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IMPLEMENTATION OF A TEACHING MODEL OF POSTMODERN PHYSICAL EDUCATION

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ABSTRACT

This study aimed to explore 12-year-old sixth-grade students' learning outcomes in the context of beliefs of pluralism, innovation, criticism, and reflection after implementing the Teaching Model of Postmodern Physical Education (TPPE). This quasi-experimental study included teaching observations and semi-structured interviews. The pre- and post-test scores were significantly different in the experimental group. The post-test scores showed an improvement in the scores for pluralism, innovation, criticism and reflection. Analysis of covariance showed that after adjustments, the effects of the independent variable on the dependent variables were significantly different for the post-test scores of pluralism, innovation, criticism and reflection in both the experimental and control groups, with better scores in the experimental group than in the control group. Both the teaching observation journals and student interview records received positive feedback and affirmation. Thus, TPPE could be an effective way to enhance the learning process in this population.

Keywords: Criticism; Innovation; Physical education teaching model; Pluralism; Reflection

INTRODUCTION

A teaching model refers to a set of plans used to guide teaching in classrooms or other scenarios and includes aspects such as teaching material design and curriculum planning and creation (Joyce & Weil, 1980). The ideal teaching model should not be static, and from the perspective of postmodernism, the plans should be free from traditional logocentrism, dualism, certainty, and unity as well as the objective, rational, and systematised ways of thinking pursued by modernism (Cherryholmes, 1988). In other words, postmodernism aims to transcend the constraints of existing traditions to create a new paradigm by questioning and criticising modernism.

In the context of physical education (PE), levels – educational guidelines for teaching models are of significance. Teachers must plan curriculum content and teaching methods that are suitable for learning at different levels in a step-by-step manner to improve students'

relevant skills and knowledge and to facilitate practical application (Hellison, 2011). Thus, many scholars apply the concept of postmodernism to the teaching of PE. They advocate the inclusion of four major characteristics, namely pluralism, innovation, criticism and reflection in the teaching model for PE in schools to create a teaching process and environment in which teachers and students can explore new knowledge together (Mosston, 1992; Hellison, 2011; Landi *et al.,* 2016; Shih *et al.,* 2017; Knijnik *et al.,* 2019).

With regard to *pluralism*, the emphasis of postmodernism is on eliminating the limitations and irrationalities of thinking in modern teaching (Jančec & Vodopivec, 2019). In view of this, a teaching model for PE is not pre-set or unchangeable and the content is created collaboratively by students and their teachers. This type of non-teacher-centred learning atmosphere (decentralisation) attaches importance to flexible thinking and the development of students' potential (Schukajlow *et al.,* 2015).

Innovation in education refers to the selection of the most appropriate teaching format, method or schedule through updates and transformation intended to meet the learning needs of different students (Kavacık *et al.,* 2015; Jurgena & Cēdere, 2016). Therefore, the content and format of a PE curriculum in real life should be brainstormed among peers to create learning methods through relevant games and competitions, as well as to evaluate standards specific to the curriculum (Jurgena & Cēdere, 2016). This allows students to learn in an environment that is aligned with their athletic abilities, concepts of teamwork and understanding of rules and standards in competitions (Bunker & Thorpe, 1982; Hastie, 2010; Cicchino, 2015).

Criticism is not the same as criticising or making offensive speeches. Rather, it confronts the questions raised in traditional concepts by examining false perspectives to explore the differences and contradictions therein (Loes *et al.,* 2015; Thaiposri & Piriyasurawong, 2016). Thus, at this level of learning, teachers should utilise teaching activities that encourage criticism to clarify the core values of the PE curriculum, thereby expanding the development of good judgement regarding students' knowledge and PE (Fitzpatrick & Russell, 2015; Landi *et al.,* 2016).

According to Miller (1997), *reflection* is an internal thinking process in an individual's behaviour that generates rational actions. An individual's knowledge framework is constructed through the validation of actions reflected on. Thus, reflection is conducive to the creation of new knowledge to govern future behaviours. Harvey *et al.* (2020) point out in their Teaching Games for Understanding (TGfU) model that PE teachers should provide active guidance for students to conduct constructive group discussions and self-reflection activities. This would give students the opportunity to reflect on the extent of the knowledge and skills acquired, which would improve their ability to apply these in daily life (Landi *et al.,* 2016; Jani *et al.,* 2018).

The Teaching Model of Postmodern Physical Education (TPPE) established in this study advocates teaching beliefs of innovation and pluralism. The curriculum content and schedule can be modified based on changes in students' learning needs and current teaching scenarios. This model helps teachers to select more appropriate teaching plans as the foundation to re-establish relevant teaching goals. The implementation of teaching activities that focus on criticism and reflection (such as group discussions) facilitates teachers' understanding of the students' comprehension of relevant knowledge and their learning needs, which can then serve

as a basis for subsequent revisions of teaching goals and innovations in curriculum contents (Harvey *et al.,* 2020). This enriches the options in different teaching plans, which exposes students to flexible and innovative learning at all times. Hopefully, the results of this study will help to establish a novel direction and perspective on the development of PE teaching.

AIM OF RESEARCH

The aim of this study was to explore sixth-grade students' learning outcomes in the context of beliefs of pluralism, innovation, criticism and reflection after the implementation of TPPE.

METHODS

Creation process of TPPE

To confirm whether teaching content conformed to the TPPE, the work of Shih *et al.* (2017) was reviewed firstly, which analysed weights for belief indices given by PE teachers under the ideology of postmodernism, using an analytic hierarchy process, as well as Shih's (2017) Learning Scale of Postmodern Physical Education (LSOPPE) for students. A preliminary checklist for the TPPE was then compiled.

Three experts were invited to confirm the connotations of the TPPE checklist in the first focus group discussion. The first expert (code A: 20 years' teaching experience) has long been engaged in the research of physical education teaching models. The second expert (code B: 28 years' teaching experience) specialises in sports pedagogy and curriculum design and the third expert (code C: 25 years' teaching experience) specialises in general philosophy, sports philosophy and sports sociology. A total of 15 wording adjustments were made during the first meeting. The checklist content was finalised in the second focus group discussion. Sixteen items were adjusted, including four each for 'pluralism', 'innovation', 'criticism' and 'reflection'.

The checklist was used to conduct on-site teaching observations for the TPPE. Experts A and B were involved in the first observation. The reliability coefficient of the checklist determined by the experts was 0.93 and 0.87, respectively, with a mean of 0.90. Experts A and C, who were involved in the second observation, assessed the teaching content by viewing video recordings. The reliability coefficient of the checklist determined by the experts was 0.87 and 0.81, respectively, with a mean of 0.84. Siedentop and Tannehill (2000) point out that an acceptable reliability coefficient is higher than 0.80 and calculated using the following formula: reliability=number of same opinions/(number of same opinions + number of different opinions) × 100(%). After two observations of the teaching model, it was confirmed that the teaching format was indeed a TPPE.

Experimental design

Participants and teachers

An experimental group (14 male students and 12 female students) and a control group (10 male students and 10 female students) were established via intentional sampling. The participants were 12-year-old sixth-grade students of a public national elementary school whose families

belonged to the middle class. The teacher of the experimental group was a researcher of TPPE (nine years of PE teaching experience, doctoral student and health and PE counsellor). The teacher of the control group (14 years of PE teaching experience, doctoral student and health and PE counsellor) adopted the direct method of teaching by demonstrating movements and skills to the learners. This represented the teacher's decision-making power (Maria, 2014). The teacher provided positive feedback for movements that achieved the goal, while the role of the learners was merely to accept instructions and to participate in activities (Metzler, 2011).

Measuring instrument and implementation processes

The measuring instrument used was the LSOPPE (Shih, 2017). By going through stages of literature review, focus group discussions, in-depth interviews, an exploratory factor analysis, and a confirmatory factor analysis, the LSOPPE introduced a questionnaire which comprised beliefs, such as pluralism (6 questions) with a composite reliability of 0.86, innovation (6 questions) with a composite reliability of 0.85, criticism (4 questions) with a composite reliability of 0.79 and reflection (5 questions) with a composite reliability of 0.90. The results of the confirmatory factor analysis were χ^2 =333.92, df=185; GFI=0.91; RMSEA=0.05; AGFI=0.89; NFI=0.90; TLI=0.94; CFI=0.95; PCF=0.84; PNFI=0.79; PGFI=0.73; and $\chi^2/df = 1.81$, which indicated good reliability and validity.

Teaching strategies utilised in the experimental group included problem teaching (to guide students to think), discussion teaching (to encourage students to brainstorm and plan their learning content), value clarification (to confirm with students the value of behaviour), and self-reflection (to encourage students to reflect after action). A 12-week course (Podnar *et al.,* 2018), which consisted of two classes per week, was implemented during the semester. A pre-test was conducted in the first week of the course and a post-test was conducted in the final week.

The teachers were to record in detail the learning situations observed in their teaching observation journals every week as a reference to improve the teaching for the following week. In addition, they were to select students for interviews during the study period. For this purpose, upon the completion of the teaching of each sport (4 weeks), two male students and two female students were randomly selected for interviews, with each interview having different candidates. Records of the interview were subsequently verified by the interviewee before they were used for analysis. The three sports taught were basketball (ball game) for four weeks, rope skipping (folk custom) for four week, and track and field (land sport) for four weeks.

Ethical considerations

The study was conducted in accordance with the provisions of the Institutional Review Board for Human Research (Ethical Clearance No.: FJU-IRB C 105-305), whereby a written consent form was obtained from the school. All the students in both the experimental group and the control, as well as their parents, provided written informed consent. The intervention phase of the study with the teaching model began once all written consent forms were received.

Data analysis

First, using the SPSS 20.0 software package, the differences between the pre-test and post-test scores regarding pluralism, innovation, criticism and reflection in the LSOPPE were analysed in the experimental and control groups via paired sample t-tests. However, to reduce the error of experimental procedures that were not controlled by the study, the teaching model was used as an independent variable (groups: experimental group and control group). Analysis of covariance (ANCOVA) was performed using the pre-test scores on pluralism, innovation, criticism and reflection as covariates, and the respective post-test scores as dependent variables. The differences in the beliefs of pluralism, innovation, criticism, and reflection between the experimental and control groups were then determined after the teaching experiment. In addition, the data were tested for violations of the basic assumptions of covariate analysis before the actual covariate analysis was performed. The significance level was set at $\alpha=0.05$.

In terms of teaching observation journals, teachers were required to record details of the teaching method (question or explanation), interaction (teacher-student or student-student discussion), and students' learning profile (focus and thinking ability) on a weekly basis (Weber *et al.,* 2016). In addition, teachers would also extract important quotations and codes after each teaching activity, and summarise the categories and themes of keywords that appeared repetitively (Anderson & Lindeman, 2017).

RESULTS

This study collected data using a quasi-experimental research design with teaching observation journals and student interview records. This approach allowed for cross-comparisons of the collected data and text, thereby providing more meaningful results (Cviko *et al.,* 2012; McDonald, 2013). With the introduction of TPPE, students could establish a fair and cooperative relationship with teachers, where they had more opportunities to express themselves and were able to accept various opinions.

Differences between pre- and post-test scores in the two groups

The data of 26 participants in the experimental group and 20 in the control group were analysed. The experimental group was the class that implemented the TPPE.

Table 1. **DEPENDENT SAMPLE T-TESTS ON PRE- AND POST-TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS**

Learning Scale for PPE	Experimental group				Control group			
		Pre-test	*Post-test*			*Pre-test*	*Post-test*	
	n	Mean±SD	Mean±SD	t	n	Mean±SD	Mean±SD	t
Pluralism	26	4.17±0.61	4.67±0.39	-3.82*	20	3.99±0.59	4.21±0.59	-1.25
Innovation	26	4.24±0.67	4.68±0.48	-2.98*	20	4.27±0.49	3.96±0.69	1.73
Criticism	26	2.16±0.64	1.67±0.56	3.62*	20	2.35±0.90	2.43±0.93	-0.24
Reflection	26	3.86±0.67	4.36±0.66	-3.55*	20	3.62±0.77	3.61±0.78	0.04

* $p<0.05$ SD=Standard Deviation TPPE=Teaching Model of Postmodern Physical Education

The mean score for *pluralism* was 4.17 in the pre-test and 4.67 in the post-test, with a significant difference between the pre- and post-tests (t= -3.82 *, p<0.05). The mean score for *innovation* was 4.24 in the pre-test and 4.68 in the post-test, with a significant difference between the pre- and post-tests (t= -2.98*, p<0.05). The mean score for *criticism* was 2.16 in the pre-test and 1.67 in the post-test, with a significant difference between the pre- and post-tests (t= 3.62*, p<0.05). The mean score for *reflection* was 3.86 in the pre-test and 4.36 in the post-test, with a significant difference between the pre- and post-tests (t= -3.55*, p<0.05). In contrast, there were no significant differences between the pre- and post-test scores in the control group. These results showed that the learning effectiveness of postmodern physical education was effectively improved in the experimental group with the TPPE intervention.

Analysis of differences

First, the homogeneity of the regression coefficients within the group was tested to verify that the relationship between the covariates and the dependent variables would not be affected by the different processing levels of the independent variable. Next, an ANCOVA was performed using the various beliefs in the LSOPPE in the pre-test as covariates, the various beliefs in the LSOPPE in the post-test as dependent variables, and the groups as fixed factors.

As shown in Table 2, the linear relationships between the pre-test and post-test scores on pluralism, innovation, criticism and reflection displayed homogeneity in the experimental and control groups. F was 0.03, 0.03, 2.12 and 1.71 (p>0.05), which followed the assumption of the covariate analysis, indicating that the data were suitable for covariate analysis.

Table 2. **ANALYSIS ON HOMOGENEITY OF REGRESSION COEFFICIENTS**

Source of variation	Sum of squares	Degrees of freedom	Mean square	F
Group* Pluralism in pre-test	0.01	1	0.01	0.03
SD	10.21	42	0.24	
Group* Innovation in pre-test	0.01	1	0.01	0.03
SD	14.64	42	0.35	
Group* Criticism in pre-test	1.16	1	1.16	2.12
SD	22.97	42	0.55	
Group* Reflection in pre-test	0.84	1	0.84	1.71
SD	20.59	42	0.49	

SD=Standard Deviation

Tables 3 and 4 show the adjusted results after excluding the effects of covariates on the dependent variables. After adjustments, the mean score for pluralism in the post-test was 4.66 in the experimental group and 4.22 in the control group, and the effects of the independent variable on the dependent variables were significant (F=8.92*; p<0.05); the mean score for innovation in the post-test was 4.68 in the experimental group and 3.96 in the control group, and the effects of the independent variable on the dependent variables were significant (F=17.44*; p<0.05); the mean score for criticism in the post-test was 1.67 in the experimental

group and 2.42 in the control group, and the effects of the independent variable on the dependent variables were significant (F=11.43*; p<0.05); the mean score for criticism in the post-test was 4.34 in the experimental group and 3.64 in the control group, and the effects of the independent variable on the dependent variables were significant (F= 0.74*; p<0.05). These results indicated that students' post-test scores varied significantly according to the different teaching methods, and learning effectiveness was significantly better with the TPPE intervention.

Table 3. **MEAN SCORES POST-TEST AFTER ADJUSTMENT OF MEAN**

Group	Pluralism	Innovation	Criticism	Reflection
Experimental group	4.66	4.68	1.67	4.34
Control group	4.22	3.96	2.42	3.64

Table 4. **SUMMARY OF ANCOVA RESULTS**

Beliefs	Source of variation	Sum of squares	Degrees of freedom	Mean square	**F**
Pluralism	Pre-test	0.22	1	0.22	
	Intergroup	2.12	1	2.12	8.92*
	SD	10.22	43	0.24	
Innovation	Pre-test	0.28	1	0.28	
	Intergroup	5.94	1	5.94	17.44*
	SD	14.65	43	0.34	
Criticism	Pre-test	0.01	1	0.01	
	Intergroup	6.42	1	6.42	11.43*
	SD	24.13	43	0.56	
Reflection	Pre-test	1.09	1	1.09	
	Intergroup	5.35	1	5.35	10.74*
	SD	21.43	43	0.50	

* p<0.05 SD=Standard Deviation

Teaching observation journals

There were two codes for the teaching observation journals. These were 'T-W1-01' and 'C-W1-01-S1', where T denotes the teacher, W1 denotes the first week, 01 denotes the first physical education lesson of the week, C denotes teacher-student dialogue, and S1 denotes a student's class number as 1. Themes extracted from the observation journals included 'Diversified guidance establishes the foundation of subsequent learning', 'Teamwork creates an excellent learning atmosphere', 'Behavioural values are universally improved', and 'Reflection introduces new progressive forces'. Associated journal contents were as follows:

> When guidance on pluralism was first provided, the students could easily express different concepts (T-W1-01, T-W9-01).
> Teacher: 'How do you make sure your actions were correct?'

> Student: 'I would observe how other students do the jumping movements, and my teammates would also tell me how to do them' (C-W7-01-S8). Senior students already had good judgement and knew how to adjust their own movements through observation of the correct movements (T-W3-01). It was specifically emphasised that the power of teamwork was far greater than that of individuals. When the students saw the positive outcome of the games, everyone would cheer each other on (T-W5-02). After reflection, most students would understand how to correct their own movements (T-W8-02).

The designers of the game would commit to the creation process and participate enthusiastically (Hastie, 2010). Under the influence of TPPE, students who had opportunities to express pluralistic imagination also improved their innovative and associative thinking. Their judgement sensitivity also improved. When encountering setbacks, the students would find solutions together to learn and grow. Students could express their views, understand how to correct and adjust their movements, establish good interpersonal relationships, accumulate positive energy and inject a new sense of unity into the learning atmosphere of the class.

Student interview records

By data coding and transcribing the interview records, not only the interviewee's relevant experience and important information were identified, but also his true feelings after the class **(**McDonald, 2013; Anderson & Lindeman, 2017; Morrison & Gleddie, 2019**).** The student interview records were written by the teacher, that is, the researcher, who conducted the interviews with the students based on the content of the lessons immediately after the completion of the lessons for each sport (four weeks).

The interview, based on eight previously designed topics, was conducted in a semi-structured manner. (1) 'What have you learnt from teacher's guidance in different sports skills?' (2) 'How do you feel about being able to create innovative learning content for physical education classes?' (3) 'What is the impact of clarifying the correctness of the current learning content on you?' (4) 'What is the impact of reflecting on the learning situation of physical education classes on you?' (5) 'What is the difference between the existing and the previous learning methods of physical education classes?' (6) 'Do you like the current learning method of physical education classes? Why?' (7) 'What do you think is the biggest gain from taking physical education classes in their current form?' (8) 'How do you apply what you have learned in physical education classes to your current and future life?'

If the students could not provide specific and clear answers, or the meanings required further clarification, the topic was further developed to obtain important points for the summary (Anderson & Lindeman, 2017). Key responses included:

> There are many 'possibilities' in learning; my 'imagination' becomes richer; it is 'fun' to participate in activities; I try to 'observe more and make more choices'; 'teamwork' is the most important; I will 'reflect on my way of learning'; there are more 'opportunities' to present; it is 'attractive'.

Ultimately, learning comes down to practical application. The actual benefits will be the greatest if the beliefs studied in the context of PE classes in schools can be applied in other contexts (Hastie, 2010; Cicchino, 2015; Harvey *et al.,* 2020). With the 12-week TPPE intervention, the students affirmed the learning effect of this teaching model. It could make considerable value additions within the same period as regular learning. Meanwhile, it could

foster students' outlook for the future and enable them to understand how to respect and cooperate with others in a team (Landi *et al.,* 2016; Jani *et al.,* 2018; Harvey *et al.,* 2020).

DISCUSSION

In this study, a TPPE based on the concept of postmodernism was proposed. This model emphasises the teaching consideration of pluralistic learning and the cultivation of innovation, criticism, and reflection in PE classes. Pluralism is the foundation of the TPPE. The concept focuses on the creation of a 'decentralised' learning atmosphere, and students' learning needs are emphasised to promote learning effectiveness (Cherryholmes, 1988; Oliver & Oesterreich, 2011).

Meanwhile, teachers can also understand different students' learning capabilities and performances by conducting relevant teaching activities, which enable them to develop more pluralistic teaching methods and contents that meet learning needs. With regard to empirical evidence, the results of this study's qualitative and quantitative analyses demonstrated that TPPE enabled students to experience more possibilities in learning and provided them with the opportunities to practice their ideas. All students gave positive feedback and affirmation in this regard.

Jurgena and Cēdere (2016) pointed out that in the model of the learning society, to cultivate students' innovative thinking is to erase the boundaries between formal and informal education so that students have adequate opportunities to express novel ideas. By doing so, a cooperative relationship between teachers and students can be established. They jointly seek the teaching methods suitable for student learning to enrich the pluralism of the curriculum content. The present study results showed that with the TPPE intervention, students could demonstrate the ability to express their views and accept different opinions when the teachers and students discussed teaching topics, contents, or goals in an equal and cooperative relationship.

This was conducive to the development of innovative thinking. In other words, the teaching consideration of 'decentralisation' advocated by postmodernism in the TPPE integrates the thoughts and creativity of teachers and students into the teaching process (Schukajlow *et al.,* 2015). It also provides students with adequate opportunities to express their innovative ideas at appropriate times (Cherryholmes, 1988; Doll, 1993; Schukajlow *et al.,* 2015). This not only transcends the constraints of traditional approach of physical education teaching in which knowledge is transmitted in one direction (Bunker & Thorpe, 1982; Harvey *et al.,* 2020), but also expands the breadth and pluralism of physical education teaching and promotes the interest and motivation for learning physical education.

Critical thinking is an advanced thinking skill that requires a considerable degree of logical reasoning, and it is crucial for effective learning and the development of living ability (Thaiposri & Piriyasurawong, 2016). Therefore, TPPE is built on the concept of game-based learning to promote students' development of critical thinking skills (Jani *et al.,* 2018). The key to the model lies in the effective use of rational judgment and decision-making to conduct unbiased reasoning and to engage in dialog to find the best solution to the problem (Tseng *et al.,* 2016; Jani *et al.,* 2018). It also enables students to develop good judgment regarding the knowledge and skills of the sport (Loes *et al.,* 2015; Knijnik *et al.,* 2019).

Finally, this model provides students with the opportunity to reflect on their learning, which is a teaching strategy for self-reflection training in the TPPE. Teachers can understand the learning performance and needs of students through continuous dynamic observations. Group discussions and self-reflective teaching activities are also implemented at appropriate times to guide students to establish appropriate learning attitudes and ways of thinking that improve the students' ability to reflect (Cicchino, 2015). In view of this, the empirical results of the present study show that through the mutual influences of reflection and action, TPPE maintains the development of a healthy physical education teaching and learning cycle. This cycle can also affect students' thinking ability and their skills in applying physical education in life (Landi *et al.,* 2016; Tseng *et al.,* 2016; Jani *et al.,* 2018; Harvey *et al.,* 2020).

CONCLUSION

Currently, PE has reinforced post-modernistic values and has been used to improve the learning motivation and thinking abilities of the students themselves toward PE (Rust, 1991; Cicchino, 2015; Jančec & Vodopivec, 2019; Harvey *et al.,* 2020). Postmodernism emphasises that education must be broad-minded in order to accept diverse opinions and differences in learning, and focuses on diversity and the learning requirements of marginalised students (Rust, 1991; Zajda & Gamage, 2009; Jurgena & Cēdere, 2016; Mangena, 2016). In this study, a quasi-experimental research design was used to investigate the learning effects of TPPE. The results demonstrated that learning effectiveness increased with regard to the beliefs of pluralism, innovation, criticism and reflection.

To integrate TPPE gradually into existing teaching methods, physical education teachers must always acquire new knowledge, take the initiative to participate in innovative teaching workshops, research growth mindset activities and prepare students for the realities of society. Furthermore, teachers should enable students to learn to adapt to changes in their future environments and adapt the acquired knowledge to their actual needs. Although the TPPE used in this study is an effective teaching model of physical education, its definitive effects need to be confirmed and validated through empirical studies. Finally, the results of this study should not be over-interpreted when applied to different age groups.

Conflict of interest

The authors report no potential conflict of interest.

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