Effectiveness of Feedback Strategies in Terms of Accuracy of Peer Assessment

Kavita Tiwari*

Abstract

The present research attempted to find out whether the accuracy of peer assessment of achievement can be improved by the use of various feedback strategies. This study was experimental in nature which concentrated on studying the effectiveness of feedback strategies in terms of accuracy of peer assessment of achievement and factors influencing it. The achievement scores of peer assessment were obtained with the help of Achievement test developed by the investigator. The tests used for measuring Intelligence were J.C. Raven's Standard Progressive Matrices and Raven's Advanced Progressive Matrices. Self-concept of student-teachers was assessed with the help of Self-Concept Inventory developed by Deo. It is known as Self Concept List (SCL). Two types of treatment were given. For Experimental Group-I Teacher Feedback and for Experimental Group-II Peer Feedback was used as treatment. No treatment was provided to the Control group. Accuracy of Peer Assessment of Achievement of student-teachers was found to be significantly affected by feedback strategy.

Introduction

Assessment is a dynamic and continuous process that includes the full range of procedures used to gain information about student's learning and the formation of value judgements concerning progression in learning. It may include both quantitative and qualitative descriptions. When classroom instruction is viewed in the light of intended learning objectives or goals, assessment becomes an integral part of the successful teaching-learning

Assistant Professor, I.P.P.G.College, Bulandshahar, (U.P.)
(e-mail:tiwari_kavi06@yahoo.com)

process. During teaching-learning process assessment is aimed at determining the extent to which the teaching-learning objectives have been achieved by the students. This is accomplished by using test and other types of techniques that are specifically designed to measure the intended learning outcomes. The purpose of assessment is to improve student's performance and not merely to audit it. Assessment should be learner centred and focused on student achievement in relation to the goals of a course, rather than being separate from learning. Assessment plays a central role in the instructional process.

Peer Assessment is one form of innovative or alternative assessment (Mowl, 1996; Mc Dowell, 1996). It is concerned with making judgment about students by other students on the basis of some characteristics. It may be carried out by an individual or by a group of individuals. Falchikov (1995) defines peer assessment as the process through which groups of individuals rate their peer. According to Donaldson and Topping (1996), the assessment may be formative or summative; it can be considered part of peer tutoring. In peer assessment students are taking responsibility of monitoring and making judgment about aspect of their own or peer's learning. Students can develop life-long evaluation skills both about their own work and thinking as well as others using peer assessment. They learn directly by constructively criticising their own and other's work in parallel.

Theoretically peer assessment is grounded in the constructivist's perspective and assumptions of active learning. Active learning refers to a situation where learners construct their own reality or at least interpret it based upon their perceptions of experiences. Teachers may use reflection to facilitate their own learning as well for facilitation of student's learning. According to Kottkamp (1990), reflection on action takes place after an activity and an analysis with the potential assistance of others. It brings about an understanding of practice and is a way practitioners may learn from their experiences.

It is a well known fact that learning is improved by detailed, positive and timely feedback on students work. In traditional and authoritative classroom environment teacher has been considered to be the sole source of feedback, while more permissive classroom ethos recognise the peer as well as the self as important source of feedback. Use of peer assessment by teachers, in part or full, however, depends upon the way peer assessment is actually

perceived by the teachers and how is it implemented in the classroom. Peer assessment can encourage a greater sense of involvement and responsibility and promote excellence, direct attention to skills and learning and provide increased feedback. It allows the students to gain experience by giving and receiving feedback and give them an opportunity to improve performance before it counts against their grades. In large part, students peer assessment works best when students share a comprehensive understanding of the assessment criteria and the characteristics of work illustrative of different levels of performance.

Researches investigated validity of Peer Assessment showed that the peer assessment in fifth year medical students who had to assess their peer as part of the examination,highly correlated with the final grade (r=0.99) and the staff assessment (r=0.93) (Burnett and Cavaye, 1980).Orpen (1982) research related to combined co and peer assessment showed no difference between lecturers and students in their average marks. Freeman (1995) study showed the quality of the presentations was rated very highly by staff and peers but no significant difference between the average staff ratings and average peer ratings. Langan (2005) found that in making use of criteria from the first grade and continuing to focus on them in subsequent classes helped students to have a clear understanding of the rating criteria. Papinczak et al. (2007) found that peer assessment is most effective when the criteria clearly understood by all students. Dannefer et al. (2007) in his experimental study, to develop and implement peer assessment as measure of professional competence of medical students, suggested that peer assessment can be introduce for formative purpose in an UG program that provides multiple opportunities to interact with and observe peers. Tsang and Tsai (2008) regarding the validity of on-line peer assessment in high schools indicated very high correlation between peer's and expert's marks. Related to different feedback sources and strategies in micro-teaching peer feedback was found equally effective to teacher's feedback, while a few researches showed it was not effective (Belt 1967, Guelcher, etal 1970, Passi 1976, Sharma 1997, Patrick, Franciana,C.J.1995). Roper (1977), Gaynor (1981), Clarina (1992) Clark (1993) on effect of student achievement level on ability to receive different forms of feedback indicated that students of different achievement level benefited with different forms of feedback.

Studies related to attitude towards different forms and strategies of Feedback, Pridemore and Klein (1995), Morison, et.

al (1995) for Computer Based Instructions showed the attitude towards different forms and strategies of feedback was positive while in few researches it was not positive. Students were showed clear and deepen understanding of course objectives by becoming critical evaluators of their peers. Students showed developed competencies and critical thinking skills as they realised and understand the assessment criteria in order to provide their peers with accurate feedback (Yamashiro and Johnson, 1997). Butler and Hodge (2001) studied the effect of peer assessment in High School Physical Education found the practical applications of peer assessment and its value for students. The results emphasised the importance of feedback in peer assessment. Race, et al (2005), Papinczak,et al (2007), Tsang and Tsai (2008) in there studies related to effect of peer assessment in feedback peer feedback was found to be effectively useful and showed positive effect of feedback in peer assessment while few researches showed at the particular stage of peer assessment the effect of feedback were not significant.

Cutler and Price (1995), Peters (1996), Cheng and Warren (1997), Hanrahan and Issacs (2001), Falchikov (2003), Bloxham and West (2004), Long,W.S.,et al (2004), Mclaughlin and Simpson (2004), Dochy et al (2005), Noonan, B. And Randy (2005) in their studies related to attitude towards peer assessment found that many students felt needof some guidance and training about assessment criteria in peer assessment behaviour before this could actually happen. Related to this aspect of peer assessment further study needed.

Therefore researches related to the finding out of Effective and Accurate Peer Assessment procedure are very important and needs to be conducted to evolve the most suitable Peer Assessment procedure according to the changing educational needs.

Operational Definitions of Keywords

Feedback Strategy: According to Good (1959), feedback is the process whereby the individuals gain information concerning the correctness of her/his previous responses in order that she/he can adjust her/his behaviour to compensate for errors. Strategy is used as a term referring to controlling or manipulating a series of events to produce modification of behaviour through learning. In this study feedback strategy means the process where information regarding

correct response and assessment criteria has been given to the student-teachers. Three Feedback strategies have been considered *viz.*, Teacher Feedback, Peer Feedback and No Feedback.

Accuracy: The absolute difference between the achievement scores awarded by the peers and by the Teacher.

Peer Assessment of Achievement: Assessment of achievement of student by other student or their peers.

The objectives of the study included the followings:

(i) To compare adjusted mean scores of accuracy of peer assessment of achievement (APAA) of student-teachers belonging to three feedback strategies by considering intelligence and self-concept as covariates.

(ii) To study the effect of treatment, gender and their interaction on APAA of students-teachers by considering intelligence and self-concept as covariates.

The hypotheses of the study are as follows:

(i) There is no significant difference among adjusted mean scores of Accuracy of Peer Assessment of Achievement (APAA) of student-teachers belonging to three feedback strategies by considering Intelligence and Self-concept as covariates.

(ii) There is no significant effect of Treatment, Gender and their interaction on APAA of student-teachers by considering Intelligence and Self-concept as covariates.

Method

The present experimental study was at P.G. Teacher Education Department, I.P. College, Bulandshahr which is affiliated to CCS University Meerut. The sample was selected with the help of purposive sampling technique. The sample comprised of 148 student-teachers, both male and female. The Experimental Group-I comprised of 58 student-teachers. Out of these 21 were male and 37 were female. The Experimental Group-II comprised of 53 student-teachers, out of them 31 and 22 were male and female respectively. The Control Group or Group-III consisted of 37 student-teachers, out of them 21 were male and 16 were female.

The sample was further classified on the basis of educational stream. Group-I included 28 students of science and 30 students of Arts stream. In Group-II 29 students of Science and 24 students

of Arts participated. In control Group 21 students of Science and 16 students of Arts were present. The population of the study constituted the student-teachers of B.Ed. level.

Tools

The achievement scores of peer assessment were obtained with the help of Achievement tests developed by the investigator. After the selection of subject Educational Psychology, syllabus of B.Ed. was studied thoroughly by investigator. Four units were selected for four achievement tests. All these tests were Criterion Referenced Written tests. Each test was subjective type of one hour's duration. For each achievement test Blue Print was prepared. Each test had five short Answer type and one Essay type item.

For this study, the ***tools*** used for measuring Intelligence were J.C. Raven's Standard Progressive Matrices and Raven's Advanced Progressive Matrices. Self-concept of student-teachers was assessed with the help of Self-Concept Inventory developed by Deo, It is known as Self Concept List (SCL).

Method of Data Collection

Two types of treatments were given. For Experimental group-I Teacher Feedback (X_1) and for Experimental group-II Peer Feedback (X_2) was used as treatment. No treatment was provided to the Control group.

After getting the permission from authorities of college, on the first day of treatment first achievement test was administered on the sample, which was subjective type test of one hour's duration. Next in the experimental group-I Feedback (X_1) was given by the researcher/teacher. This used an interactive feedback strategy, in which researcher and student-teachers actively participated in discussion about correct response and criteria of assessment. Teacher initiated discussion keeping in view the criteria of assessment and criterion responses. Students were allowed to discuss all the concepts related to test-questions.

In the experimental group-II Feedback (X_2) was given by peers. This treatment was student-oriented Feedback strategy, in which only student-teachers actively participated in discussion about correct responses and concepts related to test-questions. During this treatment teacher created situation wherein each student-teacher was free to analyse and discuss about the features of the criterion response on each question of test. In this manner students discussed criteria of assessment about all the questions

of test. No treatment was provided to control group. Control group followed the routine activities.

In the next stage, each student-teacher assessed the answer book of another peer selected on the random basis. The student pointed to the strong and weak points in their peer's responses. He or she gave suggestions to overcome the weak points and scored the answer. In this manner student-teachers assessed all the answers in answer script of their peer. Finally all answer scripts were scored by researcher (teacher). There were two set of scores of each student, one the peer score and other the teacher score. The difference between the two irrespective of sign was computed and termed as Accuracy of Peer Assessment. A similar procedure was followed for the subsequent three achievement test taken after a gap of 15 days. Treatment lasted for three months consisting of 65 effective days. The assessments of intervening variables were also done side by side during the period of 15 days.

Results and Interpretation

The first objective of the study was to compare the adjusted mean scores of accuracy of peer assessment of achievement of student-teachers belonging to three different feedback strategies by considering Intelligence and Self-concept as covariates. There were three treatment groups namely Teacher Feedback Group-I, Peer Feedback Group-II and No Feedback Group-III/Control group. The data were analysed with the help of One Way Analysis of Covariance (ANCOVA) by considering Intelligence and Self-concept as Covariates. The results of SPSS are given in Table 1.

Table 1

Summary of one way ANCOVA for APAA by considering intelligence and self-concept as covariates

Source of Variation	df	SSy.x	MSSy.x	Fy.x
Treatment	2	1098.58	549.29	28.18**
Error	144	2786.48	19.48	
Total	146			

**Significant at 0.01 level of significance

From Table 1, it can be observed that adjusted F value for treatment is 28.18 which is significant at 0.01 level of significance with

df=2/144. It indicates that the adjusted mean scores of APAA of student-teachers belonging to three treatment strategies namely Teacher Feedback, Peer Feedback and No Feedback differed significantly when intelligence and self-concept were considered as covariates. In the light of this the first null hypothesis was rejected.

Boneferroni Test was applied to analyse the pair-wise differences in mean scores of APAA of student-teachers belonging to three treatment groups, the results of which are given in Table 2

Table 2

Pair-wise comparison of accuracy of peer assessment of the three treatment groups by considering intelligence and self-concept as covariates

Treatment Pairs (J)		Mean Difference (I-J)	Standard Error
Peer Feedback	Teacher Feedback	3.59**	0.839
No Feedback	Teacher Feedback	6.97**	0.943
No Feedback	Peer Feedback	3.38**	0.959

** Significant at 0.01 level of significance

It can be observed from Table 2 that the teacher feedback group was superior in terms of accuracy of peer assessment of achievement. It should be recalled that higher the mean score of accuracy of peer assessment of achievement means less accuracy in terms of accuracy of peer assessment. Likewise, the Teacher Feedback Group was found. The peer feedback group was also superior to the no feedback/control group in terms of APAA of Student-teachers.

The **second objective** of the study was to study the effect of treatment, gender and their interaction on accuracy of peer assessment of achievement of student-teachers belonging to three feedback strategies by considering intelligence and self-concept as covariates. There were three levels of treatment namely teacher feedback, peer feedback and no feedback. On the basis of gender the subjects were divided into two groups, namely male and female. Thus the data were analysed with the help of 3×2 factorial design ANCOVA where intelligence and self-concept were considered as covariates using SPSS. The results are given in Table 3.

Table 3

Summary of 3×2 factorial design ANCOVA for accuracy of peer assessment of achievement of student-teachers by considering intelligence and self-concept as covariates

Source of Variation	df	SSy.x	MSSy.x	Fy.x
Treatment	2	1035.98	517.99	26.43**
Gender	1	7.62	7.62	0.38
Treatment × Gender	2	32.48	16.24	0.82
Error	141	2742.84	19.59	
Total	146			

**Significant at 0.01 level of significance

Table 3 shows that the adjusted mean scores of accuracy of peer assessment of achievement of student-teachers treated with teacher feedback, peer feedback and no feedback differed significantly In the light of this the null hypothesis that there is no significant effect of treatment on accuracy of peer assessment of achievement of student-teachers was rejected.

For analysing the pairwise difference in mean scores of APAA of student-teachers belonging to three treatment groups, Boneferroni test was applied, results of which are given below in Table 4.

Table 4

Pair-wise comparison of accuracy of peer assessment of the three treatment groups by considering intelligence and self-concept as covariates

Treatment Pairs (J)		Mean Difference (I-J)	Standard Error
Peer Feedback	Teacher Feedback	3.41**	0.86
No Feedback	Teacher Feedback	6.95**	0.96
No Feedback	Peer Feedback	3.53**	0.96

**Significant at 0.01 level of significance

It can be observed from Table 4 that in all three pairs of treatment groups the difference in mean scores of APAA of student-teachers is significant. The teacher feedback group was found to be superior in term of accuracy of peer assessment of achievement of student-teachers. Likewise, the teacher feedback group was also superior

to the no feedback/control group in terms of APAA of student-teachers. Further, the peer feedback group was superior to no feedback group as far as APAA of student-teachers is concerned.

There was no significant effect of Gender on APAA when intelligence and self-concept were considered as covariates.

No significant effect of interaction between treatment and gender on APAA of student-teachers was observed.

Conclusion and Educational Implication

The study leads to the following conclusions:

(i) Accuracy of peer assessment of achievement of student-teachers was found to be significantly affected by feedback strategy when the groups were equated on intelligence and self-concept. Student-teachers were most accurate in peer assessment of achievement when given teacher feedback as compared to the peer feedback or no feedback.

(ii) Gender and interaction between treatment and gender did not significantly influence the accuracy of peer assessment of Achievement of student-teachers respectively when groups were made equivalent on intelligence and self-concept.

The results of this study provide a perspective on how peer assessment can be implemented in teacher training institutions. In classrooms, teachers need help to develop the peer assessment skills for using peer assessment strategies with students. Rolheiser and Ross (2000) have emphasised the importance of training and professional development for teachers to help them better understand and implement effective practices that are important element of formative peer assessment practices. This study can help teacher-educators and teachers in this context.

References

Belt (1967) from Berihun, A., A. Tesera and D. Desta. 2006. Enhancing Active Learning Through Teacher's, Peer and Self Reflections in Selected Primary Schools in Ethopia. http://dwb.unl.edu/Edit/MB/Mason Bruning.html (downloaded on 21/03/2008)

Bloxham and West. 2004. http://www.scribd.com (downloaded on 5/04/2008)

Burnett and Cavaye. 1980. www.informaworld.com (downloaded on 22/03/2008)

Butler and Hodge. 2001. Effect of Peer Assessment in High School Physical Education. http://Pareonline.net (downloaded on 14/06/2007)

Cheng and Warren. 1997. www.informaworld.com (downloaded on 5/04/2008)

Clarina.1992. The Effect of Various Forms of Feedback. http://dwb.unl.edu/Edit/MB/Mason Bruning.html(downloaded on 21/03/2008)

Clark. 1993. The Study of Learning Differences Between Low Ability Learners Receiving Either Answer Until Correct or Inductive Feedback. http://dwb.unl.edu/Edit/MB/Mason Bruning.html(downloaded on 19/03/2008)

Cutler and Price. 1995. www.informaworld.com(downloaded on 5/04/2008)

Dannefer, E.F. et al. 2007. Peer Assessment of Professional Competence. http://www.ncbi.hlm.nih.gov/pubmed(downloaded on 21/03/2008)

Dochy, et al. 2005. Peer Assessment, www.informaworld.com(downloaded on 19/03/2008)

Donaldson and Topping. 1996. www.informaworld.com

Falchikov. 1995. http://www.scribd.com(downloaded on 5/04/2008)

Falchikov. 2003. http://www.scribd.com

Freeman. 1995. Guidelines for Group Assessment, Self-Assessment and Peer Assessment. http://www.62.gu.edu(downloaded on 4/08/2007)

Gaynor. 1981. http://dwb.unl.edu/Edit/MB/Mason Bruning.html (downloaded on 22/03/2008)

Guelcheret. al. 1970. http://Pareonline.net(downloaded on 6/04/2008)

Hanrahan and Issacs. 2001. http://www.scribd.com(downloaded on 22/03/2008)

Kottkamp. 1990. http://dwb.unl.edu/Edit/MB/Mason Bruning.html

Langan. 2005. http://www.scribd.com(downloaded on 6/04/2008)

Long, Esther, Dobbins. 2004. wwww.informaworld.com

Mc Dowell, (1996) in V. Prakash. Possible Methods of Student's Assessment. *Journal of Indian Education.* vol. xxviii, No. 2, Aug. 2002

Mc laughlin and Simpson. 2004. http://www.scribd.com(downloaded on 22/03/2008)

Merrill. 1987. The Effect of Attribute Isolation and Corrective Feedback on Student Learning. http://dwb.unl.edu/Edit/MB/Mason Bruning.html(downloaded on 19/03/2008)

Morison, et al. 1995. http://dwb.unl.edu/Edit/MB/Mason Bruning.html

Mowl (1996) in V. Prakash. Possible Methods of Student's Assessment. *Journal of Indian Education.* vol. xxviii, No. 2, Aug. 2002

Noonan, B. and C. Randy. 2005. Peer and self-assessment in High Schools. http://Pareonline.net(downloaded on 17/11/2008)

Orpen's. 1982. www.informaworld.com

Papinczak, et al. 2007. Peer Assessment in Problem Based Learning: A Qualitative Study, www.springerlink.com(downloaded on 21/03/2008)

Passi (1976) from A Dubey. Effectiveness of a Training Strategies for Developing Feedback giving and Feedback Receiving Competency in Relation to the Selected Organismic Variables of Student-teachers. Ph.D Thesis, Education, DAVV, Indore, 1988

Patrik, Francina, C.J. 1995. Effectiveness of Two Feedback Corrective Procedures Used in Mastery Learning Strategy in Terms of Students' Achievement and Retention in Chemistry. *Journal of Indian Education.* vol. xxxiii, No.1, May 2007.

Peters. 1996. www.informaworld.com

Pridemore and Klein.1995. http://dwb.unl.edu/Edit/MB/Mason Bruning.html(downloaded on 19/03/2008)

Race, et al. 2005. http://www.scribd.com

Rolheiser and Ross. 2000. http://Pareonline.net (downloaded on 21/03/2008)

Roper. 1977. http://dwb.unl.edu/Edit/MB/Mason Bruning.html

Sharma. 1997. Effectiveness of Two Feedback Corrective Procedures Used in Mastery Learning Strategy in Terms of Students' Achievement and Retention in Chemistry. *Journal of Indian Education.* vol. xxxiii, No.1, May 2007.

Topping. 1998. Peer Assessment Between Students in College and University.http://links.jstor.org.com(downloaded on 21/03/2008)

T Sang and Tsai. 2008. Peer Assessment and Computer Literacy for junior High School Students in Geography Lessons in Hongkong. www.ijedict.dec.uwi.edu.com

Yamashiro and Johnson. 1997. Public Speaking in EFL: Elements of Course Design. http://www.scribd.com(downloaded on 22/03/2008)