



Project Works By Pre-Service Science Teachers: a Self-Peer Assessment Application

Fatma Şaşmaz Ören, Özlem Ateş
Celal Bayar University (Turkey)
fsasmaz@gmail.com, hozlem@gmail.com

1. Introduction

Literature has reported that self-peer assessment at different education levels is used in the process of assessing various performances. A great majority of these studies are performed for higher education level. It is also seen that some of the self-peer assessment studies at higher education level [1, 2, 3, 4, 5, 6] are conducted in teacher education programs. Each of these studies demonstrates the examples of self-peer assessment practices for different tasks. The variables examined in Kim's (2009) experimental study on peer assessment are metacognitive awareness, learning performance and attitudes. The results of the author's study show that pre-service teachers in the group where back-feedback activities were conducted received higher scores for all three variables [2]. Self-assessment was associated with learning in a study by Mok et al. (2006) and participants were asked to assess their own learning processes. Based on the findings of this study, self-assessment was found to be a valuable tool for teachers in higher education [3]. Lejk and Wyvill (2001) used self and peer assessment together in their studies and examined the effect of adding self-peer assessment in a group project quantitatively. The results of their study show that participants under-assess themselves compared to their peer assessments [7].

When studies on this issue are examined, with the focus generally on group studies, it is seen that there are studies on assessing different performances with self and/or peer assessment. In studies by Smith, Cooper & Lancaster (2002) and Bloxham & West (2004), only peer assessment was used in assessing posters [8,9] while Orsmond, Merry & Reiling (2000) used both peer and self-assessments [10]. Tsai, Liu, Lin & Yuan (2001) used peer assessment in assessing homework [5]. In assessing oral presentation skills, Patri (2002) used self-peer assessment [11]. As seen, there are several studies in literature with regards to self-peer assessment of different performances. The present study shows an example of assessing the project studies developed by pre-service science teachers with self-peer assessment. For this purpose, the relationship between self-peer assessment scores and instructor scores is examined. In this respect, the problem statement of the study can be stated as follows: "What is the relationship between self, peer and instructor scores used for assessing pre-service science teachers' project studies?"

2. Method

The present study, which aims at assessing pre-service science teachers' projects through self, peer and instructor assessments, is a quantitative study. It was performed in the spring term of the 2009 – 2010 academic year in an Education Faculty located in the Aegean region of Turkey. Forty-eight pre-service science teachers studying in the third grade in a Science Education program participated in the study. The course on which the study was performed is called Special Teaching Methods - I, which is a compulsory course in the second term of the third year of the Science Education program curriculum. One of the methods in science instruction which pre-service teachers learn within the scope of this course is the project based learning approach. Participants were asked to prepare science projects after learning the project based learning approach. The project preparation process was realized as group work. Ten groups in total were formed with the pre-service teachers. Thus, the number of individuals in each group was 4 or 5. Each group selected a subject from the curriculum of the second stage of primary school and prepared an appropriate science project. Pre-service teachers were asked to complete their projects in five weeks' time and each groups' steps in completing the project were followed up by the instructor with the instructor's guidance by making use of the project calendar prepared in advance.

The presentations of pre-service teachers were assessed using a project assessment form. The same assessment form was used in the assessments made by pre-service teachers (peer and self-assessment) and instructor assessment. Basically, there are two sub-titles on the form, which cover different parts of assessment. The first of these is the "project content" and the second is the "project presentation". In addition to these, sections of the form are labelled group number, the name of the group, name, grade, class, name of the project and the type of the project. This form was included and published in the "Middle School Project Preparation Course Curriculum" by the Ministry of National Education Directorate of the Council of Education and Morality (2006, p.55-57) [12]. The form in the program was adapted by the researchers in accordance with the assessment of project presentations. Two examples in the "content of the project" sub-title of the project assessment form are as follows: "expressing the project results in different forms as photograph, table, graph, figure...etc.", "the level of associating the project with daily life". Two examples of items in the "project presentation" sub-title are: "being able to present the project in a way that attracts the audience's attention" and "using oral language and body language effectively in the presentation". In data analysis, correlation coefficients were calculated in order to determine the relationship between the self, peer and instructor scores.

3. Findings

Within the scope of the research problem, initially the correlation coefficients were calculated for the purpose of determining the relationships between self, peer and instructor assessment scores for the sub-titles of the project assessment form; “project content” and “project presentation”. Next, correlation coefficients between self, peer and instructor scores for the scores obtained from the sum of project content and project presentation parts were calculated. It was found as a result of these calculations that in all three cases correlation coefficients are significantly related for peer and instructor scores but no relationship was found between the others. Table 1 shows the correlation coefficients between scores.

Table 1. Correlation coefficients between peer and instructor assessment scores

Sub-titles of the project		Peer	Instructor
Project content	Peer	1.00	0.63
	Instructor		1.00
Project presentation	Peer	1.00	0.75
	Instructor		1.00
Total project assessment scores	Peer	1.00	0.67
	Instructor		1.00

As seen in Table 1, correlations between scores from instructor and peer assessment scores were found to be 0.63 and 0.75 respectively for project content and project presentation. For the sum of these two parts, the correlation coefficient between instructor and peer assessment scores was found to be 0.67. All coefficients in the table are significantly related. These values demonstrate that there is consistency between peer assessment scores and instructor assessments. According to Büyüköztürk (2004, pp.31-37), the correlation coefficient is considered as high level of relationship if between 0.70 and 1.00 as absolute value, medium if between 0.30 and 0.70 and low if between 0.30 and 0.00 [13]. In this case, in assessing the projects pre-service teachers have prepared, it can be said that there is a medium level positive relationship between peer and instructor scores in project content and total scores and a high level, positive relationship in project presentation.

Also, in the study, it was requested from the pre-service teachers that they assess the projects with a score between 0 and 100 for the parts project content and project presentation separately. These assessment scores given by self, peer and instructor were analyzed. Correlation was calculated in order to determine the relationship between these three scores. Correlation calculations were made for the project content, project presentation and total scores separately. According to the results of this analysis, it was found that there is a significant relationship only between peer assessment and instructor scores in the project presentation sub-title and similarly between peer assessment and instructor scores in the total scores. Table 2 shows the results of the analysis.

Table 2. Correlation coefficients between peer and instructor assessment scores based on 1–100 score assessments

Sub-titles of the project		Peer	Instructor
Project presentation	Peer	1.00	0.74
	Instructor		1.00
Total project assessment scores	Peer	1.00	0.65
	Instructor		1.00

As seen in Table 2, correlations between the scores from instructors and peer assessment scores were found to be 0.74 and 0.65 respectively for project presentation and total scores. All coefficients in the table are statistically significant and these values indicate that there is consistency between peer assessment and instructor assessments. In assessing the projects that pre-service teachers prepared, it can be said that there is a medium level and positive relationship between peer and instructor scores in total scores while there is a high level and positive relationship in terms of project presentation.

The average of self, peer and instructor assessment scores for the project content sub-title of the project form is $X_{\text{mean}}=84.40$ and for project presentation, it is $X_{\text{mean}}=81.80$. When compared, although these two values are close to each other, it can be said that pre-service teachers are more successful in preparing the content of the project than presenting it.



4. Discussion and Conclusion

In the present study, a medium level of correlation was found between the project content (0.63) and project presentation (0.67) sections between peer and instructor assessment scores and a high level of correlation was found for the project presentation (0.75) part when pre-service teachers' projects were assessed. The projects were assessed with scores between 0 and 100 and as a result, similar results were seen when correlation results between self-peer and instructor assessment scores were examined. A significant relationship was found only between peer assessment and instructor assessment scores. Some studies in literature support this finding. In the study that Pope (2005) used both self and peer assessment, it was found a correlation value of 0.59 between self-assessment and tutor assessment; and a correlation value of 0.60 between peer assessment and tutor assessment [14]. Patri (2002) found a low level of correlation (0.49) in control group in peer assessment while a high level of correlation (0.85) in experiment group. In the same study, a moderately low level of correlation (0.50, 0.46) was found between teacher assessment and self-assessment scores both in control and experiment group [11]. In Segers and Dochy's (2001) study, peer and tutor scores were found to be significantly interrelated (approximately 0.7) [15].

Based on the findings of the study, peer assessment scores may be included in the general assessment scores with a certain percentage; however, this may not be done for self-assessment scores. Also, it can be suggested that in order to find what the reason of discrepancy in self-assessment scores, further studies should be made which involve detailed interviews with pre-service teachers or which aim at examining whether the results would change with a long-term self-assessment study. Further, it can be recommended that in the process of project assessment, studies on comparing the results by using different assessment methods and techniques with which process based assessments can be done, such as check lists, rubrics, diaries and portfolios can be used with self-peer assessments.

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