

Enhancement of Sport Skill Learning through Intensive Peer and Teacher Feedback

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Abstract

The purpose of the programme was to improve the teaching and learning of sport skill through the introduction of teaching methods focusing on intensive peer and teacher feedback in physical education/sport skill classes. A total of six table tennis classes (a university-wide sport skills course) and two gymnastic classes (for students in the Department of Physical Education and Recreation Management) constituted the first cycle of the project. Students, working in pairs, were required and encouraged to give verbal feedback to each other about their performance. Two instructors also gave feedback by correcting errors so that correct skill technique might be acquired. After reflecting on the first cycle, the second cycle was planned using the same procedures and involving two table tennis classes and one gymnastics class. Evaluation of both cycles included systematic observations of peer and teacher feedback. Findings demonstrated that peers tended to give very little feedback to their partners about their performance. Learners were hesitant to give feedback because of their perceived poor skill-related knowledge. There was an apparent improvement in the situation when the instructor teamed up novice and more experienced learners. A more homogenous group of students, i.e. from the same major, and a smaller class size, appeared to contribute to students being more vocal. In general, students agreed that verbal feedback was helpful in the learning of skills, but the class size and the individual student's personality had an effect on the quality and quantity of verbal feedback. It is intended, as a follow-up to the project, to produce a video recording on the introduction of "Systematic observations to facilitate self-reflection for physical education teachers".

Introduction

One of the objectives of physical education is to help students attain motor skills with teachers giving frequent feedback to students about their skill performance. Based on the findings of motor-learning research, it is widely accepted by researchers and teacher educators that feedback is an essential element in motor skill learning. As a result, guidelines for giving feedback in skill teaching have been established (Lee, Keh, & Magill, 1993). Feedback is referred to as "all of the response-produced (sensory) information that is received during or after movement" (Schmidt, 1988, p.424), the two types of movement-related feedback being intrinsic and extrinsic. Intrinsic feedback is perceived through the learner's sensory channel, such as seeing the results of performance or feeling the movements. In contrast, extrinsic feedback is referred to as information provided about the task which supplements or augments intrinsic feedback (Schmidt, 1988) and is provided to learners by some external source such as the teacher, coach, videotape or computer (Lee, Keh, & Magill, 1993). The provision of extrinsic feedback by the teacher or peer is crucial in the enhancement of sport skill learning, particularly if the feedback is positively presented and skill-related. Positive skill-related feedback is exemplified by the teacher saying: "Quite good but you need to tighten up your body". "It's no

good, your body is too loose” is an example of negative skill-related feedback while “good form” is an example of positive and general feedback and “incorrect form” an example of negative and general feedback.

To improve teaching and learning of sport skills, it was decided to introduce teaching methods which focussed on intensive peer and teacher feedback, i.e. augmented or extrinsic feedback, believing that most teachers occasionally use peer feedback, where students work in pairs, to practise skills. At the same time, teachers give verbal or non-verbal feedback aimed at students’ learning to enhance performance. However as a result of teaching experience questions are raised which require investigation. Such questions include the following:

- Can students recognise errors made by their peers?
- Does increased peer feedback enhance sport skill learning?
- How often and what type of feedback is given by the teacher?
- Does increased peer and teacher feedback make a difference to sport skill acquisition?

To explore and determine ways in which peer and teacher feedback could be utilised to the optimum to enhance skill learning, it was decided that teachers should first plan for the provision of intensive and structured peer learning, simultaneously reflecting on the aspects of teacher feedback which needed improvement. The process in the first cycle of the study involved planning, observing, discussing and reflecting so that improvements could be made before the next cycle was operationalised.

The research focused on both the introduction of intensive and structured peer learning and teaching, as well as on the delivery of teacher-feedback to detect and correct errors.

The aims of the project therefore were:

- to determine the effectiveness of providing intensive peer learning and peer feedback in the acquisition of skills;
- to help teachers improve feedback to correct errors during sport skill teaching.

Method

Definition of Terms

Intensive peer feedback:

A variety of planned and structured activities for pairs of students and small groups. Students are given teaching cues to enable them give more positive and skill-related feedback when correcting a peer’s errors.

Teacher feedback:

Systematic actual or video-taped observations and recordings of teacher behaviour are used to evaluate teachers’ feedback. The procedures are analysed and discussed by the teaching team, after which the teachers engage in reflection on their performance in an attempt to improve the quality of their feedback, for example a teacher may need to improve error detecting skills.

Project Design

Eleven (11) classes consisting of a total of approximately 244 students and taught by two members of the project team were involved. The aim of the project was to determine the effect of intensive

peer and teacher feedback on the acquisition of skills needed for table tennis and Gymnastics I and II. The skills necessary for table tennis were taught by one project member while Gymnastics I and II were taught by another project member. Teaching of table tennis involves facilitating the acquisition of basic skills such as drive, push, service and smash (see Figure 1).

Figure 1: Teaching schedule for table tennis

Session	Contents (2 hours per session)
1	Introduction
2	Fitness testing
3	Pre-test position
4	Grip; Forehand drive
5	Backhand drive; Combination of forehand and backhand drives
6	Service; Service with spin; Receive
7	Backhand push
8	Forehand smash; Backhand smash
9	Backhand push; Underspin
10	Singles play
11	Theory; Doubles play
12	Skill exam
13	Skill exam

Gymnastics I involves teaching basic skills such as forward roll, cartwheel, and handstand, while Gymnastics II involves teaching more advanced skills such as tumbling, and apparatus skills (see Figure 2).

Figure 2: Teaching schedule for Gymnastics I and II (2hours per session)

Session	Gymnastics I (content)	Gymnastics II (content)
1	Introduction (pre-test)	Introduction (pre-test); Balance; Jump; Turn; Run
2	Balance; Turn	Rolls, forward, backward; Use of springboard; 1 st , 2 nd flight
3	Forward roll	Cartwheel; Vaulting
4	Backward roll	Round off; Vaulting; History of gymnastics
5	General gymnastics	Vaulting; Beam; Safety in gymnastics
6	Cartwheel	Beam; Bars
7	Vaulting	General gymnastics
8	Use of small apparatus	Skill practice; Code of points; Rhythmic gymnastics
9	Use of big apparatus (Beam, Bar)	Skill practice; Regulation competition; Trampoline

10	Trampolining	Skill practice: Biomechanics
11	Skill practice	Skill practice: ; Physical training
12	Skill practice	Practical examination
13	Practical examination	Practical examination
14	Practical examination	Written examination

Table tennis classes were included in the required physical education programme for university-wide students but gymnastics classes were taken only by the Physical Education and Recreation Management Degree Course students. The classes involved the usual teaching schedules of the two project members, one being the table tennis instructor and the other the gymnastics instructor. The average class size for table tennis was 32: for Gymnastics I, 30 and Gymnastics II was approximately 10 or 12. Class time for table tennis was either 1-hour single or 2-hour double periods. The duration of all gymnastics classes was 2 hours. The Chief Investigator of the project did not teach any of the classes but was an unbiased observer overseeing the planning and implementation of the study.

Cycle 1 (academic year 1997-1998).

This cycle involved six table tennis and two gymnastics classes. Both instructors introduced intensive and structured peer learning and teaching. Simultaneously the instructors explored different methods of peer feedback, and ways to improve teacher feedback. The effectiveness of the different methods was evaluated. As a result of the evaluation and the reflection on teaching in the first semester, both instructors were able to incorporate changes in peer and teacher feedback in the second semester.

Cycle 2 (academic year 1998-1999)

As a result of the changes made following the experiences of the first cycle, it was hoped that improvements in learning, peer feedback and teacher feedback would be made. The instructors incorporated new ideas for delivering peer and teaching feedback in two table tennis classes and one gymnastics class. The research process was similar to the first cycle consisting of the spiral of reflection, planning, action, observing, discussion and reflection.

Evaluation

Systematic Observations of Peer and Teacher Feedback

Systematic observations of peer and teacher feedback were obtained by recording targeted behaviour based upon selected tape recordings of classes and in-class observations. Teacher feedback was tape-recorded a number of times throughout the semester, the feedback being based on the Self-Assessment Feedback Instrument (SAFI) developed by Mancini and West (1989). Data categorisation was completed by a Research Assistant. The SAFI divided teacher verbal feedback into 11 categories which included: praise; praise/re-instruct; acceptance; questions; instruction during performance; giving directions; hustle behavior (e.g. urging students to “move on”; “hurry up”; “quicker, quicker”), criticism; constructive criticism; criticism/re-instruct and constructive criticism/re-instruct. A 45- minute training session was given to the Research Assistant by the Chief Investigator to clarify definitions of verbal feedback categorisation

followed by a trial recording exercise from a short videotape of class teaching. Any problems encountered during the observation were recorded.

Data of peer feedback was obtained from in-class observations by the project assistants who were trained before they conducted and analysed the observations. The observers spent 1-4 minutes in each group and then rotated to another group, thus ensuring adequate representation of the class in the data collected. The observed verbal peer feedback was categorised into positive, positive specific, negative and negative specific. 'Specific' is referred to as feedback information being skill-related.

Students' Perceptions

Students' perceptions were elicited by using questionnaires with rating scales to assess the perceptions of usefulness of more peer or teacher feedback. Questions related to the effect of feedback on the enjoyment of the activity, the student's relationships, and skill acquisition. Verbal comments from students were sought using face-to-face structured interviews. Project assistants constructed interviews with randomly selected students with varied skill ability.

Expected Outcomes

It is expected that:

- students, especially lower ability students, will find peer and teacher feedback beneficial to skill-learning;
- instructors will reflect on their own practice, teaching style and method;
- the results of this project will be shared with colleagues in the department to enhance sport skill classes
- the team will produce an instructional video to improve instruction of physical education/sport skill lessons using systematic observational techniques.

Results

Teacher feedback was analysed using the SAFI. Verbal feedback was divided into 11 categories. Data from table tennis classes and gymnastics classes were analysed separately. A total of seven and three class sessions were taped for the first and second cycles respectively. The total feedback given by the instructor per class ranged from 2.3 to 3.9 items of feedback per minute, averaging 2.7 per minute. The most consistent and frequent type of feedback was in the 'Instruction during performance' category, followed by the 'Acceptance' category. 'Praise' and 'Praise/re-instruct' were third and fourth in terms of the frequency of verbal feedback. In the first two single periods (1 hour) the instructor engaged in a much higher frequency of 'hustle behaviour' (48% and 34%). This did not appear in double period classes, suggesting that she was under pressure of time in the shorter classes.

A total of nine gymnastics classes were taped, six in the first cycle and three in the second. The average rate of feedback ranged from 1.4 to 3.6 per minute. A summary of the results is found in Figure 3.

When comparing the cycles, it was noticed that the teacher appeared to give 'Praise' more frequently as the project progressed, with the gymnastics teacher giving more 'Praise' than the table tennis instructor. One might speculate that this was because the gymnastics instructor had a closer relationship with her students since they were all undertaking the same major, the classes were smaller and she also taught them in other subjects. Conversely, the table tennis

students all came from university wide programmes, the classes were larger and she saw them less. However caution is needed when interpreting teacher verbal feedback since data were drawn from different classes. One must consider that different teachers might engage in different 'styles' of teaching and give different types of feedback to meet the specific needs of individuals.

Figure3: Summary of the results* of systematic observations of teacher feedback

Feedback category	10 Table tennis classes			9 Gymnastics classes		
	Mean %	(min/max)	Rank	Mean % (min/max.)	Rank	
Praise	37.0	(4 99)	3	39.2	(5 53)	2
Praise/re-instruct	36.8	(0 57)	4	22.4	(6 56)	5
Acceptance	40.6	(0 66)	2	25.3	(5 48)	4
Questions	15.5	(4 29)	7	9.8	(3 22)	8
**Instructions during performance	75.7	(39 163)	1	65.9	(10 125)	1
Gives directions	22.7	(21 59)	5	37.2	(21 58)	3
Hustle behaviour	12.0	(4 48)	8	14.3	(4 29)	7
Criticism	3.0	(0 8)	11	0.2	(0 1)	11
Constructive criticism	9.0	(0 24)	9	4.4	(2 20)	9
Criticism/re-instruct	3.4	(0 8)	10	1.0	(0 4)	10
Constructive criticism/re-instruct	22.3	(7 51)	6	16.3	(0 47)	6

* Summary of result of mean %, denotes average %age of sum of total number of incidents of feedback in that category, divided by total instructional periods (minutes), i.e. 100% = instructor gave one item of feedback of a specific category per minute

** Instruction during performance

Observations of Peer Feedback

Information related to peer feedback was obtained by the in-class observations of project assistants using 1-4 minute time intervals for each table tennis/gymnastics group during practice periods. Observations usually lasted for 20 minutes for a single period and 32 minutes for a double period.

A pattern emerged in peer feedback data. For some table tennis classes, students tended to give more positive, but general, feedback such as "quite good" at the beginning of the semester. As classes progressed, they tended to give more negative specific feedback with a marked decrease in positive feedback. In some classes, peers gave more positive specific feedback which may have been the result of encouragement or reminding by the instructor. The frequency of negative feedback tended to be low, in some practice periods there being none. A similar pattern was found in the gymnastics classes, with students tending to give more negative specific feedback.

Students Perceptions of the Effectiveness of Feedback

Seventy (70) students from table tennis and gymnastics classes were selected according to their level of skill: high, low or medium. They were asked to complete questionnaires with questions relating to their perceptions of grouping in class and the effectiveness of feedback given by teachers and classmates. The two cycles were investigated. In the first cycle, 43 students gave their opinions about lessons in the middle and the end of the course while 27 students engaged in a similar exercise in the 2nd cycle.

Evaluation of Table Tennis Sessions

In the mid-term evaluation most students thought that grouping in class was helpful and in both cycles most students agreed that the teacher gave adequate feedback. However the teacher could not always point out mistakes or help the students correct them. Fifty percent of the students in the second cycle thought that the teacher was good or there was no need to improve instruction. However, about 20% of students suggested that class sizes should be reduced, or the number of teachers in a class increased. During the first cycle, there were different opinions about ways for teachers to improve teaching methods, e.g. giving students more time to practise; more demonstration; more specific feedback. In the second cycle, no opinions were given about this area, suggesting that teachers' instruction methods had improved.

Final-term Evaluation of Table Tennis Sessions

As in the first cycle most students agreed that grouping was helpful. There was an increase in the second cycle of the number of students who agreed that the teacher gave adequate help and always indicated and corrected errors. Over 70% of students in the second cycle were neutral about ways that teacher instruction could be improved in table tennis classes. The frequency of peer feedback demonstrated a marked increase in the second cycle. In the first cycle, about 60% of students indicated that they did not receive enough peer feedback, however in the second cycle over 60% believed that they received adequate feedback. This suggests that teachers successfully encouraged students to engage in giving feedback. It is possible too, that students were more confident, knew each other better and were better equipped to give feedback. Although the amount of feedback increased, however, students could not always indicate and correct errors with feedback being too general. As with the results in the mid-term evaluation, half the students in the second cycle gave feedback because they were knowledgeable about the skills. But some gave feedback because they thought they were better than others, demonstrating a growing confidence in their skill achievement. About 60% of students in the second cycle did not give feedback because they did not understand the skills, but unlike the first cycle, reasons did not include: 'not paying attention in class', 'being shy', and having 'no confidence'.

Evaluation of Gymnastics Sessions

Mid-term Evaluation of Gymnastics

In both cycles, over 50% of subjects thought that grouping in class was helpful for learning skills. About 60% agreed that the teacher gave adequate feedback, but this figure decreased to less than 20% in the second cycle, demonstrating that the teacher had not improved her error correction activity. In spite of this, over half the students in the second cycle thought that the teacher was good and there was no need for improvement, although some suggested that more time should be given to practice sessions, and that more specific feedback should be given. The teacher had also improved in the amount of demonstration given. The percentage of students who 'always' provided feedback fell in the second cycle, with most only 'sometimes' giving feedback. About 20% 'rarely' gave feedback in the second cycle. The frequency of students always pointing out errors in the second cycle was low (approximately 20%), suggesting that students were not

enthusiastic about communicating in gymnastics classes. During the first cycle, students gave feedback because they knew the skills or could detect movement errors in peers. However, in the 2nd cycle, the predominant reason was that they knew one another. Therefore 30% of students did not give feedback because they were shy or lacked confidence, with fewer citing a lack of understanding of the skill as a reason for not giving feedback.

Final-term Evaluation of Gymnastics Sessions

Over half the students agreed that grouping in class was helpful for learning skills. When they considered teacher feedback, over 60% in the second cycle as opposed to approximately 40% in the first cycle agreed that the teachers gave adequate feedback. More than half the students in both cycles agreed that the teacher always pointed out and corrected errors and agreed that it was adequate. Many students were satisfied with teaching methods, but a few stated that the teacher should allow more time for practice and give more specific feedback. When considering feedback from peers, about 50% of students in the second cycle agreed that it was adequate, as opposed to less than 40% in the first cycle. The frequency of indicating errors rarely decreased between the first and second cycles, and the frequency of 'always' indicating errors, increased in the second cycle. In the first cycle, students gave feedback when they knew their peers and knew how to correct skills, but in the second cycle it appeared that these were not the main reasons for giving feedback. Only 20% gave feedback when they knew the skills, much lower than in the first cycle. However, reasons that students did not give feedback were similar, with about 40% in both cycles keeping silent when they did not understand the skills.

Instructors' Perceptions

Both instructors believed that in some cases verbal feedback was useful for error detection during motor skill learning, and that feedback could reinforce teaching points in the skill learning process. It was particularly helpful when the class was large (i.e. 30+ students). In maximising peer feedback they found that: i) students might not have been able to give corrective feedback because their skills were poor; ii) students were sometimes shy and introverted, in line with the Chinese culture.

Discussion

In the earlier classes, students tended to provide more positive feedback. This may have been firstly, because they did not have adequate knowledge to evaluate skills and, secondly, it was much easier to give positive general feedback if the instructor kept urging them to give peer feedback. However, the pattern shifted towards the later sessions when peers began to provide more negative specific feedback. The team perceives this to be a beneficial change to learners since negative specific feedback provides skill-related information for learners which aims at avoiding errors. Generally, the feedback varied from class to class, possibly influenced by the atmosphere of the specific class, and the reminder from the instructor about giving feedback.

Results from the in-class systematic observations of students showed that peers tended to deliver infrequent feedback about their partner's skills. The reason for this, as given by the students, was that they believed their knowledge was inadequate. The situation improved when the instructor matched novice with more experienced learners. But it was also noticed that students in the smaller and more homogenous gymnastics class, where students were studying the same major, were more vocal. Generally, students in all classes agreed that verbal feedback was helpful in skill acquisition, but the class size and class dynamics also had an effect on peer feedback. Results from the questionnaire demonstrated that both instructors improved their teaching in the second cycle by allowing more practise time and giving more time to individual students.

Conclusion

In conclusion, the team is of the opinion that peer feedback may not be helpful in facilitating skill acquisition but it can improve the class dynamics, providing for a more lively learning atmosphere. However verbal peer feedback seems to serve the function of helping beginner learners improve their performance. The table tennis instructor in particular, believed that when there are large classes of 32 students, peer feedback can help detect more errors, thus enhancing teaching effectiveness. The team, however, is doubtful about the benefit of peer feedback for more skillful players. Apart from the actual skill learning function of feedback, the team believes that giving more positive peer and teacher feedback can at least provide more psychological or emotional support to learners.

The issues of the complexity of the learning environment, teacher variation, the nature of different tasks and varied feedback quality were all methodological concerns in this research.

Since this research only involves teaching of table tennis and gymnastics, both of which are categorised as closed sport skills in an unchanging environment, it is recommended that future research related to sport skills teaching should explore the effects of intensive peer and teacher feedback on open sport skills learning by beginner learners. It is also suggested that a further direction of research might focus on the impact of the nature and scheduling of the feedback on different skill levels of learners.

References

- Lee, A.M., Keh, N.C., & Magill, R. (1993). Instructional effects of teacher feedback in physical education. *Journal of Teaching in Physical Education*, 12, 228-243.
- Mancini, V. H., & West, D. A. (1989). Self-assessment feedback instrument (SAFI). In R. A. Schmidt, *Motor control and learning: A behavioral emphasis* (2nd ed.) Champaign, IL: Human Kinetics.
- Schmidt, R.A. (1988). *Motor control and learning: A behavioral emphasis*. (2nd ed.) Champaign, IL: Human Kinetics.