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Applying Microteaching to the Training of Movement Explanation and Demonstration Skills of Physical Education Majors: Findings of a Pilot Study

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Abstract

This pilot study aimed to evaluate the effects of microteaching on the movement explanation and demonstration skills of Chinese university students majoring in physical education, using a Cluster Randomised Controlled Trial (CRCT) design. Yancheng Teachers University served as the experimental group (microteaching training), and Huaiyin Normal University was the control group (standard training), with 54 participants aged 20-22. The training procedures were reviewed and approved by experts. Data analysis used Generalised Estimation Equations (GEE) and Bonferroni tests. Significant improvements in the two skills were observed within both groups over time. At the pre-test stage, no significant differences were found between the groups. but at the post-test stage, the experimental group showed statistically significant improvements in the two skills compared to the control group (MES: Cohen's d = 0.58, $p < 0.05$; MDS: Cohen's d = 2.24; $p < 0.05$). These results suggest that microteaching is more effective than standard training in enhancing movement explanation and demonstration skills in physical education majors, making it a superior method for teaching skills training.

Keywords: Microteaching, Movement Explanation Skills, Movement Demonstration Skills, Physical Education Majors.

Introduction

Teaching skills are the core element of teachers' professional skills, mainly reflecting the development level of the teachers' professionalism Joyce (2002). It plays a positive role in achieving good results and realising teaching innovation. To become a successful physical education teacher, having a deep theoretical understanding of physical education and high-level movement skills is insufficient. It would be best to have solid teaching skills (Chan et al.,

2023; Jiang et al., 2023; Wu, 2023). These skills form the basis of the professional core competitiveness of physical education teachers (Chen, 2017). Physical education teachers lacking these skills will have difficulty becoming competent, qualified, and experienced physical education teachers (Napper-Owen et al., 2008).

The physical education major is critical in cultivating future physical education teachers. Its main task is to strengthen students' teaching skills, but more importantly, the teaching skills students acquire are directly related to their future professional development as teachers (MacPhail et al., 2021; Richards et al., 2014). Therefore, the physical education major should focus on cultivating teaching skills to ensure students have the critical abilities to become excellent physical education teachers before entering the field (Casey et al., 2015; MacPhail et al., 2021; O'Sullivan et al., 1997).

Compared to other subjects, the distinguishing feature of physical education teaching is that students are in a dynamic environment and primarily use physical exercises and cognitive activities as teaching methods (Ward et al., 2005). Explanation and demonstration are the most fundamental teaching methods for physical education teachers to impart basic knowledge and skills (Mosston & Ashworth, 2008). They are also the basic means for students to establish correct technical concepts (Siedentop, 1976).

Microteaching began in the 1960s. Professor D.W. Allen of Stanford University first proposed the concept of microteaching, which utilizes advanced teaching equipment and excellent audiovisual technology to provide uniform teaching skills training for in-service teachers (Allen & Ryan, 1969). This process of teaching skills requires relatively complex techniques. Therefore, in the actual teaching process, it is necessary to classify the various skills required for teaching and then conduct targeted training for different teaching skills (Remesh, 2013). According to the different characteristics of different skills, different teaching training goals are set, thereby forming a complete teaching system (Amobi, 2005). The characteristics of the microteaching method can be summarised in one sentence: miniaturisation of training topics, standardisation of skill actions, audiovisual recording of the process, and timely observation and evaluation (Kusmawan, 2017; Ralph, 2014).

China is a major education country, with significant achievements in both ancient and modern education. However, it has long been influenced by traditional physical education teaching methods, where teachers teach mechanically and students follow reluctantly (Li et al., 2018). As a result, after entering the workforce, physical education majors often have superficial teaching skills, increasing internal pressure, and are unable to ensure the quality of physical education, which threatens their job stability (Zhou & Zhang, 2020). Faced with this situation, universities must safeguard physical education students by focusing on "teaching skills" as the main training content, gradually promoting their adaptability in the field (Liu et al., 2019; Han & Li, 2001). Given this, this paper further explores the impact of microteaching on the explanation and demonstration skills of physical education majors. It proposes feasible implementation strategies to help physical education students better master teaching skills (Chen, 2017).

Methodology

This study was conducted as a Cluster Randomised Controlled Trial (CRCT) since the group, not the individual, was used as the randomisation unit. This true-experimental design consisted of one control group and one experimental group: a standard training (ST) group and a microteaching training (MT) group. The Ethics Committee of Yancheng City Hospital of Jiangsu Province approved this study's measurement protocol (Approval number: 2023-K-100). Additionally, participants signed an informed consent form before participating in the study, which provided them with sufficient detailed information about the survey to make an informed, voluntary, and rational decision to participate.

Participants

This study conducted teaching skill (movement explanation and demonstration skills) training with microteaching intervention. Based on the research objectives and resource limitations, Yancheng Normal University and Huaiyin Normal University were selected for a CRCT. A randomised method was used to divide the two schools into two groups; Yancheng Teachers University was the experimental group, and Huaiyin Normal University was the control group. The experimental group received microteaching training, and the control group received standard training. A total of 54 students with n = 27 per group participated in the experiment.

Measurement of Variables

The present research employed a comprehensive set of validated instruments to measure the efficacy of microteaching training on specific teaching skills based on Shi (2013). It included:

1) Microteaching Skills Assessment Scale

Microteaching skills assessment scales are a standardised tool to rate individual teaching skills observed during microteaching sessions.

2) Grading Ratio Statistical Scale

This scale quantifies teaching performance based on a set grade ratio, allowing for objectively comparing skill proficiency levels.

3) Matrix Calculation

Matrix calculation is a systematic approach to calculating the overall teaching skills score, integrating scores from the microteaching skills assessment scale and grading ratio statistical scale to provide a holistic view of each participant's scores.

Each instrument was carefully chosen for its relevance to the research objectives, proven reliability and validity in prior studies, and ability to provide nuanced insights into the development of teaching skills among physical education students.

Table 1
Instruments Used to Evaluate Teaching Skills

Term	Instruments
Movement explanation skills	Movement Explanation Skills Microtraining Evaluation Form (Shi, 2013)
Movement demonstration skills	Demonstration Skills Microtraining Evaluation Form (Shi, 2013)
Comprehensive scores of Participants in individual teaching skills	1. Grading Ratio Statistical Scale 2. Matrix Calculation (Shi, 2013)

Data Analysis

This study's experimental data was analysed using Statistical Software for Social Sciences (SPSS) version 25. Descriptive approaches were used to check the data quality after the data entry. Data analysis by the researcher happened before data cleaning and hypothesis testing. The statistical significance was assessed by calculating two-tailed p-values at the alpha level of 0.05. Before evaluating the research hypotheses, certain assumptions, such as the normality test and homogeneity test of variance (Levene's test), were conducted. The effectiveness of intervention programs on dependent variables was assessed using the Generalised Estimating Equation (GEE) method since the study was conducted using a cluster design. GEE expands upon the logistic regression model and is a preferred method for conducting CRCT (Offorha et al., 2023). CRCT studies employ GEE for analysis, as Barker et al. (2016) demonstrated. After the GEE analysis, a Bonferroni post hoc test was used to compare the means within and across groups.

Results

Test of Normality

It is essential to check that study variables are normal before doing any statistical analyses, especially for inferential statistics. When data is normal, it follows the normal distribution curve. Normality was checked with the Kolmogorov-Smirnov and Shapiro-Wilk tests. The results showed that most variables had a normal distribution, backed by p-values higher than 0.05.

Table 2
Normality Test of Variables at pre-test and post-test

	GR	Kolmogorov-Smirnova	p value	Shapiro-Wilk	p value
MES.Pre	EG	0.102	.200*	0.945	0.121
	CG	0.112	.200*	0.958	0.276
MES.Post	EG	0.166	0.034	0.886	0.004
	CG	0.100	.200*	0.983	0.898
MDS.Pre	EG	0.113	.200*	0.949	0.161
	CG	0.074	.200*	0.968	0.491
MDS.Post	EG	0.111	.200*	0.927	0.041
	CG	0.111	.200*	0.973	0.62

Homogeneity Test

The results of the homogeneity test on various variables are presented in Table 3. Each variable is accompanied by the Levene statistic, degrees of freedom (df1 and df2), and their respective p-values. The test evaluates the equality of variances between the groups being compared for all research variables, including movement explanation skills (MES) and movement demonstration skills (MDS). The Levene statistic values quantify the extent of variation in variances among groups, with higher values indicating increased heterogeneity. The p-values associated with the observed differences establish the level of significance, where values over a specific threshold indicate no meaningful difference in variances between the groups. These results showed that the two groups have the same variance for all research variables ($p>0.05$).

Table 3
Test of Homogeneity of Variance (Leaven test) for all Research Variables

Variable	Levene Statistic	df1	df2	p-value
MES	0.057	1	58	0.812
MDS	2.738	1	58	0.103

MES: movement explanation skills; MDS: movement demonstration skills;

Comparison between Control and Intervention Groups at the Baseline

Before analysing the data, it is recommended that the assumption for homogeneity of groups be evaluated before conducting the analysis, which shows that groups were at the same level for research outcome at baseline. As a result, the homogeneity of the research variables for the intervention and control groups was assessed as one of the assumptions. An independent t-test was applied for normally distributed variables, while for non-normal variables, the Mann-Whitney U test was used as a non-parametric test to compare two groups. The results (Table 4) of comparing the two groups indicated that there were no significant differences between control and intervention for the variable. Therefore, the pre-test score for this variable was used as a covariate in the analysis of post-test scores.

Table 4
Comparison between Groups for all Research Variables at Baseline

Variable	Group		t/z value	p-value
	EG	CG		
MES	65.43(1.77)	65.17(1.93)	0.548 a	0.586
MDS	68.29(3.83)	68.05(2.91)	0.27 a	0.788

MES: movement explanation skills, MDS: movement demonstration skills
** Significant at 0.05 level, A: t-test, b: Mann-Whitney U test*

Demographic Variables of Control and Intervention Groups

Descriptive data for the demographic factors within the Experimental Group (EG) and the Control Group (CG) are shown in Table 5. Descriptive statistics were used in independent analyses for each group to assess these demographic factors' homogeneity thoroughly. Then, using chi-square tests, a comparison evaluation between the EG and CG was carried out. Gender and age were the two main demographic factors included in the analysis. Regarding gender distribution, the data showed that 9 participants (30%) in the CG and 8 (26.7%) in the EG were classified as female. Accordingly, 21 (70%) and 22 (73.3%) male participants were in

the CG and EG, respectively. When the observed differences were tested using a chi-square test, the p-value was 0.774, meaning there was no statistically significant difference between the gender compositions of the two groups ($\chi 2 = 0.082$).

The participants were divided into three age groups based on their age distribution: 20 years, 21 years, and 22 years. Within the EG, the ages of 8 individuals (26.7%), 21 participants (70%), and one person (3.3%) were recorded as being in their 20s. By contrast, in the same age ranges, the CG consisted of nine participants (30%), 19 people (63.3%), and two participants (6.7%). After doing a chi-square test to assess the importance of age distribution discrepancies between the two groups, no statistically significant difference was found, as indicated by the p-value of 0.782 and $\chi 2$ value of 0.492. It was confirmed that there were no statistically significant differences between the Experimental Group (EG) and the Control Group (CG) based on the study of demographic factors, specifically gender and age.

Table 5
Descriptive Statistics for Demographic Variables in Both Groups

Variable	Level	EG	CG	$\chi 2$	P value
Gender	Female	8(26.7)	9(30)	0.082	0.774
	Male	22(73.3)	21(70)		
Age	20 years	8(26.7)	9(30)	0.492	0.782
	21 years	21(70)	19(63.3)		
	22 years	1(3.3)	2(6.7)		

Effectiveness of Microteaching Training Program on Movement Explanation Skills

The research objective of this study is to assess the effect of microteaching training on movement explanation skills among Chinese university students specialising in physical education. To evaluate the efficacy of the microteaching training program on movement explanation skills, Generalized Estimating Equations (GEE) were utilised. Table 6 presents the descriptive statistics for both groups at the pre-test and post-test stages, precisely the mean and standard error.

Table 6
Descriptive (Mean and SD) Statistics of Movement Explanation Skills

Time	Group	Mean	SE
Pre-test	EG	65.428	0.317
	CG	65.167	0.346
Post-test	EG	82.907	0.780
	CG	81.077	0.228

The results of the Generalised Estimating Equations (GEE), as presented in Table 7, concerning the total score of movement explanation skills among students, revealed significant findings. Firstly, time significantly affected the total score of movement explanation skills ($\chi^2 = 1171.254$, $p < 0.001$), indicating that movement explanation skills exhibited notable changes over time, encompassing the pre-test and post-test assessments. Furthermore, the main effect of the group was found to be significant ($\chi^2 = 5.403$, $p = 0.020$), suggesting a discernible difference between the Experimental Group (EG) and the Control Group (CG) regarding their

movement explanation skills. However, the interaction between time and group was not deemed significant (χ^2 = 2.548, p = 0.108), demonstrating no significant difference between the EG and CG in the patterns of movement explanation skills with time. Regarding movement explanation skills, both groups essentially showed comparable improvement trends from pre-test to post-test assessments.

Table 7
Results of Generalised Estimating Equations (GEE) on Movement Explanation Skills

Source	Wald Chi-Square	df	*p*-value
Time	1171.254*	1	<0.001
Groups	5.403*	1	0.020
Time * Group	2.584	1	0.108

** significant at .05*

In order to evaluate the differences in the movement explanation skills among participants across the time for both groups, the post-hoc test (Bonferroni) was applied (Table 8). Based on the result of the Bonferroni test, the difference in movement explanation skills scores between the pre-test and post-test of both EG and CG were statistically different (p<0.001). These findings highlight substantial improvements in movement explanation skills scores from the pre-test to the post-test for both the EG and CG. Cohen's d values of d=5.36 for the EG and d=9.92 for the CG suggest large effect sizes, indicating considerable improvements in movement explanation skill over time within both groups.

Table 8
Pairwise Comparison of Movement Explanation Skills Score across Time for Both Groups

Group	Test	Mean Difference	SE	*P* value	95%CI for Difference		*Cohen d*
					LB	UB	
EG	Pre Vs post	-17.478	0.866	<0.001	-19.763	-15.194	5.36
CG	Pre Vs post	-15.910	0.449	<0.001	-16.985	-14.835	9.92

In order to evaluate the differences in movement explanation skills scores between groups at both the pre-test and post-test stages, a pairwise comparison was performed. The results (Table 9) indicate no statistically significant difference in movement explanation skills scores between the EG and CG at the pre-test (p = 0.577, Cohen's d = 0.14). However, at the post-test, a significant difference was observed between the groups (p = 0.049), with the EG exhibiting higher mean movement explanation skills scores than the CG. The effect size (Cohen's d = 0.58) suggests a moderate effect, indicating a meaningful difference between groups at the post-test assessment.

Table 9
Pairwise Comparison of Movement Explanation Skills Score between Groups at Pre and Post-test

Group	(I) Test	Mean Difference	SE	P value	95% CI for Difference		Cohen d
					LB	UB	
Pre-test	EG vs CG	0.262	0.469	0.577	-0.658	1.181	0.14
Posttest	EG vs CG	1.830	0.813	0.049	0.008	3.652	0.580

Figure 1 shows the mean score of movement explanation skills across the time, which revealed an increase in both experimental and control groups, while the experimental group had a higher score at the post-test.

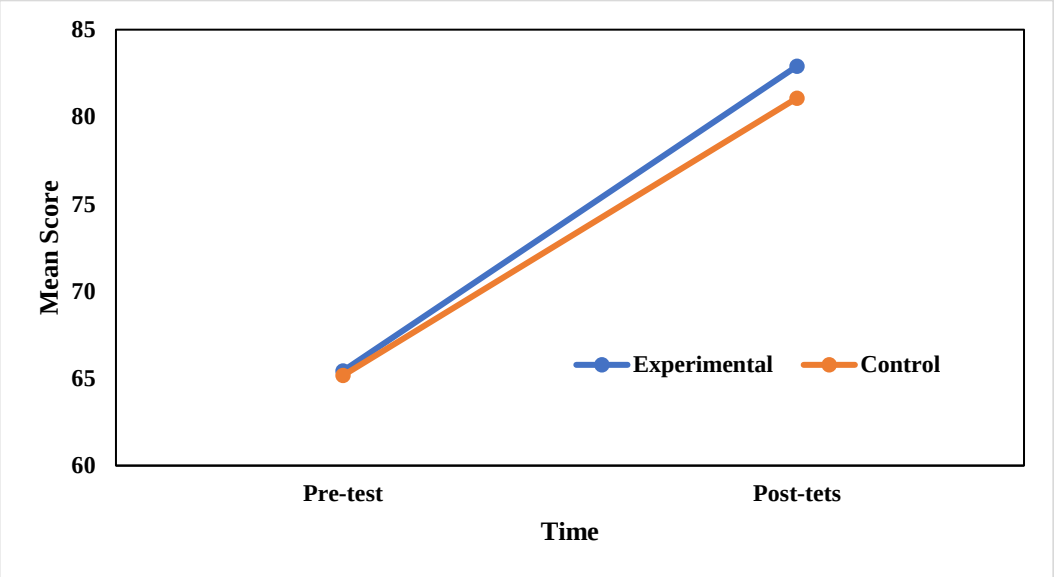

Figure 1: Mean score of Movement Explanation Skills of Experimental and Control Groups across the Time

Effectiveness of Microteaching Training Program on Movement Demonstration Skills

Evaluating the effect of microteaching training on movement demonstration skills in Chinese university students specialising in physical education is the third research objective of this study. Generalised Estimating Equations (GEE) were used to assess the effectiveness of the microteaching training program on movement demonstration skills. The descriptive statistics for both groups at the pre-test and post-test phases are shown in Table 10, precisely the mean and standard error.

Table 10
Descriptive (Mean and SD) Statistics of Movement Demonstration Skills

Time	Group	Mean	SE
Pre-test	EG	68.287	0.687
	CG	68.050	0.522
Post-test	EG	85.173	0.448
	CG	80.717	0.254

Significant findings were found when the Generalized Estimating Equations (GEE) were run on the overall score of students' movement demonstration skills. These results are shown in Table 11. First, the movement demonstration skills total score showed a significant influence of time ($\chi^2 = 879.718$, $p < 0.001$), suggesting significant changes in movement demonstration skills throughout time, including between the pre-test and post-test evaluations. Additionally, the group's main effect was discovered to be significant ($\chi^2 = 21.472$, $p< 0.001$), indicating a distinct difference in the movement demonstration skills of the Experimental Group (EG) and the Control Group (CG). The results indicated a significant variation in the patterns of

movement display skills between the EG and CG with time and a significant interaction between time and group ($\chi^2 = 17.937$, $p < 0.001$).

Table 11
Results of Generalised Estimating Equations (GEE) on Movement Demonstration Skills

Source	Wald Chi-Square	df	p-value
Time	879.718*	1	<0.001
Groups	21.472*	1	<0.001
Time * Group	17.937*	1	<0.001

** significant at .05*

The post-hoc test (Bonferroni) assessed participant differences in movement demonstration skills over time for both groups (Table 12). According to the Bonferroni test results, the difference in movement demonstration skills scores between the pre-test and post-test for both EG and CG was statistically different (p<0.001). These results show significant gains in movement demonstration skills scores for both the EG and CG from the pre-test to the post-test. Furthermore, Cohen's d values of d=5.32 for the EG and d=5.63 for the CG point to sizable effect sizes, showing that both groups' movement demonstration skills improved significantly over time.

Table 12
Pairwise Comparison of Movement Demonstration Skills Score across Time for Both Groups

Group	Test	Mean Difference	SE	*P* value	95%CI for Difference		*Cohen d*
					LB	UB	
EG	Pre Vs post	-16.886	0.824	<0.001	-19.060	-14.713	5.32
CG	Pre Vs post	-12.666	0.560	<0.001	-14.008	-11.325	5.63

A pairwise comparison was done to assess the variations in movement demonstration skills scores across the groups at both the pre-test and post-test phases. The findings (Table 13) show no statistically significant difference between the scores of EG and CG's movement demonstration skills at the pre-test ($p = 0.784$, Cohen's $d = 0.07$). On the post-test, however, there was a significant difference ($p < 0.001$) between the groups, with the EG showing higher mean scores for movement display skills than the CG. The effect size (Cohen's $d = 2.24$) is noteworthy as it indicates a significant difference between the groups at the post-test evaluation, suggesting a big effect.

Table 13
Pairwise Comparison of Movement Demonstration Skills Score between Groups at Pre and Post-test

Group	(I) Test	Mean Difference	SE	*P* value	95%CI for Difference		*Cohen d*
					LB	UB	
Pre-test	EG vs CG	0.237	0.863	0.784	-1.455	1.928	0.07
Post-test	EG vs CG	4.4567b	0.515	<0.001	3.303	5.610	2.24

The mean score for movement demonstration skills over time is shown in Figure 2. It can be seen that both the experimental and control groups saw an increase in the post-test, with the experimental group scoring higher.

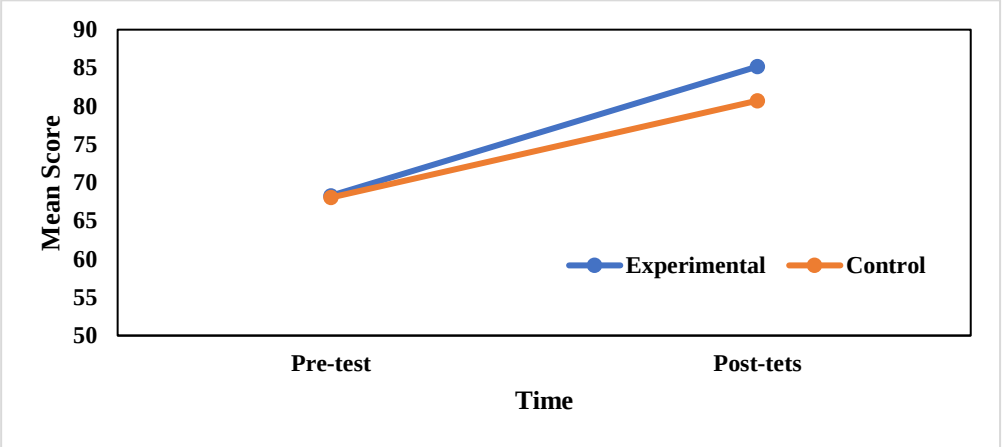

Figure 2: Mean Score of Movement Demonstration Skills of Experimental and Control Groups across the Time

Discussion

To the best of the researcher's knowledge, this is the first study to examine the effect of microteaching training on the explanation and demonstration skills of university students majoring in physical education. As a result, this part aims to evaluate the effect of microteaching training on the explanation and demonstration skills of university students majoring in physical education and compare and analyse results from previous studies. It also discusses how the result can improve students' teaching skills.

Effect of Microteaching on Movement Explanation Skills

The results of the GEE showed a significant effect of time on the total score of movement explanation skills ($p < 0.001$), indicating that movement explanation skills exhibited notable changes over time and considerably in the improvements of movement explanation skills over time within EG and CG. Pairwise comparison results showed no statistically significant difference in movement explanation skills scores between EG and CG at the pretest ($p>0.05$). However, at the post-test, a significant difference was observed between the groups ($p <0.05$), with EG exhibiting higher mean movement explanation skills scores than CG.

Pairwise comparison results proved no statistically significant difference in the movement explanation skills scores of the groups during the pre-test ($p>0.05$). After a 12-week training period, the two groups' energy-saving scores for movement explanation skills differed significantly ($p <0.05$). The difference was that EG showed higher movement explanation skills scores than CG. Due to this finding, the hypothesis that microteaching can significantly improve the movement explanation skills of physical education university students was verified. These findings indicated that both microteaching and standard training methods improved students' movement explanation skills, but the effect of microteaching training was more significant than standard training.

When using standard teaching methods to train students' teaching skills, the teacher pointed out most students' problems (Shulman, 1987). Some problems could be understood by the students at once, but other problems were complex for students to understand and understand at once (Rosenshine, 2012; Li, 2013). Regarding the timing of explanations, key points, and methods of explanation, the teacher repeatedly pointed out that students also needed several experiences before they could gradually understand and correct them (Hattie et al., 2011; Joyce et al., 2002; Wang et al., 2021). The timing and manner of feedback are crucial in helping students refine their skills and improve their understanding (Peterson et al., 1978).

Microteaching can effectively solve these problems, as determined by its characteristics. Microteaching uses audio-visual technology to repeat and reproduce the teaching situation many times, allowing students to change from the perspective of "authorities" to the perspective of "bystanders" to find their problems in the explanation process (Allen & Ryan, 1969; Li, 2013). Hearing or seeing errors in explanations directly deepens individual impressions of the mistakes, especially when faced with more complex information transmitted through others (teachers), which are challenging to understand, such as when explaining the essentials of movements (Remesh, 2013). Whether the key points and difficulties are grasped and the explanation time is appropriate, coupled with the teacher asking questions through videos and providing professional explanations, this additional feedback in various ways can quickly promote the improvement of students' explanation skills (Amobi, 2005; Kusmawan, 2017). The teaching effect significantly differed from standard teaching because of microteaching's advantages and teaching characteristics.

Effect of Microteaching on Movement Demonstration Skills

The GEE results showed a significant effect of time on the total score of movement explanation skills ($p < 0.001$), indicating that movement explanation skills exhibited notable changes over time, encompassing the pre-test and post-test assessments. The Bonferroni test results confirmed considerable improvements in movement explanation skills over time within both groups. The pairwise comparison results illustrated no significant difference in the movement demonstration skill scores of the two groups ($p>0.05$) in the pre-test. After the 12-week training period, there was a significant difference between the two groups (($p < 0.001$). Compared to CG, EG experienced higher scores on movement demonstration skills. Due to this finding, the hypothesis that microteaching training can significantly improve the movement demonstration skills of college students majoring in physical education was verified. These findings indicated that both microteaching and standard training methods improved students' action explanation skills, but the effect of microteaching training was more significant than standard training.

Microteaching training has outstanding advantages in action demonstration skills. The advantages are mainly related to the characteristics of microteaching. In microteaching, students who are teaching can observe a variety of their behaviours through the mirror effect of a teaching video, such as whether the demonstration movements are standardised and graceful, the demonstration position is in place, the demonstration surface is reasonable, the demonstration timing is accurate, and the demonstration sound and volume are appropriate (Kpanja, 2001; Xiao & Meng, 2014; Chen, 2017). This kind of direct observation can produce a better first impression and becomes deeply engraved in the students' minds. When students

see that their actions are not standard, they will feel embarrassed, which makes them determined to correct them (Amobi, 2005). The increase in information feedback channels, deepening of first impressions, and dissatisfaction with one's movements will improve students' movement demonstration and presentation skills (Gall, 1996; Ralph, 2014; Chen, 2017). The teaching effect and efficiency significantly improve with the teacher's guidance. Compared with microteaching, standard teaching can only guide students' skills by asking questions multiple times and emphasising how to improve. It has a single information channel, and the teaching effect and efficiency are usually worse than microteaching (Ralph, 2014; Ma et al., 2014; Ding, 2021).

Conclusions

The training used in microteaching is a sub-skill training to make teaching skills more perfect. Both microteaching and standard teaching improve the teaching skills of physical education majors, but the training effect of microteaching is better than standard teaching.

(1) The groups' movement explanation skills have significantly improved. However, there is a significant difference in the score of comprehensive teaching skills between the two groups, and the effect of microteaching training is better than standard teaching.
(2) The groups improved their movement demonstration skills significantly. However, there is a significant difference in the scores of comprehensive teaching skills between the two groups, and the effect of microteaching training is better than standard teaching.

Future Research

Based on the findings, several recommendations for future research are listed.

(1) This study only verified the effect of microteaching training on movement explanation skills and movement demonstration skills in physical education. Future studies need to verify the effect of microteaching training on other teaching skills in physical education, such as introduction, questioning, body language, and lesson-closing skills. The current research results do not indicate whether microteaching will affect introduction, questioning, body language, or lesson-closing skills. This focus may be an aspect that needs to be supplemented in future research.
(2) This study did not explain the effect of students' personality characteristics on the formation of physical education teaching skills. As every student has personality characteristics, future research should focus on developing teaching skills training methods based on students' personality characteristics to optimise students' physical education teaching skills.

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