer assessment process (McLaughlin & Simpson, 2004; Nulty, 2011; Pond, Ul-Haq, & Wade, 1995), although here the data analysis suggests that there are some concerns for enabling students with this form of assessment and the reliability of the results. One student reported the following points as disadvantages in using the peer assessment:

The students are not well qualified. Some people are new to authority and can abuse it. Some peers are condescending or critical but not constructive (MA)

This was indicative of many comments. Yet, this could be due to the innovative nature of peer assessment in contrast to the student's level of familiarity with conventional methods of assessment. The concern in relation to the quality of feedback was also a common concern for students, as the engagement and validity was questioned in regard to their peer evaluators. Another student suggested:

That sometimes the people whom are not particularly engaged in the subject are called on to assess peers whom are (MB)

While students were concerned with the marks received, they did however see the value in seeing other students work. A student reflected on the advantages in using peer assessment as:

Probably seeing the quality of work and depth of understanding that other students have attained, so that I can establish where I sit within the academic process. Especially as this was done in the first few weeks where any skill level was still "the great unknown". (PA)

This comment illustrates the view expressed by Boud and Associates (2010:2), that assessment has the greatest effect when "students develop and demonstrate the ability to judge the quality of their own work and work of others against agreed standards".

One of the intentions behind implementing a peer assessment process was to produce a supportive peer learning environment. In the results to date the students did not perceive this to be a peer learning exercise. A number of participants reported that they had 'an improved' understanding of and a 'greater appreciation' for other class members through their involvement in the peer assessment. Yet conversely, they also reported that as a result of the peer assessment they had 'not improved' their relationships with other members of the class. The data shown in Table 3 supports this view where only 39 of 103 participants reported an improvement in their appreciation for their peers as a result of their completing the peer assessment. This could be due to the method of implementation of the peer assessment where students retain their anonymity throughout the process of submission and evaluation. The learning activities in class are supportive of collaborative processes and establish progressive peer learning environments, but they do not directly affect the assessment task and therefore was perceived as not supporting positive social relationships. Anonymity was supported, however, where students reported that they thought it important that they do not know who it is they are marking and also, they do not like the idea that markers know whose work it is they are marking.

The overall experience for the participants on the peer assessment tasks is considered to have been adversely influenced by a number of possible issues which arose during the process. One challenge which caused some distress for participants and the course coordinator was the process of distribution of the tasks to students. Because the task was completed in the first half of the semester when attrition is highest, a number of the allocations to students went to those who had dropped out of the program. This situation was not able to be identified until after the date for marking assessment had passed and the marking had not been completed. The re-allocation of tasks was then not feasible and some students were not able to receive student feedback. Completing the evaluation phase of the task as an in-class activity would overcome this problem, but this introduces issues in relation to anonymity.

Students reported to be supportive of the criteria and rubric creation. They reported that this helped them to ‘understand assessment’ and ‘knowing what to do’ in tasks. One student reported that it ‘makes you feel more involved’ with the task. The collaborative criteria development was not something that was addressed in the questionnaire directly, neither was it something that directly affected the assessment submission or evaluation. Much of the learning in peer assessment, however, is through the process rather than the outcome. Students’ reported that they had learnt from analysing the intended learning outcomes, specified in the course outline, and had found it helpful to align these with the criteria of the assessment. One student commented: ‘Makes you more aware of what is required to receive high marks’. Students were able to see the correlation between intended learning outcomes, assessment tasks and marking procedures, a view also supported by Boud and Associates (2010:2) who stress the importance of having students “inducted into the assessment practices and cultures of higher education”.

Conclusions

Prior to presenting the findings and conclusions, it is appropriate to consider the limitations applicable to the research. The primary limitation is that the study has been conducted with one cohort of students at a single university and has utilised a relatively small sample size. While this limits the capacity for generalisation of the findings, the study provides some initial insights into the value of implementing peer assessment for this atypical student cohort. The conducting of similar research in other contexts and institutions would be necessary to further develop our understanding of the use of peer assessment in this context. The findings of Searby and Ewers (1997), that students inexperienced in the use of peer assessment report a lower level of approval, are also considered relevant here. Tertiary bridging students will very likely fall into this category and this may adversely influence the experience being reported.

The primary conclusion of this study is that the participants appear as being very ambivalent in relation to their experience of the peer assessment process. The hoped for improvements in peer

relationships, which had been identified as one justification for undertaking the peer assessment process early in the semester, did not eventuate. Likewise, the favourable attitude towards peer assessment that has been identified in other research (Cho, Schunn, & Wilson, 2006; Falchikov & Goldfinch, 2000; Hammond, Bithell, Jones, & Bidgood, 2010; Kingsley, 2010; Lea, Stephenson, & Troy, 2003; Searby & Ewers, 1997; Tiew, 2010; Vickerman, 2009) was not identified. While some participants reported positive attitudes and experiences, there was a lack of evidence to support peer assessment as an approach which will have great influence improving bridging students' attitudes towards assessment, at least when used in fashion that was utilised in this study. It is concluded however, that, similar to other research (Nulty, 2011; Searby & Ewers, 1997; Tiew, 2010), the participants' metacognitive awareness of the assessment process was positively influenced.

The self-reflective nature of peer assessment and the intrinsic nature of assessment that involves applying criteria, ranking or grading others, and making judgements certainly suggest that it is a suitable assessment approach for a tertiary bridging course. The potential of peer assessment is that its value is built into the actual task process as well as the final results. The approach used in this study is a process that will support the tertiary bridging student's future success in higher education where it is essential to be able to critically analyse assessment processes and engage with the academic requirements in a shared learning environment.

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