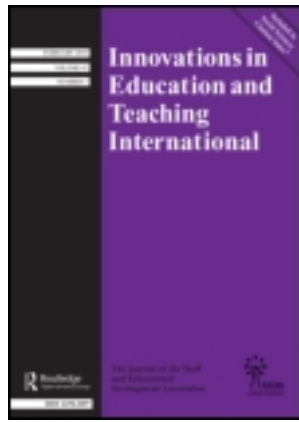


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# Attitudes towards peer assessment: a comparison of the perspectives of pre-service and in-service teachers

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In recent years, peer assessment has been increasingly used as an alternative method of assessment in classrooms. The study described in this paper employed a 13-item Likert-scale instrument to evaluate participants' attitudes towards both general (seven items) and online peer assessment (six items). A sample of 280 pre-service teachers and 108 in-service teachers from northern Taiwan participated in the study. A difference in attitude was found between pre-service and in-service teachers, because the latter viewed peer assessment as a learning aid. Our results also showed that male pre-service teachers had more positive attitudes towards peer assessment in general; male in-service teachers also liked the online approach more than did their female counterparts. Item-by-item analyses have been conducted in order to explore both the differences in attitude between pre-service and in-service teachers and to identify any gender effects.

## Introduction

Peer assessment (PA) has been frequently used as an alternative evaluation method in recent years. Consequently, this has brought profound changes in assessment procedures and purposes. Boud has identified two important functions of academic assessment: assessment of students 'intends to improve the quality of learning ... [and] the accreditation of knowledge or performance' (1990, p. 102). These two purposes are usually referred to as formative and summative assessment. Formative assessment attempts to understand students' needs during a learning process while summative assessment responds to needs from the external world—for example, parents' expectations of how much their children have learned over a period of time. However, some research has argued that classroom practices usually neglect formative assessments (Boud, 1990) and alternative assessment methods, such as PA, should be included to help students to become active, responsible and reflective learners (Sambell & McDowell, 1998).

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PA is a process whereby groups of individuals rate their peers (Falchikov, 1995) and students are encouraged to observe the learning progress of their peers in the assessment process. Sluijsmans *et al.* (1999) found that PA activities engaged students in judgement making and helped them to learn about learning. A review of related research also supports that PA may enhance students' metacognitive understanding about their own learning process (Topping, 1998).

Recent studies have found that students like PA activities in general because they can compare their work with that of their peers—but they do not want to face criticisms from peers at the same time (Cheng & Warren, 1997; Paquet & Des Marchais, 1998; Smith *et al.*, 2002). Orsmond and Merry (1996) also found a lack of self-confidence within students when rating their peers.

The research cited above has provided us with an understanding of the advantages of PA activities—but has also indicated that PA has been negatively perceived because of a lack of anonymity. The issue of confidentiality might be related to students' uncomfortableness when rating their peers; this has also been a concern of many research studies (Freeman & McKenzie, 2002). It has also been found that PA activities take extra time and may increase teaching loads (Davies, 2000). Some of these problems and issues can be solved by implementing PA on the Internet. This provides an anonymous environment for learners to express freely their thoughts about other people's work. It also allows interaction with teachers and peers whenever they can access the Internet. Related studies have shown that the Internet can provide an anonymous and confidential learning environment in which students feel they can give an honest and fair assessment online (Tsai *et al.*, 2001b; Freeman & McKenzie, 2002).

Besides students' perceptions, teachers were also found to agree upon the usefulness of PA activities, which helped students learn about the evaluation process (Zevenbergen, 2001). PA is often used in pre-service teacher education programmes to help novice teachers understand how to make qualitative judgements (Hinett & Weeden, 2000). Despite these advantages, most research investigating PA has focused on students' attitudes towards its use—with only a few exceptions examining classroom teachers' attitudes towards using it. Bearing this in mind, in our study a questionnaire approach was used in order to investigate both pre-service and in-service teachers' attitudes towards PA activities (in general) and online PA activities (in particular). Additionally, differences in attitude towards learning environments, such as laboratory activities, are usually found between students and in-service teachers (Tsai, 2003).

In addition, previous studies have shown a relationship between gender and Internet use. Females tended to have higher anxiety towards the Internet (Zhang, 2005). They also appear to have different perceptions and attitudes towards the Internet than do males (Tsai & Lin, 2004). These studies show that gender may be one of the factors influencing online learning and, therefore, in our study we decided that we would investigate the role of gender in pre-service and in-service teachers' perceptions of PA activities.

In our study, differences between pre-service teachers' (also referred to as students in this paper) and in-service teachers' attitudes towards PA activities have been examined. By appropriately surveying samples of pre-service and in-service teachers in Taiwan, our study was intended to explore the following research questions:

- What are the pre-service and the in-service teachers' perceptions of general and online PA?
- What are the differences between pre-service and in-service teachers' perceptions of general and online PA?

- Are there any gender differences in the perceptions of pre-service and in-service teachers in relation to general and online PA?

## Method

### *Sample*

A sample of 280 pre-service teachers from two large national universities in northern Taiwan participated (as students) in this study. These pre-service teachers were taking teacher education courses at the Centre for Teacher Education in each university, and therefore they had a dual identity—being both pre-service teachers *and* students. The majority (85.1%) of the pre-service sample was studying for their undergraduate degrees; however, 14.9% were graduate school students. There were 58.1% male and 41.9% female pre-service teachers.

The in-service teacher sample consisted of 108 K–12 teachers from northern Taiwan, of which 52.0% were male and 48.0% were female. Approximately 36.4% of them taught mathematics, 35.4% taught science-related subjects and 28.3% taught art-related subjects.

### *Instrument and data analysis*

The questionnaire items for this study were developed and revised based on a questionnaire developed by Wen and Tsai (2003). Using the results of relevant studies undertaken by other researchers (Falchicov, 1995; Cheng & Warren, 1997; Stanier, 1997; Brindley & Scofield, 1998), two of us (Wen and Tsai) developed a questionnaire, with a reliability coefficient of 0.80; we used this to investigate college students' perceptions of general PA and online PA activities. In the current study, the questionnaire that was used consisted of 13 five-point Likert-scale items—the responses to which were coded as 1 = strongly disagree through to 5 = strongly agree. Seven items (Scale I) were intended to investigate students' and teachers' attitudes towards PA in general while the other six items (Scale II) were about online PA. Individual item descriptions are given in Table 1.

Reliability coefficients within each scale were calculated both for the pre-service sample of teachers and for the in-service sample. The results are summarised in Table 2.

For the pre-service sample, the reliability (Cronbach's alpha) for Scale I was 0.84 while that for Scale II was 0.74. Similarly, for the in-service sample, the reliabilities for Scales I and II were 0.84 and 0.75, respectively. These values were similar to those reported by Wen and Tsai (2003).

Scale scores were generated using the mean value of the items within each scale, and were used as the outcome variable to examine the gender effect on pre-service and in-service teachers' attitudes towards PA. In order to understand the differences between pre-service and in-service teachers' perspectives, subsequent statistical comparisons were made between pre-service and in-service teachers' scores.

## Results

The descriptive information on the students' and the teachers' scale scores are listed in Table 3.

Table 1. Descriptions of items and independent *t*-tests for individual items between pre-service and in-service teachers' responses

Item <sup>a</sup>	<i>t</i>
Scale I: general PA	
1. PA is helpful to students' learning	2.85**
2. PA makes students understand more about teacher's requirement	1.91
3. PA activities motivate students to learn	2.74**
4. PA activities increase the interaction between the teacher and the students	7.17**
5. PA helps students develop a sense of participation	4.09**
6. PA activities increase the interaction among students	2.60*
7. I think students are eligible to assess their classmates' performance	-1.30
Scale II: online PA	
8. Online PA activities can be time-saving	0.26
9. Online PA activities can increase the interaction among students	4.38**
10. Online PA activities can be economical	-3.15**
11. Online PA activities can increase the interaction between the teacher and the students	4.94**
12. Online PA has the advantage of maintaining anonymity	-0.33
13. Online PA activities are fair when assessing students' performance	-0.11

\* $p < .05$ ; \*\* $p < .01$ .

<sup>a</sup>The descriptions of the items are expressed in a generic way. The phrases used in the student and teacher versions were modified accordingly. For example, for Item 1, the teacher version was 'PA is helpful to my students' learning' and for the student version the corresponding wording was 'PA is helpful to my learning'.

Table 2. Cronbach's alpha values for the instrument

	Pre-service	In-service
Scale I: general PA (Items 1-7)	0.84	0.84
Scale II: online PA (Items 8-13)	0.74	0.75
Composite (Items 1-13)	0.85	0.85

Table 3. Descriptive information for Scale I and II scores and differences between pre-service and in-service teachers' scale scores

	Pre-service		In-service		<i>t</i>	<i>d</i>
	Mean	SD	Mean	SD		
Scale I: general PA	3.30	0.64	3.57	0.54	3.90**	0.46
Scale II: online PA	3.15	0.61	3.24	0.62	1.34	0.15

\*\* $p < .01$ .

One-sample *t*-tests showed that the mean values of both pre-service and in-service teachers' scores in Scales I and II were all statistically higher than the value of 3 (the *neutral* attitude); therefore, both students and teachers held statistically positive attitudes towards PA in general (Scale I) and online PA in particular (Scale II). A subsequent comparison of the scale scores of students and teachers was also undertaken. The results showed that in-service teachers held significantly more positive attitudes towards PA in general than did pre-service teachers ( $t = 3.90, p < .01$ ). Also, both pre-service and in-service teachers had statistically similar attitudes towards online PA ( $t = 1.34, p = .18$ ).

In order to further investigate the differences in item responses between pre-service and in-service teachers, individual *t*-tests were administered on an item-by-item basis; the results are presented in Table 1. In-service teachers liked PA more than did pre-service teachers because they thought PA was a helpful way of enhancing students' learning (Item 1) and developing motivation (Item 3). It also brought a sense of participation (Item 5) and increased classroom interaction (Items 4, 6, 9 and 11). However, regarding the economy of online PA (Item 10), pre-service teachers were more optimistic than in-service teachers. Pre-service and in-service teachers' responses showed no differences in relation to: whether PA helped students to understand teachers' requirements (Item 2), students' eligibility to rate peers (Item 7), the ability of online PA to save time (Item 8), whether online PA had the advantage of anonymity (Item 12) and whether online PA was fair (Item 13). In five of the seven items in Scale I, in-service teachers were more positive towards PA than were pre-service teachers. For Scale II (online PA), in-service teachers had more positive attitudes than pre-service teachers for two items but lower attitudes for one of the items.

In order to examine the gender effect on pre-service and in-service teachers' attitudes towards PA, the scale scores of Scales I and II were used as dependent variables; the results are shown in Table 4.

The relevant *t*-tests revealed that male pre-service teachers held significantly more positive attitudes towards PA in general than did their female counterparts. In addition, statistically, male in-service teachers liked online PA more than did female in-service teachers.

After examining the gender effect by *t*-tests, effect sizes were also calculated in order to examine the significance of scale-score differences between male and female teachers. The effect size for *t*-test is often described as Cohen's *d*. According to Cohen's rough characterisation (1988, pp. 24–26),  $d = 0.2$  is deemed to be a small effect size while a value of  $d = 0.5$  is regarded as a medium effect size and  $d = 0.8$  is considered to be a large effect size. It should be kept in mind

Table 4. Mean scores and standard deviations (in parentheses) by gender and *t*-values for gender effect on scale scores

	Pre-service response				In-service response			
	Male	Female	<i>t</i>	<i>d</i>	Male	Female	<i>t</i>	<i>d</i>
Scale I: general PA	3.37 (0.63)	3.20 (0.63)	2.16*	0.27	3.64 (0.63)	3.48 (0.63)	1.54	0.25
Scale II: online PA	3.16 (0.63)	3.14 (0.63)	0.31	0.04	3.37 (0.63)	3.09 (0.63)	2.40*	0.44

\* $p < .05$ .

that when the standard deviations are not equal, the definition of  $d$  needs to be slightly modified in the following way:

$$d' = \frac{\text{Mean}_A - \text{Mean}_B}{\sigma'}, \sigma' = \sqrt{\frac{\sigma^2_A + \sigma^2_B}{2}}$$

In the above expression,  $\sigma$  represents the standard deviation of the populations (see Cohen, 1988, p. 44). The results shown in Tables 3 and 4, which reached statistical significance by  $t$ -test, were viewed as having at least a small to medium effect size, indicating adequate practical significance for the difference investigated (Scale I in Table 3, Cohen's  $d = 0.46$ ; Scale I pre-service response in Table 4, Cohen's  $d = 0.27$ ; Scale II in-service response in Table 4, Cohen's  $d = 0.44$ ).

An item-by-item analysis was conducted to further examine which items showed gender differences in pre-service and in-service teacher samples (see Table 5).

Compared to female pre-service teachers, male pre-service teachers were more positive towards the ideas that PA was helpful to students' learning (Item 1), PA made students understand more about teachers' requirements (Item 2), and students were eligible to assess their peers' performance (Item 7).

In the in-service teacher sample, male teachers were more positive than female teachers regarding the helpfulness of PA for supporting students' learning (Item 1), online PA being time-saving (Item 8) and online PA activities being economical (Item 10).

## Conclusions and discussion

The purpose of this study was to assess the attitudes of pre-service and in-service teachers towards PA in general and online PA in particular. One-sample  $t$ -tests also revealed both pre-service and in-service teachers held positive attitudes towards PA and online PA, which is similar to the findings from previous studies (Topping, 1998; Davies, 2000; Tsai *et al.*, 2001b) and suggests that both groups liked the idea of incorporating PA into classroom assessment activities.

When examining the attitude gap between pre-service and in-service teachers towards PA and online PA, a significant difference was found in that in-service teachers were more positive towards general PA than pre-service teachers were. This statistical difference reached adequate significance when effect sizes were examined. This result was also confirmed by an item-by-item comparison of pre-service and in-service teachers' responses which showed that in-service teachers had more positive attitudes towards general PA in five out of seven items. In general, in-service teachers were more able to identify the advantages of using PA activities to facilitate student learning and classroom interactions, while pre-service teachers were less able to do so but still held positive attitudes towards PA. This gap could be associated with the aforementioned research findings that students (pre-service teachers in this current example) were afraid of being criticised by their peers and were not self-confident enough to rate their peers (Orsmond & Merry, 1996; Cheng & Warren, 1997; Paquet & Des Marchais, 1998; Smith *et al.*, 2002).

Although the in-service teachers' responses in Scale II were not statistically different from those of the pre-service teachers, two of the items (Items 9 and 11)—which concerned classroom



Table 5. Independent *t*-values for gender effects on individual items for pre-service and in-service teachers' responses

Item	Pre-service	In-service
Scale I: general PA		
1. PA is helpful to students' learning	2.35*	2.59*
2. PA makes students understand more about teacher's requirement	2.00*	1.37
3. PA activities motivate students to learn	1.83	1.09
4. PA activities increase the interaction between the teacher and the students	1.69	0.58
5. PA helps students develop a sense of participation	0.64	0.62
6. PA activities increase the interaction among students	0.28	0.76
7. I think students are eligible to assess their classmates' performance	2.24*	0.66
Scale II: online PA		
8. Online PA activities can be time-saving	-0.74	2.90**
9. Online PA activities can increase the interaction among students	0.32	0.29
10. Online PA activities can be economical	0.60	2.23*
11. Online PA activities can increase the interaction between the teacher and the students	1.49	0.64
12. Online PA has the advantage of maintaining anonymity	-0.85	1.86
13. Online PA activities are fair when assessing students' performance	0.84	1.19

\* $p < .05$ ; \*\* $p < .01$ .



interactions—yielded significant differences. It was therefore concluded that in-service teachers, as compared to pre-service teachers, were more capable of recognising the ‘learning aspects’ of the benefits that PA might bring. Some possible reasons for this difference include in-service teachers’ experiences of assessment methods (including the PA method), their understanding of the nature of assessment as part of learning and in-service teachers’ professional training on methods facilitating classroom interactions. Our results also showed that there is room for pre-service teachers to recognise how PA can help them to learn; therefore, more experience with carefully designed PA activities are necessary for pre-service teachers’ education.

The only item for which pre-service teachers had a more statistically positive attitude than in-service teachers was Item 10 (online PA can be economical). This might be due to the pre-service teachers’ relatively more extensive experience with the Internet—which meant that they were more able to realise the economical advantage when accessing information online. Participating pre-service teachers therefore identified themselves with this benefit more than did the in-service teachers.

When gender effect was considered for each scale, *t*-tests showed a small to medium effect (effect size  $d = 0.27$ ) that male pre-service teachers liked PA more than female pre-service teachers. The item-by-item gender-effect analysis provided more information to illustrate the points above. For example, male pre-service teachers held more positive attitudes regarding the helpfulness of PA for student learning and for promoting students’ understanding of teachers’ requirements. In addition, male pre-service teachers showed more agreement with the students’ ability and, perhaps, confidence to rate their peers as compared to female pre-service teachers (Item 7). Because these pre-service teachers were also college students at the time of this study, this finding concurs with Fitzpatrick’s (1999) findings, namely that female students felt less self-competent to rate their peers than did males during PA activities. Consequently, male pre-service teachers might have felt more confident and comfortable in rating their peers, while their female peers felt more awkward during PA activities.

Scale-wise, gender differences were also found with a medium effect size ( $d = 0.44$ ) in the in-service teacher sample on the online PA scale instead of general PA scale. Male in-service teachers were more positive towards using PA on the Internet than were female in-service teachers. The male in-service teachers perceived online PA as being time-saving and economical (Items 8 and 10) to a higher level compared to the female in-service teachers. This phenomenon is in line with the findings that male in-service teachers used computers more and had better computer abilities than females (Mathews, 2000). Males also tended to have more positive attitudes towards the Internet than did females because males had more experience of using the Internet (Tsai *et al.*, 2001a). Male in-service teachers were therefore more able to recognise the benefits of online PA activities in classroom practices. If female in-service teachers could be provided with more online PA opportunities and experiences, then it may be possible that their attitudes to online PA might improve. However, the role that Internet experiences play on improving teachers’ views towards online learning activities still needs further validation by future research.

The results of our item-wise analysis of the in-service teacher sample also revealed a gender difference on one of the items of Scale I (general PA), which showed a more positive attitude by male in-service teachers towards the helpfulness of PA for student learning. This significant gender difference can be observed in both pre-service and in-service samples of teachers, and it

reveals a quite interesting phenomenon suggesting males, regardless of their pre-service or in-service status, held an even more positive attitude towards the helpfulness of PA for student learning.

There were no differences between male and female pre-service teachers' attitudes towards online PA (Scale II, Items 8–13). This might be due to the pre-service teachers' more frequent exposure to the Internet—while in-service teachers did not have the time or need to do this.

In conclusion, this study has explored the attitudes of pre-service and in-service teachers' towards PA (in general) and online PA. Our results show that both pre-service and in-service teachers had positive attitudes towards both PA and online PA. Gender played a role in both pre-service teachers' responses about PA in general and in-service teachers' responses about online PA—where males had more positive attitudes in both cases. Future research needs to be undertaken in order to develop ways to enhance female pre-service teachers' attitudes towards and self-confidence in rating their peers and to increase opportunities for female in-service teachers to use the Internet as an interface for PA activities.

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