

Peer Assessment in Teacher Education – Online

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This paper reports on a study conducted into the feasibility, difficulties and potential of including authentic peer assessment in an online teacher education course. As well as confirming a number of findings reported in the literature, several surprising results surfaced. These included a degree of confusion, a feeling of inadequacy, and a sense of liberation among some of the 44 students who participated. As part of the peer assessment process, course members went beyond their proposed criteria to reflect on the impact on themselves of the report being assessed.

In recent years there have been a number of recommendations to include peer assessment in the school curriculum (Croft, 1995; Ministry of Education, 1993, 1994; NCTM, 2000). These semi-official and professional proposals may be valuable but, in our experience, unless teachers have personal experience of them they are simply not aware of the issues involved in implementing peer assessment into their classrooms. To address this matter, a recent Australian document entitled *National Standards and Guidelines for Initial Teacher Education* (Adey, 1998) recommends that, “Graduates should have the confidence and ability to engage in collegial peer assessment and self assessment as part of every-day work” (p.17) and that to achieve this, “Student teachers should engage in collegial peer assessment and self-assessment” (P.25). Adey’s contention seems very reasonable but research to date appears to provide only limited guidance about how peer assessment can be implemented successfully at the tertiary level, let alone in an online mathematics education course.

Searby and Ewers (1997) in the United Kingdom claimed that peer assessment has actually been used in higher education for at least 20 years. In their case they included it in a BA music course to provide students with an opportunity to assess a peer’s musical composition. They concluded that the peer assessment seemed to improve the students’ critical faculties and gave them greater ownership of the learning and assessment process. They were also clear (p. 374) that, “Each year the criteria of assessment need to be renegotiated because the act of devising criteria is very important to the development of the students’ understanding of the whole process.” Searby and Ewers concluded that skills developed in peer assessment can be used by students to critically analyse their own work, which in turn enables them to improve their own performance.

Fry (1990) reported that in a peer evaluation experiment in a British polytechnic peer grading correlated positively with teacher grading. Zariski (1996) mentioned that Tyree and Boud obtained a similar result in 1979 in the area of law education; they found a strong correlation between marks given by peers and lecturers for the same work. However, they also reported a degree of hostility toward including peer assessment marks in the formal assessment. Zariski himself observed that peer assessment reports (again in the area of law education) provided considerable insights into the competence and responsibility shown by the peer assessors.

As far as we are aware, only two studies have investigated the use of peer assessment in mathematics teacher education. Zevenbergen (2001) has reported on peer assessment of student constructed posters. She found that peer assessment was a reliable process but, better still, the quality of student learning was considerably enhanced. For example, the

students learnt more about poster construction, the mathematics itself and ways of teaching it, and the inherent difficulties in the process of assessment. Zevenbergen also noted the need to negotiate and clarify assessment criteria so that there was shared meaning of them among the students.

At Waikato University, peer assessment (and self-assessment) has been part of a 300 level undergraduate paper in mathematics/science/technology education for several years. In a preliminary study, Biddulph (1998) found that (i) there was a measure of agreement between student and lecturer marks, (ii) students seemed to be taking greater ownership of the learning and assessment process, and becoming more perceptive and critical about their own learning, and (iii) they recognised that the experience provided a model which they could implement in their own classrooms.

To date, however, we know of no report of peer assessment being used in an online teacher education course. Online learning is a relatively new field of endeavour and research, and hence there is little guidance for teachers in this medium. What little there is suggests that the role of the staff and the stance that they take is critical, (Light & Light, 1990) but that almost nothing is known about ways in which learners may be effectively helped to think deeply and critically (Andrusyszyn & Davie, 1997). Since we were involved in teaching an online teacher education course, we considered it worthwhile to include peer assessment, given that it seems to enhance the quality of learning.

The purpose of this paper then is to report on the feasibility of using peer assessment in an online mathematics teacher education course, and to examine benefits and difficulties reported by students.

The Context

The setting in which peer assessment was used and investigated was an online version (using a programme called Class Forum) of the 300 level undergraduate course referred to above. It was conducted during the first half of the first semester, 2001. The paper is titled "Curriculum Development in Mathematics, Science and Technology Education" and is an optional paper for students completing their Bachelor's degree in teaching/education. The paper itself has been developed within an enactivist framework (Taylor & Biddulph, 1999, 2000) in which those involved (students and teachers) are considered cultural and biological beings who are influencing the environment by participating within it and are simultaneously being influenced by it (Varela, Thompson & Rosch, 1991). Learning and teaching are viewed as symbiotic processes in which everyone who is involved is changed (Davis, 1996; Dawson 1999). This means, among other things, that the course process is very interactive with all course members contributing to the course development in an ongoing manner. However, as Atkins (1995) has warned, interactivity does not necessarily equate with learning.

Peer assessment was used in the first of three assignments in the paper. This particular assignment required students to interview a peer regarding her/his school curriculum experiences in either mathematics or science (41 of the 44 students chose mathematics). The interviewer then wrote a qualitative case study report in which the interviewee's curriculum experiences were critically analysed in terms of learning theory. When the report was complete it was submitted to the interviewee to assess.

Assessment criteria suggestions (with supporting reasons) were generated by the online class, and collated into a manageable set of criteria by the authors. The collated assessment criteria (see Appendix) were then posted online for each course member to access electronically. This meant that the peers were assessing the reports written about

themselves (using the posted criteria). They were asked to award an authentic grade, which constituted 10% of the final course mark for their partner.

It should be noted that the students chose their own partner for the interview and peer assessment, often someone at a considerable distance. In practice some partners were student friends whereas others were fellow students whom they had never seen, and wouldn't see – unless the partner's photo appeared in the Class Forum software.

We included peer assessment in the course for the reasons outlined in the Introduction above and because we felt that it was consistent with the enactivist framework within which we were working.

Method

Data for this investigation were collected from 44 students and comprised electronic material of three types provided by the course members in the normal course of their study. These were (i) the suggestions for criteria for peer assessment, together with reasons for those suggestions – and often an affirmation of or challenge to others' thoughts (a total of 48 contributions), (ii) students' actual peer assessments which included several additional comments (see Results/Discussion below), and (iii) students' views and feelings about contributing to the peer interview criteria and using these to assess their partner's case study. We printed the data from screen to facilitate critical analysis.

Results and Discussion

In this paper limitation of space mean that we have had to be selective. Consequently we report on just those student responses which struck us as being significant in some way. As with Zevenbergen's (2001) data, we have noticed that the value of peer assessment for our tertiary students seems to go beyond the process itself.

The Peer Assessment Schedule

We were somewhat surprised by the suggestions for peer assessment criteria offered by the students, on two counts. Firstly, our collation of their ideas revealed that the first two of their three suggestions (see Appendix) went beyond the criteria that we saw ourselves using to assessment the reports. Nevertheless they seemed quite valid for inclusion in the schedule, but it made the question of reliability or match between peer and lecturer assessment too problematical to pursue.

Secondly, the suggestions went beyond actual criteria to include an opportunity for students to reflect on their 'stories' as told by their partners. Again, although this might not have been our view of the purpose of peer assessment, it was nevertheless something that the students felt was important to them so we included a section on the peer assessment schedule to allow them this opportunity (see the first part of the peer assessment schedule in the Appendix).

Student Reactions Upon Reading Their 'Stories' in Their Partner Reports

The students commented particularly on how they felt that their experiences had been validated in the reports, and how they had gained profound insights from reading them. A small number mentioned that seeing their experiences recorded and analysed in writing gave them a sense of relief that their experiences and associated deeply held feelings were

being taken seriously and could be examined for what they really were. For example, one student wrote:

Reading my story was very liberating. I had always blamed myself for my lack of mathematical ability but have come to realise when seeing my story written that I was not so useless as I had been led to believe. It is not a good feeling to have been made to believe for so many years that I was 'dumb' at something.

Another recorded:

It was rather a strange sensation to see my memories laid out 'publicly' and analysed. It really brought home to me how much a young people we accepted the view that failures at school were a result of our incompetence or academic inability.

A third reported:

Unconsciously the hidden past aroused my previous attitudes and feelings to surface whenever the thought of mathematics arose. She [my partner] retold my experiences so sensitively that I found it hard to contain my emotions.

Most students commented on the sense of enlightenment or understanding they had gained about why they felt the way they did with respect to their past curriculum experiences. They wrote that they now realised why they had developed feelings of hopelessness and they wrote about now having feelings of sadness, or frustration at their lost chances at learning in mathematics, or at being badly let down by teachers. One student, for instance, commented,

My initial reaction was one of frustration, that teaching in those days was not for the benefit of the child. It has opened my ideas about how I developed such low self-esteem in relation to my learning ability. I always believed I was below average in ability but this is not the case. I was never given the right circumstances to develop my capabilities.

Perceived Value of the Peer Assessment Experience

The students recorded a number of benefits which they felt they had gained from being able to assess a peer's work.

Need for reflection. The majority of students recognised that they needed to examine, reflect on, and move beyond their own deep-seated feelings if they were to become effective teachers. This is illustrated by one student who noted, "I can see that I need to examine my own feelings and ideas and reflect on these, to enable me to move on" and another who wrote:

It has made me consider what implications my maths anxiety could have had on my teaching of the mathematics curriculum. If this had been left buried in my memory I may have unwittingly transmitted this anxiety to the students. I am now very aware of the fact that emotion has a large part in learning and that it has both negative and positive connotations.

Awareness of children's learning needs. Many students commented on how their involvement in peer assessment in this particular assignment had given them greater sensitivity to the learning needs of children who would be in their classes, including the need to provide children with meaningful learning contexts and careful introduction of any peer assessment they would use in a classroom. This awareness is summed up by one student who wrote, "When reading through 'my story' it helped me form a better picture of what sort of math environment I will want to create in my own classroom" and another who recorded:

I now realise that if I had been given the appropriate support for my learning needs I may actually have had more success with maths as a child. This revelation highlights the need for me to adapt my teaching methods to meet the individual learning needs of children in my class.

Students recognised the power that teachers have over the learning of children and that they would have to consider alternatives to behaviourism if they were to avoid replicating the factors that have a negative impact on children's learning. They were also aware, as one student put it, of, "...the enormity of the task that lies ahead".

The Experience of Engaging in Peer Assessing

The students reported a range of both negative and positive feelings about contributing suggestions for peer assessment criteria, and using the peer assessment schedule.

Confusion. Several students commented on the confusion that peer assessing had caused them, mostly because their peer's report was so different from their own. This reaction is summed up in the remarks of two students. One wrote, "My initial reaction on reading my story as told by my peer was, 'Oh my goodness, I've done it wrong.' Our approaches to the assignment were so different." The other commented that reading her 'story'

...literally BLEW me away. I felt that I had it all wrong and thought, OH MY GOODNESS. But I took a firm hold of myself and reminded myself firmly that everyone does things differently and that there is no RIGHT way as we are all different.

Inadequacy. Three students expressed feelings of inadequacy after reading through their partner's report on them. This was because their partner seemed to have done a far superior job of analysing their curriculum experiences than they had done, but in one case it was because the student felt guilty about providing her partner with inadequate data or rather that she felt she had failed to check that her partner was understanding the data in the way the student intended. As one student expressed it:

Being honest, I hated assessing someone else. I thought my partner did a wonderful job and reading her work made me feel inadequate as she linked things so clearly and logically.

Discomfort. The uncomfortable feeling reported by a number of students was associated with their awarding of a grade to their peer. This largely stemmed from the fact that the peer was a friend whose feelings they did not want to hurt. One student reported that she felt more comfortable after she had discussed with her partner the grade she had awarded her. The sense of discomfort is captured in the words of the student who wrote, "I really disliked having to assess a friend's work" another who commented, "...it was difficult as I was aware of the other person's feelings" and a third who recorded, "Peer assessment – wow, what a mixed bag of emotions this exercise stirred up. Like others I found this task quite unsettling." In one case the discomfort arose from a student feeling less knowledgeable than his partner,

I didn't really enjoy assessing one of my peers. It put a lot of pressure on me to make a critical evaluative statement when I considered my peer to be more 'in tune' on this subject than I am. It was hard to assess someone's strengths and/or weaknesses (for lack of a better term) when I considered them to be more knowledgeable than me.

Positive feelings. A few students commented that the experience had been relatively positive because it had allowed them to give constructive feedback to their partner, and

enabled them to gain insights into their experiences and reflect on the implications of these for their classrooms. For example, two students wrote:

Wow! How did she figure all that out? It seems so different when my reactions and memories are related to learning theories. I feel that "D" took time to reflect on my comments and analysed them thoughtfully.

After completing the peer assessment it made me think more about how I would approach this type of assessment in the classroom. I think giving us a choice in the questions gave us ownership of the assessment and also the criteria or structure was clearly set which made the questions easy to follow. I think these points could be really important in the class – almost to scaffold children through their first peer assessment experience.

A real challenge. The majority of student responses in one way or another indicated that they had found the peer assessment experience much harder than they had thought it would be. Despite this, all considered that it had been very beneficial for them, although one did comment that she hoped we would not put her through it again! As one noted, "I found the task challenging. There is a skill involved particularly in divorcing personal feeling from the final result" and another reported, "I thought the peer assessment was very useful but very hard. It was a friend I assessed and that made it very difficult. It was harder than writing the report." The feeling of many is summed up in the comment of a third student who wrote, "I felt it was a valuable exercise putting ourselves into our pupils' shoes – made us aware of many difficulties".

Conclusion

Our data has indicated that incorporating peer assessment into an online course designed along enactivist lines is indeed possible. However, the course participants did, in most cases, find it quite a challenge to peer assess. The challenges came from being exposed to others' thinking in a formal piece of writing, to assessing a friend's work, and being expected to award a grade (even though the criteria were derived from their suggestions). At the same time the students saw the peer assessment experience as very valuable as it enabled them to appreciate the complexity of the assessment process. In short, it provided them with an opportunity to put theory into practice and consider the implications for their work with children in classrooms.

For our part, we were struck by the complexity of the issues. We became aware of dimensions to peer assessment that we had not previously considered. The fact that the contributions from the students were captured in written form online meant that all participants could be reflective about them, and that the various dimensions could become visible. Although we have become more aware of the painful nature of the experience for some students, we have also realised that in most cases it has benefited them professionally.

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Appendix: Peer Assessment Schedule

Based upon your suggestions, here is a suggested peer assessment schedule. It also provides an opportunity to communicate your thoughts/feelings upon first reading your 'story'.

PERSON WHO WROTE THE 'STORY':

PERSON DOING THE ASSESSING:

- My reaction upon reading my 'story' (as told by my partner) was...
- My comments about its value in helping me understand my curriculum experiences, particularly for my professional development, are...

CRITERIA

- Has my peer truly understood my 'story', and told it with sensitivity and understanding?
- Has the report captured the essence of my experiences, i.e. to what extent have important factors in my curriculum experience been identified?
- Have clear links been made between my experiences and the theories?

I AWARD MY PARTNER THE FOLLOWING GRADE (A+ TO E):