Can the Games Solve the Problems?
遊戲法能解決問題嗎？

Alberto CRUZ
Department of Creative Arts and Physical Education, Hong Kong
The Hong Kong Institute of Education

高達倫
香港教育學院體藝學系

Abstract

This study examined the effect of the application of games on students' interest and learning in volleyball lessons. Two experienced secondary physical education teachers involved in the Secondary Teaching Evaluation and Mentoring Project (STEM) were purposely invited to take part in the study. They were trained with the skills and knowledge of mentorship as well as the application of variation theory in designing lessons for learning. The study was premised on a conceptual framework of variation theory and employed an action research methodology. The study lessons were taught in three cycles by the two teachers to three S. 2 classes of students in their own schools. Games were specially adopted to address the students' interest and learning in the lessons. Pre and post conferences were arranged for reviewing and improving the effectiveness of the lessons. Questionnaire and a volleyball skill test were developed to evaluate the student perception and learning in the lessons. The results revealed that there was an increase in the number of students showing interest in participating in volleyball lessons as well as the students had improved significantly in the application of volley pass skill. Findings of the present study hold implications of the instructional practice for physical educators.

摘　要

本研究探討遊戲學習模式影響學生學習排球及興趣。兩位曾參加教學啟導與中學課堂教學評估計劃的經驗體育教師被邀參與是次研究。本研究設計建基於變易理論及行動研究模式。兩位教師以遊戲形式設計課堂活動，利用三循環周對三班中二生進行研究，在課前課後會議檢討反思課堂教學效能，並利用問卷及技巧測試評估學生學習。結果顯示學生參與排球課興趣的人數明顯增加。學生於上手傳球技巧應用亦顯著改善。結果對體育教學有多方面啟示。

Introduction

Physical educators have long concerned the student attitude in physical education (Ryan, Fleming, & Maina, 2003; Silverman & Subramaniam, 1999; Stewart, Green, & Huelskamp, 1991). They believe this information is valuable as this could help to make curricular changes and address the needs of students when presenting the subject matter (Cothran & Ennis, 1998). Besides, there is evidence indicating that attitude in physical education may influence participation in physical activity outside of school (Carlson, 1995; Ennis, 1996; Portman, 1995). It may be possible if influencing attitude in positive ways in physical education could help promoting an active lifestyle among our students.

Psychologists maintain that enjoyment is a major element of the affective component of attitude (Bagozzi & Burnkrant, 1979; Zajonc & Markus, 1982). In order to flourish this affective component, the learning

environment will be the critical part of a teaching lesson. How students perceive the learning environment will make difference in their level of enjoyment. Results of studies have indicated that students viewing the learning environment as positive and caring are more likely to make learning fun, enjoyable and meaningful (Chen, 1998; Duda, 1996; Goldstein, 1999; Solmon & Carter, 1995). The high attitude students viewed the learning environment differently from the low attitude counterparts (Subramaniam & Silverman, 2002). The high attitude students enjoyed what they had done and had fun, while the low attitudes students' level of enjoyment was minimal in the physical education lessons. This implies that enjoyment of physical education may influence student attitude toward the subject contents (Portman, 1995). In fact, results of large survey studies also indicated that PE enjoyment was positively associated with out-of-school physical activity participation (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Trost, Pate, Saunders, Ward, Dowda, & Felton, 1997). In other words, how physical education teachers manage and plan the learning environment may influence how the students view the lesson as well as participation in physical activity. Recent research findings also confirm that what teachers know and do has a direct influence on student learning (Darling-Hammond, 2000; Muijs & Reynolds, 2000). The design of teaching has impact on the students' interest and learning of the subject.

Although physical educator has warned against using student enjoyment as the sole indicator of a successful physical education (Placek, 1983), physical education teachers usually agree that student enjoyment should not be discounted as relevant to learning. Most physical education practitioners assume that emotional state is important in the classroom, and positive student emotions assist their learning. They argue that students should have fun in physical education and advocate that the learning activities designed should be more like play than like work (Henderson, Glancy, & Little, 1999; Siedentop, 1996). Sports psychologists and educators also recognize the importance of enjoyment in learning and treat enjoyment as a motivator in the educational context (Biddle & Chatzisarantis, 1999). Heywood (2001) suggests that joy forms an important part in children's educational experience. Therefore, schoolteachers usually spend some time trying to design enjoyable ways of engaging children or creating element of fun in the learning environment.

Positive game learning experience may produce enjoyment and enhance learning interest of students. In a recent study by O'Reilly, Tompkins and Gallant (2001), they found that low organization/modified games immediately stimulated student interest. Participants in their study described games with low skill demands and a minimum of rules as fun. It seems that modified games highlight success and motivate students continue participating in physical activities. Educators realize that modified games can be used to help promoting enjoyment and interest in learning experience. Belka (1994) pointed out that if games are carefully planned and organized, they contribute to desirable cognitive, emotion and social outcomes. Game play of students will improve and their enjoyment may increase.

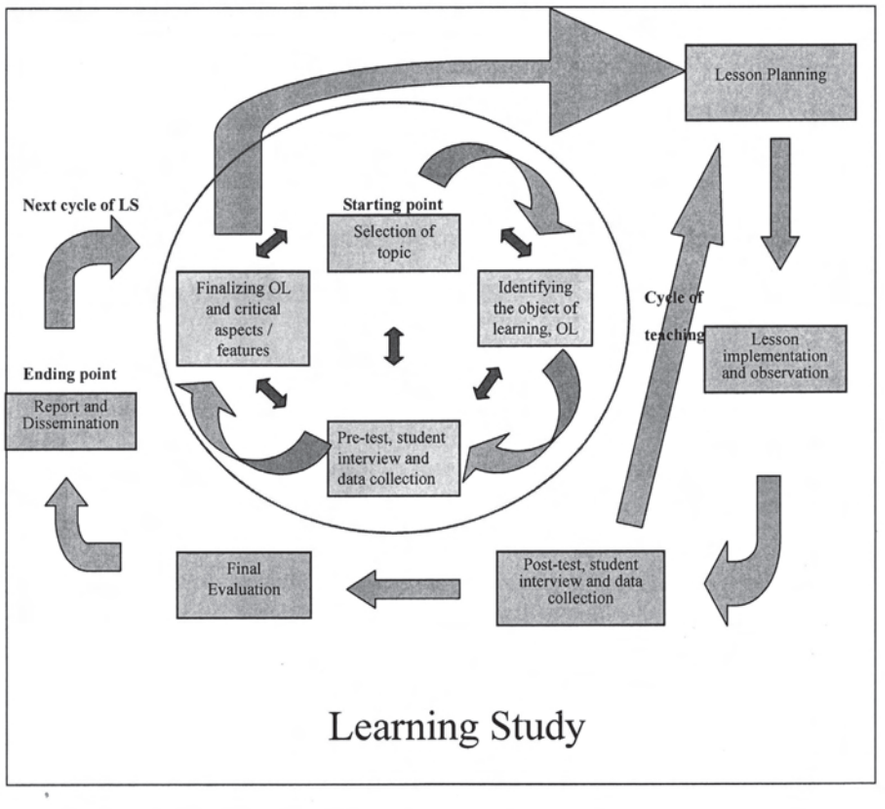
School-based staff development is a current encouraged practice in Hong Kong. Tertiary academics specially design projects to support schoolteachers in their professional development. Secondary Teaching Evaluation and Mentoring (STEM) Project is one of the approved Quality Education Fund projects that helps secondary school teachers' professional development in Hong Kong. Within the project, secondary schools are invited to be the partnership schools of one local institute of education. They work closely with the institute trying to create a collaborative and supportive culture for their teachers' professional development. Schoolteachers receive training in mentorship, lesson observation, lesson analysis and the implementation of the school-based lesson study. These serve to help teachers' professional growth and development as well as improving their practice in teaching.

The STEM project adopts the "learning study" model, which guides the design and implementation of the present study. The study presented here is one of the subject studies within the STEM project. The "learning study" was inspired by the systematic work of the Chinese teaching study (Ma, 1999) and the Japanese lesson study (Stigler & Hiebert, 1999) as to conduct in-depth studies of research lessons. It aims at improving teaching and learning in schools based on the university-school partnership effort. Moreover, the learning study in the present study is underpinned by the theory of variation (Marton & Booth, 1997; Pang, 2003), a learning theory which provides an essential rationale for guidelines and suggestions of the model. According to the variation theory, learning is based on the learner's

dynamic structure of awareness which is closely associated with discernment, variation, and simultaneity (Marton & Booth, 1997). Learning takes place when critical features are discerned and focused on simultaneously. Learners must experience variation in the dimension relating to the feature in question in order to discern a particular feature. Thus, variation is the key for discernment as well as the mechanism of learning.

For the implementation of the present study, it involved the collaboration of invited schoolteachers and academics in one local institute of education. Through meetings and discussions over a period of time, schoolteachers and academics worked together on the design, implementation, testing, and improvement of one or more "research classroom lessons" (Stigler & Hiebert, 1999). Schoolteachers first identified major learning problems in the subject contents and attempted to resolve them by re-designing the learning of the lessons. The focus was to help students discern the critical features of the object of learning and improved their learning. Since the present study was premised on a conceptual framework of variations and employed an action research methodology, the learning situations were varied and the learning environment were continuously refined in order to help students discern the critical features of the learning object. In practice, it is a reflexive and on going process in which practitioners develop their practice collaboratively with other practitioners. By proceeding through steps cycle, appropriate teaching strategies are initially identified and then implemented into a practice lesson. The effects of this strategic action are then observed, discussed and reflected upon. A new cycle then begins as the reflections help refining the strategies being employed. The process of the learning study was shown in Diagram 1. The results presented in this paper in fact are parts of the results of a learning study project. As the physical education teachers in the study intended to employ games strategy as to raise the interest and students learning in volleyball lessons, therefore, the purpose of the study was to examine the effect of the application of games on students' interest and learning in volleyball lessons. The study will specifically address the following research questions: (a) Does the games strategy help the students learning in volley pass? and (b) Does the games strategy help to raise the students' interest in learning volleyball? The findings of the study are important in determining if the games strategy is effective in helping students to learn volleyball. This information is invaluable to physical education practitioners and physical education teacher educators as they provide insights to the practice of classroom teaching in future.

Diagram 1: Flow Chart of the Process of the Learning Study



Method

Participants

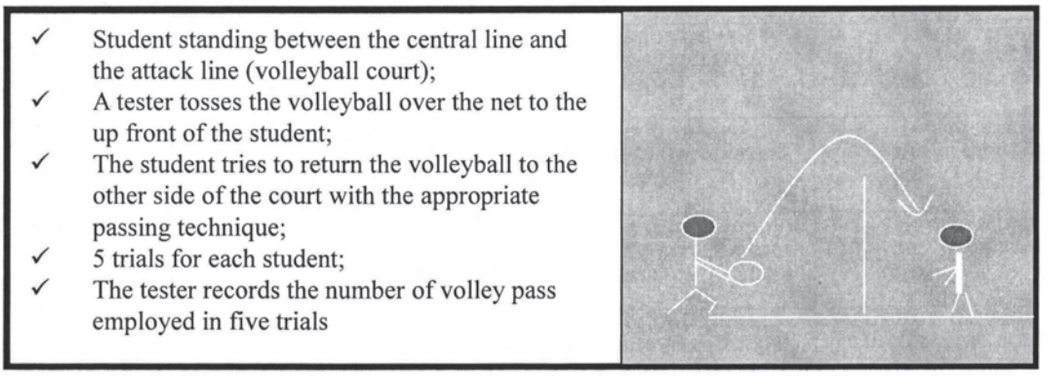
The participants for this study were two local experienced secondary school physical education teachers and 132 secondary two male students in their teaching schools, A and B. The teachers, Yeung and Chu, were purposely invited to take part in the study, as they were involved in the Secondary Teaching Evaluation and Mentoring Project (STEM). They were trained with the skills and knowledge of mentorship and lesson analysis as well as the application of variation theory in designing lessons for learning. Both teachers were trained locally in teaching physical education and obtained qualified teacher status. Besides, they have rich background knowledge and experience in teaching and coaching team games. Their experiences in teaching physical education are over 10 years and 25 years respectively. They are responsible to teach boys in their school physical education lessons. Before the implementation of the study, permissions were then sought from their school principals and consent forms were completed by the teachers. All names used in this paper had been changed to protect the anonymity of the participants.

Procedure

The investigation commenced with the meetings among the study group members, the two teachers, the institute faculty member (the author) and the teacher development consultant to discuss the framework and purpose of the learning study. Within the meetings, the author acted as the facilitators of the research lessons. As one of the purposes of the learning study was to empower teachers, so they could gather evidence to help themselves reflect and improve their own teaching. The teachers understood their roles and agreed to continue engaging in the learning study. Based on the common interests and needs, the teachers intended to improve their teaching in volleyball. After hours of brainstorming different aspect of volleyball learning, they identified that their students had common problems in applying volley pass in game situations when playing volleyball. They decided to enhance the learning of the application of volley pass through the learning study. In subsequent meetings, they further identified “actively apply the volley pass in volleyball playing” as the object of the learning and proposed “movement” “timing” and “sense of success” as the three critical features of the learning object. However, they both raised that the attitude of their students toward volleyball was low and special teaching strategies need to be employed to maintain their interest in learning. To address this issue, the teachers chose to adopt the games and indirect teaching strategies as to arouse the students’ learning interest in the lesson. Lesson’s learning activities were then planned and developed based on these underlying principles to help students discern the critical features of the learning object. Besides, the study group members also agreed that providing positive feedbacks to students would help students to develop their sense of success in the lessons. Therefore, the teachers were reminded to deliver positive feedbacks and comments to students as many as possible in the lessons.

As to understand more about the background information of the students’ knowledge and attitude toward volleyball, the study group members developed a questionnaire addressing these concerns. 10 secondary two male students not participating in this study from each school were asked to complete the questionnaire. Based on this information, the study group members modified the questions and designed a revised questionnaire for evaluating the learning and attitude of students toward the volleyball lesson. The questions designed in the questionnaire focused on the learning of the volley pass as well as the students’ subjective feelings of the taught lesson. Besides, a volley pass test was also developed for the purpose of evaluating the application of volley pass of the students. The questionnaire and the volley pass test were reviewed by two experienced physical education teacher educators in one local institute of education for content validity. The pilot run of the volley pass test was executed on a group of 10 secondary two male students in school A by Yeung. The procedure of the volley pass test was then refined and improved the smoothness of the administration procedure. The test requires a tester tossing volleyball over the net to the up front of the student on the other side of the court. The student stands between the central line and the attack line and tries to return the volleyball back to the tester by means of appropriate passing technique. The tester records the number of volley pass employed by the student in five trials. The procedure of the volley pass test was shown in Diagram 2.

Diagram 2: Procedure of the Volley Pass Test



After designing the skill test and questionnaire, the study group members started to focus on the planning of the lesson. Based on the variation theory (Marton & Booth, 1997), the teachers designed a number of games for arousing the students' interest as well as helping them discern the critical features identified in the lesson. These included 'cushion' games, 'number ball' games and various cooperative-passing games. The descriptions of these games were shown in the Appendix. Besides, the teachers employed the variation principles when designing the games. There were variants and invariants among these games. The examples of the variants, invariants and discernment of the games were listed in Table 1.

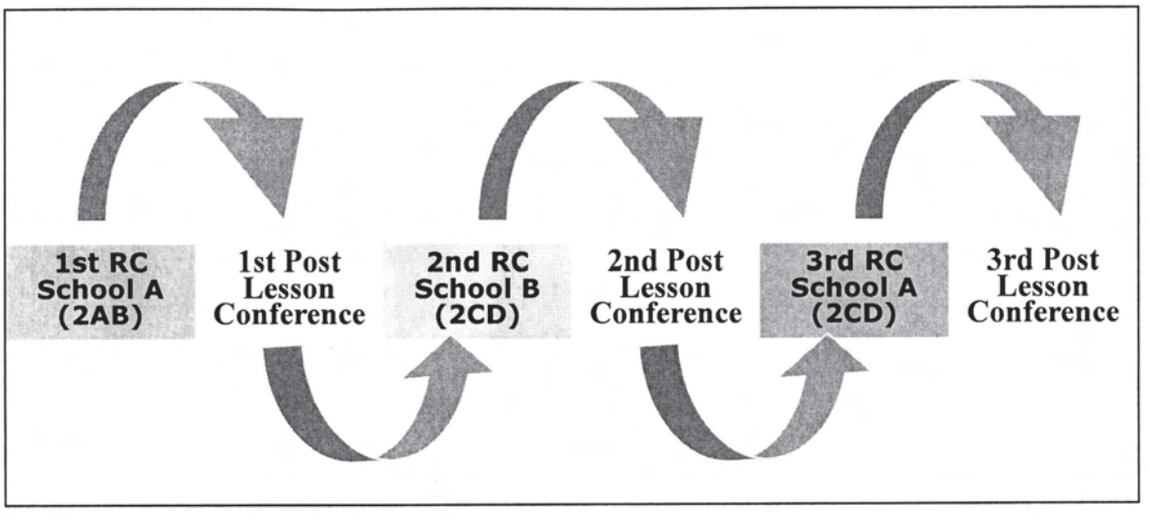
The study lessons were taught in three cycles by two teachers to three S. 2 classes of students in their own school. Each study lesson lasted 80 minutes. Yeung started the first study lesson in school A and the second refined lesson was carried out in school B by Chu. Yeung taught the final revised lesson in school A again. The flow of the three cycles of the learning study was shown in Diagram 3.

Table 1. The Use of Variation in the Teaching Flow.

Activity	What Changes (Variants)	What Unchanges (Invariants)	Discernment (What is learnt)
'Cushion' Activity (i) vs (ii)	• Position at which the ball is caught	• Catching the ball from above	• Opposing force → sound • Cushion → no sound
'Cushion' Activity (ii) vs (iii)	• Position at which the ball is caught • Action of the hands and body coordination	• Catching the ball from above	• Action of the hands and body coordination associated with volley pass (receive)
Passing Game I	• Speed of the ball • Position of the receiver	• Catching the ball from above	• Series of movement to perform the volley pass (receive)
Passing Game II	• Speed of completing a volley pass (receive and push) • Holding the ball or not	• Perform a volley pass (receive and push)	• How to receive and push and without holding the ball
Passing Game III	• Speed of completing a volley pass (receive and push) • Holding the ball or not	• Perform a volley pass (receive and push)	• How to receive and push and without holding the ball
Passing Game IV	• Speed of completing a volley pass (receive and push) • Holding the ball or not	• Perform a volley pass (receive and push)	• How to receive and push and without holding the ball
Passing Game V	• Speed of completing a volley pass (receive and push) • Holding the ball or not • Movement of the receiver	• Perform a volley pass (receive and push)	• How to move to a desirable position in receiving and pushing without holding the ball

All lessons were videotaped for later analysis and reflections. The students of each class were required to take the volley pass test and complete the questionnaire before and after each study lesson. The study group members held pre- and post-lesson conferences as to reflect and critique the teaching and learning of the lessons. They also considered the post-test results of the students and worked on a revised lesson plan based on what was observed and discussed.

Diagram 3: The Flow of the Three Cycles of the Learning Study



Within the three cycles, the learning activities in the lessons were slightly modified and changed according to the reflections and discussion during the post lesson meetings. In addressing the responses and interests of the students in the study lessons, the time of the game activities were re-scheduled and re-organized. More modified games were introduced in the lessons. Besides, the teachers were strongly encouraged to shorten the explanation time and to provide positive feedbacks to the students in the lessons. The outline of the learning activities in each study lesson was shown in Table 2.

Table 2. The Learning Activities in Each Study Lesson.

Serial No.	1st RC, School A (2AB)	2nd RC, School B (2CD)	3rd RC, School (2CD)
1	Warm-up (rope)	Warm-up (game: chains)	Same
2	Stretching (rope)	Stretching (volleyball)	Same
3	"Cushion" activity	Same	Same
4	Passing Game (I)	Same	Same
5	Passing Game (II)	Passing Game (IV)	Same
6	Passing Game (III)	Passing Game (V)	Same
7	Modified game	Modified game (rope as net)	Same

Data Analysis

Quantitative data were processed with Statistical Package for Social Science (SPSS) procedures. For ease of interpretation, some findings revealed in the questionnaire were presented in the form of percentages and descriptive statistics. The dependent t-tests were employed to determine any difference in the performance of volley pass between the pre- and post-test. A significance level of 0.05 (two tailed) was established for test analyses.

Results

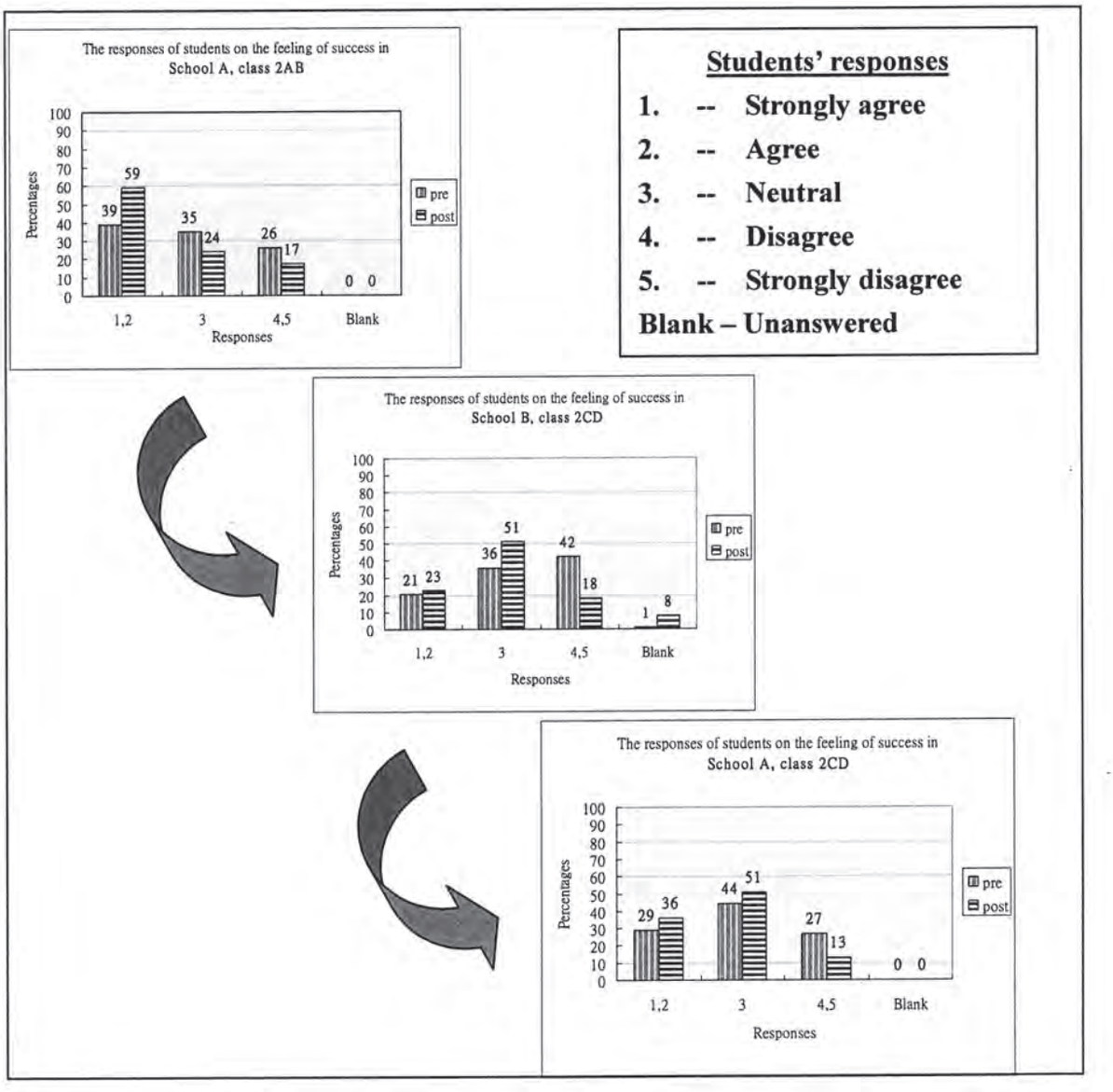
For the interest of this study, pre-and post-test data of the volley pass test and the questionnaire of each study lesson were compared and analysed. The results of the t-test indicated that there were significant differences in the performance of volley pass between the pre- and post-test among the students in all three study lessons. The results of the performance of the volley pass of students in the three study lessons were shown in Table 3. Statistical analysis revealed that all students in the three study lessons had significantly ($p<.05$) improved their performance in the application of volley pass after the lesson.

Table 3. The Performance of Volley Pass of Students in the Three Study Lessons.

School	Class	N	Pre-Test		Post-Test		t	p
			Mean	S.D.	Mean	S.D.		
A	2AB	48	0.83	1.35	2.06	2.16	-5.07	0.00
B	2CD	41	2.24	1.93	3.73	1.50	-4.67	0.00
A	2CD	43	0.20	0.96	4.35	1.07	-20.69	0.00

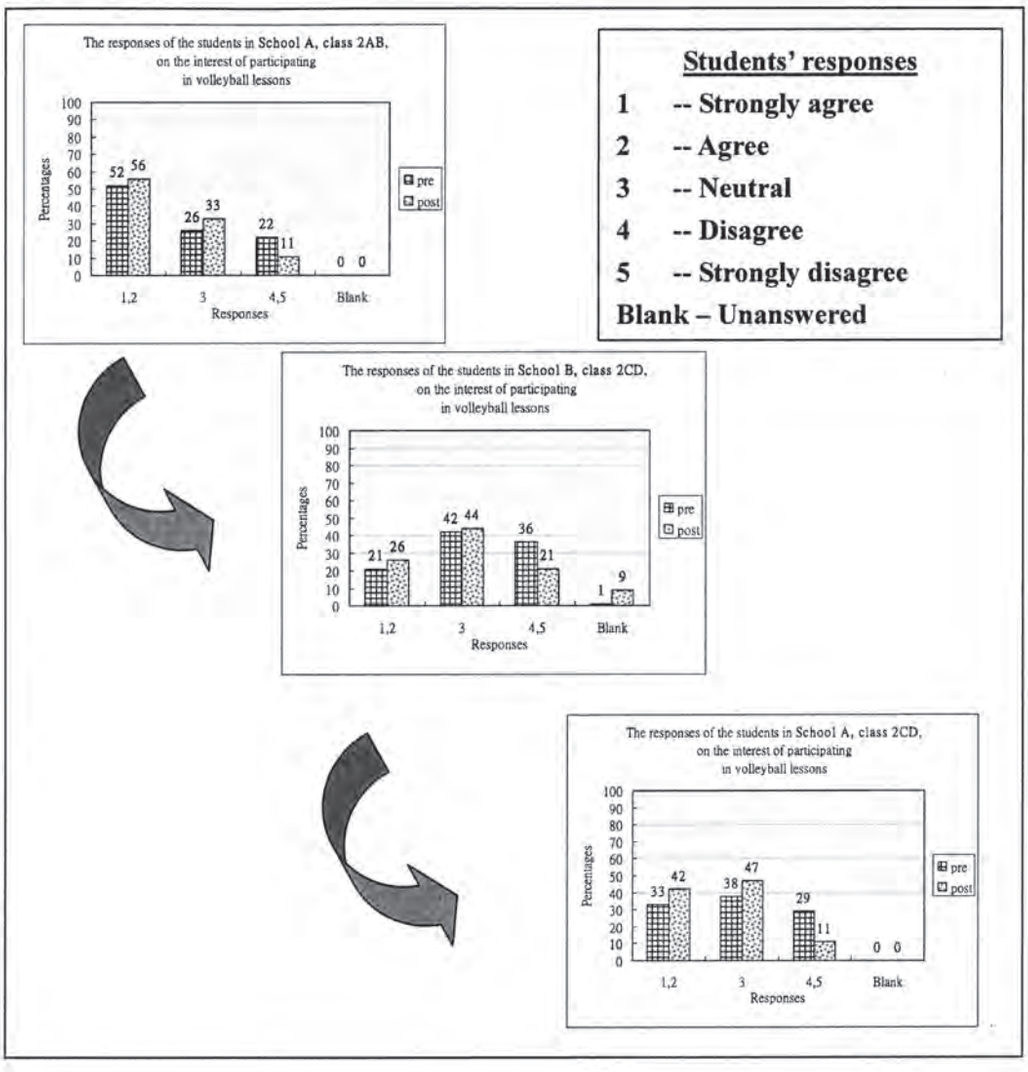
For the purpose of addressing the research questions in the present study, only the results of two selected questions in the questionnaire were presented. As the study group members wished to understand the subjective feelings of the students toward the lessons, the students were asked to indicate their feeling of success during the lesson by using a Likert-type scale of 1 (strongly agree) to 5 (strongly disagree) in the questionnaire. Comparing the pre- and post-test data of the question asking the subjective feeling of success of the students, it was found that there was an increase number of students indicating they either agreed or strongly agreed that they had experienced success in the lessons. For the responses on the feeling of success, the number of percentage of 2AB students in A school changed from 39% to 59%. While the number of percentage of 2CD students in B school slightly rose from 21% to 23%. The number of percentage of 2CD students in A school had an increase from 29% to 36%. The results of the students' responses on the feeling of success were shown on Figure 1.

Figure 1: The Responses of the Students on the Feeling of Success.



Moreover, the group members also wanted to know whether there were changes of attitude of students toward volleyball lessons. The students were then asked to show their interest in participating in future volleyball lessons after the lesson implementation by using a Likert-type scale of 1 (strongly agree) to 5 (strongly disagree) in the questionnaire. Comparing the pre and post-test data of the question asking the attitude toward participating in volleyball lessons in future, it was also found that there was an increase number of students showing they either agreed or strongly agreed that they showed interest in participating in volleyball lessons in future. For the responses on their interest of participating in volleyball lessons, the numbers of percentage of 2AB students in A school rose from 52% to 56%. While the number of percentage of 2CD students in B school changed from 21% to 26%. The number of percentage of 2CD students in A school increased from 33% to 42%. The results of the students' responses on the interest of participating in volleyball lessons in future were shown on Figure 2.

Figure 2: The Responses of the Students on the Interest of Participating in Volleyball Lessons.



Discussion

The major purpose of this study was to examine the effects of the application of games on students' interest and learning in volleyball lessons. The findings are aimed at contributing to the evaluation of games strategy practice with a view to improve effectiveness of physical education teaching. The results of this study suggest that the games strategy is effective in helping students learn volley pass as well as enhancing their interest in learning volleyball.

Findings in the present study indicated that there was an increase number of students showing interest in participating in volleyball lessons in future. The quantitative data presented in the paper are unable to suggest why this is the case. However, the work of previous researchers on enjoyment and fun in physical education may be able to provide possible explanations for the increase of interest of the students in this study (Griffin, Chandler, & Sariscsany, 1993; Hastie, 1998; O'Reilly, et al., 2001). These researchers argued that if students were provided conditions with realistic challenges and success in terms of mastery, they would find fun in physical education lessons. Once the students had fun, they would have positive attitude toward the subject. According to the observations and reflections of the study group members, they all agreed that the students did enjoy the games activities and showed interest in participating in the lessons. As in the present study, the physical education teachers deliberately employed games strategy to address the low interest issue. The results appeared to

confirm the appropriateness of adopting the games strategy in the study. As indicated in previous research studies, boys preferred team games and had greater enjoyment during team games in physical education lessons (Goudas & Biddle, 1993; Dickenson & Sparkes, 1988). Since the students in the study were boys, it is possible that the designed games activities may raise their interest in learning in the lessons. It seemed that the teaching strategy adopted did influence the students' interest in participating in volleyball lessons in future.

Besides, there was also an increase number of students claiming that they had feeling of success in the lessons. It implied that providing appropriate games activities did help them experiencing success in the lesson. Experiencing success in turn would help to generate positive attitude and learning interest. As in previous studies, students perceived physical education classes to be fun and enjoyable if they experienced success in the activities (Carlson, 1995; Portman, 1995; Sanders & Graham, 1995; Tinning & Fitzclarence, 1992). This seems to substantiate the notion that experiencing success affects student motivation in the lesson. Creating a positive learning environment with challenging and successful experience becomes an important task for physical education teachers during teaching.

Findings of the present study also indicated that the students of all study lessons had significantly improved their performance in the application of volley pass. It seemed that games designed according to the variation theory did help students discern the critical features of the learning object and ultimately enhanced their learning in the application of volley pass. This suggests that the application of variation principles in designing learning activities is practical and effective. In fact, numerous researchers also demonstrated that the effectiveness of the application of variation principles in designing lessons as to improve the learning in different subjects (Kwan, Ng, & Chik, 2002; Lo, Chik, & Pang, 2006; Pang & Marton, 2003; Runesson & Marton, 2002). It is likely that the variation theory can be used as a theoretical foundation to support the use of the learning study process.

Finally, the results of the present study clearly reveal that the learning study model can serve as a means of teacher professional development with positive impact on teacher instructional practice. The two physical education teachers personally expressed that they had learned a lot and improved their instructional practice through the learning study process. Therefore, there is a need for further implementation and future research on the learning study. A better understanding of how to make this kind of school-based professional development model workable in different settings and contexts is encouraged.

Conclusion

From the results of this study, it seems that the games strategy is effective in promoting students' interest and skill learning in volleyball. This holds implications of the instructional practice for the physical education practitioners and teacher educators. Games can be an optional teaching strategy to physical education teachers when teaching volleyball. It is noteworthy that the findings generated in the present study cannot be generalized as the study is only small-scaled with limited participants. However, the procedure of how the learning study is implemented may be useful to those who wish to employ the learning study in future. In future study, more research with greater sample size in different schools is needed. As to understand more about the application of games in teaching physical education, additional studies are needed to investigate how the games affect students' learning in physical education lessons.

References

Bagozzi, R. P., & Burnkrant, R. E. (1979). Attitude organization and attitude-behaviour relationship. *Journal of Personality and Social Psychology, 37*(5), 913-929.

Belka, D. E. (1994). *Teaching children games: Becoming a master teacher.* Champaign, IL: Human Kinetics.

Biddle, S. J. H., & Chatzisarantis, N. (1999). Motivation for a physically active lifestyle through physical education. In Y. V. Auweele, F. Bakker, S. Biddle, M. Durand & R. Seiler (Eds.), *Psychology for physical educators* (pp. 5-26). Champaign, IL: Human Kinetics.

Carlson, T. B. (1995). We hate gym: Student alienation from physical education. *Journal of Teaching in Physical Education, 14*(4), 467-477.

Chen, A. (1998). Meaningfulness in physical education: A description of high school students' conceptions. *Journal of Teaching in Physical Education, 17*(3), 285-306.

Cothran, D. J., & Ennis, C. D. (1998). Curricula of mutual worth: Comparisons of students' and teachers' curricular goal. *Journal of Teaching in Physical Education, 17*(3), 307-326.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1), 1-49.

Dickeson, B., & Sparkes, A. (1988). Pupil definitions of physical education. British *Journal of Physical Education Research Supplement, 2,* 6-7.

Duda, J. L. (1996). Maximizing motivation in sport and physical education among children and adolescents: The case for gender task involvement. *Quest, 48*(3), 290-302.

Ennis, C. D. (1996). Students' experiences in sport-based physical education: (More than) apologies are necessary. *Quest, 48*(4), 453-456.

Goldstein, L. S. (1999). The relational zone: The role of caring relationships in the co-construction of mind. *American Educational Research Journal, 36*(3), 647-673.™

Goudas, M., & Biddle, S. (1993). Pupil perceptions of enjoyment in physical education. *Physical Education Review, 16*(2), 145-150.

Griffin, L. L., Chandler, T. J. L., & Sariscsany, M. J. (1993). What does 'fun' mean in physical education? *Journal of Physical Education, Recreation and Dance, 64*(9), 63-66.

Hastie, P. A. (1998). The participation and perceptions of girls within a unit of sport education. *Journal of Teaching in Physical Education, 17*(2), 157-171.

Henderson, K., Glancy, M., & Little, S. (1999). Putting the fun into physical activity. *Journal of Physical Education, Recreation and Dance, 70*(8), 43-45, 49.

Heywood, P. (2001). Learning joyfully: An emotional and transformative experience. In S. Gunn & A. Begg (Eds.), *Mind, Body and Society* (pp.73-79). Melbourne: Department of Mathematics and Statistics, The University of Melbourne.

Kwan, T., Ng, F., & Chik, P. (2002). Repetition and variation. In F. Marton & P. Morris (Eds.), What matters?: *Discovering critical conditions of classroom* learning (pp. 39-57). Goteborg, Sweden: Acta Universitatis Gothoburgensis.

Lo, M. L., Chik, P., & Pang, M. F. (2006). Patterns of variation in teaching the colour of light to Primary 3 students. *Instructional Science, 34*(1), 1-19.

Ma, L. P. (1999). *Knowing and teaching elementary mathematics: Teacher' understanding of fundamental mathematics in China and the United States*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Marton, F., & Booth, S. (1997). *Learning and awareness*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Muijs, D., & Reynolds, D. (2000). School effectiveness and teacher effectiveness in mathematics: some preliminary findings from the evaluation of the Mathematics Enhancement Programme (Primary). School Effectiveness and *School Improvement, 11*(3), 273-303.

O'Reilly, E., Tompkins, J., & Gallant, M. (2001). 'They ought to enjoy physical activity, you know?': Struggling with fun in physical education. *Sport, Education and Society, 6*(2), 211-221.

Pang, M. F. (2003). Two faces of Variation – On continuity in the phenomenographic movement. *Scandinavian Journal of Educational Research, 47*(2), 145-156.

Pang, M. F., & Marton, F. (2003). Beyond "lesson study": Comparing two ways of facilitating the grasp of some economic concepts. *Instructional Science, 31*(3), 175-194.

Placek, J. (1983). Conceptions of success in teaching: Busy, happy and good? In T. Templin & J. Olson (Eds.), *Teaching in physical education* (pp. 46-56). Champaign, IL: Human Kinetics.

Portman, P. A. (1995). Who is having fun in physical education classes? Experiences of six-grade students in elementary and middle schools. *Journal of Teaching in Physical Education, 14*(4), 445-453.

Runesson, U., & Marton, F. (2002). The object of learning and the space variation. In F. Marton & P. Morris (Eds.), What matters?: *Discovering critical conditions of classroom learning* (pp. 19-37). Goteborg, Sweden: Acta Universitatis Gothoburgensis.

Ryan, S., Fleming, D., & Maina, M. (2003). Attitudes of middle school students toward their physical education teachers and classes. *Physical Educator, 60*(2), 28-42.

Sallis, J. F., Prochaska, J. J., Taylor, W. C., Hill, J. O., & Geraci, J. C. (1999). Correlates of physical activity in a national sample of girls and boys in grades four through twelve. *Health Psychology, 18*(4), 410-415.

Sanders, S., & Graham, G. (1995). Kindergarten children's initial experiences in physical education: The relentless persistence for play clashes with the zone of acceptable responses. *Journal of Teaching in Physical Education, 14*(4), 364-371.

Siedentop, D. (1996). Physical education and education reform: The case of sport education. In S. J. Silverman & C. D. Ennis (Eds.), *Student learning in physical education* (pp. 247-267). Champaign, IL: Human Kinetics.

Silverman, S., & Subramaniam, P. R. (1999). Student attitude toward physical education and physical activity: A review of measurement issues and outcomes. *Journal of Teaching in Physical Education, 19*(1), 96-124.

Solmon, M. A., & Carter, J. A. (1995). Kindergarten and first-grade students' perceptions of physical education in one teacher's classes. *Elementary School Journal, 95*(4), 355-365.

Stewart, M. J., Green, S. R., & Huelskamp, J. (1991). Secondary student attitudes toward physical education. *Physical Educator, 48*(1), 72 -79.

Stigler, J., & Hiebert, J. (1999). *The teaching gap*. New York: The Free Press.

Subramaniam, P. R., & Silverman, S. (2002). Using complimentary data: An investigation of student attitudes in physical education. *Journal of Sport Pedagogy, 8*(1), 74-91.

Tinning, R., & Fitzclarence, L. (1992). Postmodern youth culture and the crisis in Australian secondary school physical education. *Quest, 44*(3), 287-303.

Trost, S. G., Pate, R. R., Sauders, R., Ward, D. S., Dowda, M., & Felton, G. (1997). A prospective study of the determinants of physical activity in rural fifth-grade children. *Preventive Medicine, 26*(2), 257-263.

Zajonc, R., & Markus, H. (1982). Affective and cognitive factors in preferences. *Journal of Consumer Research, 9*(2), 123-131.

Acknowledgement

The author would like to thank the Quality Education Fund for financing this study.

Appendix: The Outline of the Passing Games

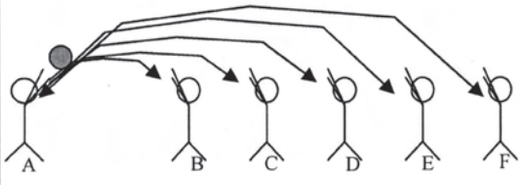
Passing Game I

- Students are grouped in 6's and every student is assigned a number from 1 to 6;
- One student tosses the volleyball vertically upward and calls out a number from 1 to 6, the numbered student tries to receive the ball;
- If the numbered student fails to receive the ball, he needs to catch back the ball and calls "stop". Other students stop moving immediately when hearing "stop" ;
- The numbered student can move 3 steps and throw/roll/... the ball to a target student. If the ball hits the target student, the target student gets 1 mark. If not, the numbered student gets 1 mark;
- Repeat the game procedure until one student in the group gets 3 marks;
- The student who gets 3 marks is needed to complete a task decided by the group mates.

Remarks: The ball holder is not allowed to call number of the previous ball holder.

Passing Game II

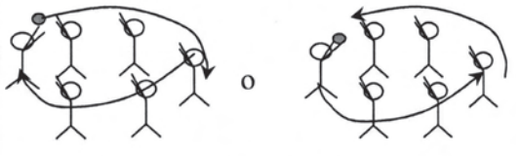
- Students are grouped in 6's;
- Students discuss the order of their lining up (according to their ability) ;
- Demonstration as below:



- Student A passes the ball to student B. Student B passes the ball back to student A and student A passes to student C and etc. The game is finished until the ball passing back from student F to student A;
- Students are required to use volley pass (can hold the ball before passing). If the ball is dropped during the game, student A needs to start the passing from the beginning again;
- The first group to complete the game is the winner.

Passing Game III

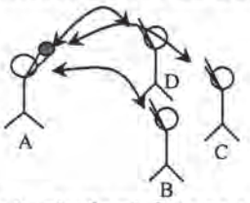
- Students are grouped in 6's;
- Demonstration as below:



- Students try to pass the ball in either clockwise or anticlockwise directions to the student next to him without dropping the ball (can hold the ball before passing) in a number of rounds (designed by the teacher);
- The first group to complete the game is the winner.

Passing Game IV

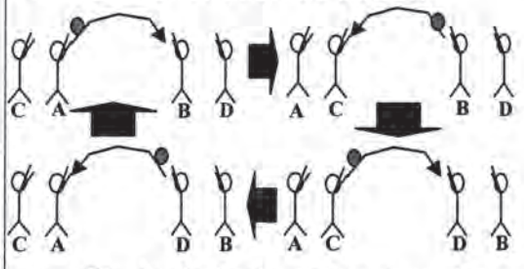
- Students are grouped in 4's;
- Demonstration as below:



- First, student A tosses the ball (in parabola) to students B, C and D's up front and students try to return the ball to student A with volley pass (can hold the ball before passing);
- After few trials, student A tries to toss the ball randomly to students B, C and D;
- Further, student A tries to toss the ball randomly to student B, C and D but need not in the up front position;
- After few trials, the students change the positions and repeat the game.

Passing Game V

- Students are grouped in 4's;
- Demonstration as below:



- Students try to volley pass the ball to the opposite side without dropping the ball (can hold the ball before passing);
- Students need to queue up at the back after passing the ball;
- Count the number of continuous successful pass in a restricted time;
- Self competition;
- The group with the most number of passing is the winner.

Correspondence:

Dr. Alberto Cruz 高達倫博士
10 Lo Ping Road, Tai Po,
New Territories, Hong Kong
香港教育學院體藝學系
香港新界大埔露屏路十號
Telephone : (852) 29487847
Fax : (852) 29487848
E-mail : acruz@ied.edu.hk