University of Limerick, Ireland, 22nd - 25th, June, AIESEP 2011

Teaching strategy for correcting naive conception in an overhand volleyball pass skill among seventh grade PE student

JUNTENDO 筑波大学 University of Tsukuba

Tomoko Ogiwara (Juntendo University / ogiwara@sakura.juntendo.ac.jp),
Yoshinori Okade (University of Tsukuba), Riki Suko (Japan woman's College of Physical Education),
Kenji Yomoda (University of Tsukuba), Toyokazu Imazeki (Juntendo University)

ACKNOWLEDGMENT
This work was supported by KAKEN (22700598), Grant-in-Aid for Young Scientists (B).

Abstract

In this study, the possibility to change naive conception on a volleyball overhand pass skill and its impact on improving performance were examined. To achieve this aim, a peer teaching model was introduced in the unit. Peer teaching involves students teaching each other based on the class content set by the teacher.

The participants were 43 seventh grade students who took part in a 10-hour PE volleyball unit. Each participant completed the Naive Conception Questionnaire to rate the degree of importance of various movements (DIM) in the overhand pass and to identify technical problems in skill performance (TPI). The questionnaire was administered pre- and post-unit, and the students' own performance was also filmed at those times. Furthermore, the control group for this study was the baseline class (n=38), which included data collected previously. The performance of the students allowed for a comparison of the DIM and TPI between the control group and the intervention class.

The results showed that;

1) DIM scores increased significantly in the post-unit with the intervention classes. DIM No.4 [Bringing the ball down to the forehead] scores increased significantly in the post-unit as students were not able to execute this skill prior. TPI scores also increased significantly in the post-unit on the intervention classes. Students' performance increased significantly in the post-unit, but P [Interaction - elbows & knees] and P [Bringing the ball down] yielded no change with a success rate of about 50%.

2) The DIM scores increased in the baseline and intervention classes. Additionally, it was noted that the TPI and performance scores increased significantly with the intervention class when compared with the baseline class.

These results suggest that peer teaching is an effective strategy for improving both cognition and performance of a volleyball overhand pass skill.

Introduction

In recent years, attention has been given to students' information processing in physical activity contexts (Lee, 1997; Lee & Solomon, 1992, 2005), and evidence suggests that performance is positively correlated with participants' knowledge (Rink, 2002, 2003; Siedentop & Tannehill, 2000).The factor believed to play a role in students' physical activity performance is *naive conception* (Dodds, Griffin, & Placek, 2001; Griffin et al., 2001). Naive conception refers to the system of knowledge that people possess through previous experience and activities, such as daily walking and running. It is formed prior to learning, and it affects students' information processing abilities (Clement, 1982; Fisher, 1985). Specifically, the relationship between naive conception and performance of an overhand volleyball pass skill was addressed among junior high school students in a PE volleyball unit. The overhand pass is a difficult skill for novices, who typically *hit* the ball with both hands (Endo & Shinomura, 1994), and the probable reason for this common mistake is the influence of a naive conception of the skill.

Purpose

In this study, the possibility to change naive conception on a volleyball overhand pass skill and its impact on improving performance were examined. To achieve this aim, a peer teaching model (Meztler, 2000) was introduced in the unit. Peer teaching involves students teaching each other based on the class content set by the teacher.

Methods

The participants were 43 seventh grade students who took part in a 10-hour PE volleyball unit. Furthermore, the control group for this study was the baseline class (n=38), which included data collected previously.

Table 1 Participants of the each class

Groups		Intervention class	Baseline class
School / grade		Seven grade student K junior high school in Ibaraki Pref. (Japan)	Seven grade student K junior high school in Ibaraki Pref. (Japan)
Time / season		November to December, 2008	January to February, 2007
Participants	male	23	24
	female	20	14
	total	43	38
Number of hours		10 hours	10 hours
teacher		Teacher A He had thought for 10 years in junior high school, and long time cadet, and his major is track and fields.	

	1	2	3	4	5	6	7	8	9	10
0	Class greeting, verification that all students are able to participate, explanation of lesson content, warm-up, Overhand pass passing practice drills									
10	Orientation	Overhand passing game [Use of Overhand pass in attack] (without Intervention : Baseline Class/2007) (A peer teaching model : Intervention Class/2008)						Overhand passing game		NCQ administration Assessment
20	Team Building							Team Practice and strategy discussion		
30	NCQ administration	3 on 3 catch / overhand pass / attack game (League Ⅰ) *One bounce arrowed			3 on 3 Game (League Ⅱ) *No bounce arrowed			3 on 3 Game (League Ⅲ) *No bounce arrowed		
40										
50	Reflection on the lesson, confirmation of date / time of next class.									

Figure 1 Content of the volleyball unit

Each participant completed the Naive Conception Questionnaire (Ogiwara et al., 2008) to rate the degree of importance of various movements (DIM) in the overhand pass and to identify technical problems in skill performance (TPI). The questionnaire was administered pre- and post-unit, and the students' own performance was also filmed at those times. The performance of the students allowed for a comparison of the DIM, TPI between the baseline class and the intervention class.

Data was analyzed through *t*-test, chi-squared tests and two way ANOVA by SPSS Ver. 11. 0J. statistical analysis. Skill performance was analyzed by having the students carry out an overhand pass drill. Inter observer agreement by two judges was calculated to assure objectivity of the data. Inter observer agreement was 84.1%.

Procedure of peer teaching model

Result and Discussion

1. result of intervention class

Table 2 Result of DIM evaluation in NCQ at pre-post unit

No.	DIM items	Pre-unit M	Pre-unit SD	Post-unit M	Post-unit SD	t
1	Forming the hands like a triangle	4.45	0.80	4.43	0.80	0.14
2	Getting under the ball	4.29	1.00	4.64	0.79	-1.89
3	Contacting the ball at the forehead	4.10	0.98	4.31	0.87	-1.07
4	Bringing the ball down to the forehead	3.71	1.07	4.52	0.80	-4.06***
5	Cushioning the ball with the wrists	3.86	1.12	4.17	0.88	-1.41
6	Cushioning the ball with the fingers	3.74	1.04	3.83	1.03	-0.43
7	Extending the fingers	2.88	1.09	2.95	1.31	-0.26
8	Bending the elbows	4.02	0.98	4.36	0.88	-1.69
9	Bending the knees	3.79	1.05	4.48	0.83	-3.35***
10	Interaction - elbows & knees	3.88	1.09	4.43	0.99	-2.27*
11	Position of the feet	3.81	1.02	3.36	0.93	2.02
12	Contacting the ball in front of the body	3.33	1.30	3.33	1.32	0.00
	Mean	3.83	0.55	4.07	0.61	-2.56*

n = 43 *p < .05, ***p < .001

- DIM No.4 [Bringing the ball down to the forehead] scores increased significantly in the post-unit as students were not able to execute this skill prior.

Table 3 Result of TPI in NCQ at pre-post unit

Total: 7points

TPI	Pre-unit	Post-unit	t
mean	4.23	5.84	6.49***

n=43 *** p<.001

Students has become to recognize the technology of an overhand passing correctly.

TPI		Pre-unit (N=43) correct (N)	Pre-unit (N=43) (%)	Post-unit (N=43) correct (N)	Post-unit (N=43) (%)	χ^2
S. 1	No. 1 (Form of the hands is round)	21	48.8%	34	80.8%	8.52**
	No. 2 (Form of the hands is flat)	21	48.8%	30	75.6%	3.90*
	No. 3 (Arms are too low)	40	93.0%	43	100.0%	3.11
	No. 4 (Arms are too spread out)	23	53.5%	37	80.8%	10.81***
S. 2	No. 1 (Back of the head)	28	65.1%	37	88.5%	5.10*
	No. 2 (Front of the forehead)	24	55.8%	36	85.9%	6.52*
S. 3	(Bringing the ball down to the forehead, movement like catching)	27	62.8%	33	83.1%	2.55

N=43 * p<.05, ** p<.01, *** p<.001

Table 4 Result of performance in NCQ at pre-post unit

Performance category	Pre-unit	Post-unit	χ^2
P [Hands]	61.9%	77.8%	16.40***
P [Ball contact]	54.2%	75.7%	27.68***
P [Elbows]	82.7%	91.5%	9.61**
P [Knees]	49.2%	86.3%	86.39***
P [Interaction elbows & knees]	25.4%	53.2%	43.70***
P [Bringing the ball down]	35.0%	54.2%	20.27***

n=43 **: p<.01,***: p<.001

- TPI scores also increased significantly in the post-unit on the intervention classes.
- Students' performance increased significantly in the post-unit, but P [Interaction - elbows & knees] and P [Bringing the ball down] yielded no change with a success rate of about 50%.

2. Comparison between intervention and baseline class

■Baseline class ○Intervention Class

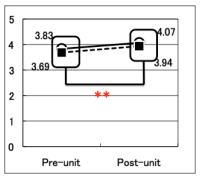

Figure 2 Result of the DIM evaluation

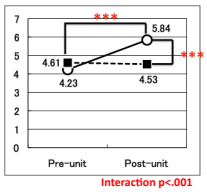

Figure 3 Result of the TPI score

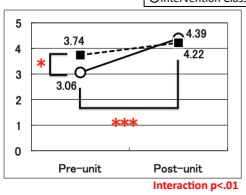

Figure 4 Result of the performance score

- The DIM scores increased in the baseline and intervention classes.
- Additionally, it was noted that the TPI and performance scores increased significantly with the intervention class when compared with the baseline class.

Conclusion

These results suggest that peer teaching is an effective strategy for improving both cognition and performance of a volleyball overhand pass skill.

References

- Clement, J. (1982). Students' preconceptions in introductory mechanics. American Journal of Physics, 50: 66-71.
- Dodds, P., Griffin, L.L., & Placek, J.H. (2001). A selected review of the literature on development of learner's domain-specific knowledge. Journal of Teaching in Physical Education, 20 (4): 301-313.
- Endo, T., & Shinomura, T. (1994). A study on the development of volleying in junior high school students. Journal of Education of Yamanashi University, 45: 70-79.
- Fisher, K.M. (1985). A misconception in biology: Amino acids and translation. Journal of Research in Science Teaching, 22 (1): 53-62.
- Griffin, L.L., Dodds, P., Placek, J.H., & Tremino, F. (2001). Middle school students' conceptions of soccer: Their solutions to tactical problems. Journal of Teaching in Physical Education, 20(4): 324-340.
- Lee, A.M., & Solomon, M.A. (1992). Cognitive conceptions of teaching and learning motor skills. Quest, 44(1): 57-71.
- Lee, A.M. (1997). Contributions of research on student thinking in physical education. Journal of Teaching in Physical Education, 16(3): 262-277.
- Metzler, M.W. (2000) Instructional models for physical education. Allyn and Bacon: Boston.
- Ogiwara T., Okade, Y., Onizawa, Y., & Suko, R. (2008). Characteristics of naive concept on overhand pass in junior high school students. Japan Society for the Pedagogy of Physical Education, 24(2): 13-28.
- Rink, J. (2002). Teaching physical education (4th ed.). Boston: McGraw-Hill.
- Rink, J. (2003). Effective instruction in physical education. In S.J. Silverman & C.D. Ennis (Eds.),Student learning in physical education (2nd ed., pp. 165-186). Champaign, IL: Human Kinetics.
- Siedentop, D., & Tannehill, D. (2000). Developing teaching skills in physical education (4th ed.). Palo Alto, CA: Mayfield.