



# Understanding the Influence of Combined Teaching Styles on Football Passing Performance among PETE Freshmen Students

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## Abstract

**Background.** The selection and effectiveness of teaching styles have been the focus of previous investigations. Therefore, further studies are needed to broaden the spectrum of teaching styles by exploring their combinations.

**Objectives.** This study aimed to investigate the influence of different teaching styles, specifically inclusion, guided discovery, and combined guided discovery-practice, on football passing performance among freshmen students enrolled in a Physical Education Teacher Education (PETE) program.

**Materials and methods.** The sample comprised 66 male first-year students enrolled in the Basic Football Skills course for the 2024/2025 academic year at the Physical Education Study Program, Universitas Cenderawasih, Indonesia. The participants were randomly assigned to one of inclusion, guided discovery, and combined guided discovery-practice groups, with each group consisting of 22 students. After confirming the necessary assumption, one-way ANOVA was conducted at a 0.05 confidence level, followed by a post hoc Tukey test.

**Results.** Each teaching style group showed an improvement in passing performance, confirming a significant influence of teaching style implementation on football passing performance among PETE freshmen students. One-way ANOVA revealed substantial differences among the groups ( $p < 0.05$ ). After teaching style implementation, combined-GDP had the fastest passing performance time (67 seconds), compared to guided discovery (87 seconds) and inclusion (96 seconds). Furthermore, the results indicated that combined guided discovery-practice led to a better passing performance.

**Conclusions.** The findings of this study emphasized the effectiveness of combining teaching styles to enhance football passing performance among PETE freshmen students. Combined guided discovery-practice resulted in a better passing performance compared to guided discovery and inclusion styles. Therefore, combining teaching styles could help maximize the benefits and mitigate the limitations of individual teaching styles, typically leading to improved learning outcomes.

**Keywords:** combined teaching styles, inclusion, guided discovery, passing performance.

## Introduction

Physical education (PE) is an educational process that uses physical activity to produce holistic individual well-being. PE contributes to the development of students' fundamental movement skills and physical competencies while simultaneously supporting social skills and behavioral growth (Bailey, 2006). Comprehensive studies have reviewed that PE improves student's physical activity levels and movement skills (Dudley et al., 2011). In addition, it serves as an effective tool for promoting lifelong physical activity,

contributing to good health and an active lifestyle (Ahmed & Al Salim, 2024).

In recent years, there has been growing concern about the declining levels of physical activity among young people. Physical activity levels in many societies are worryingly low across both adult and youth populations (Wintle, 2022). A study showed that managerial strategies should be applied to increase millennial participation in physical activity and sports (Sudharma, Asmawi, & Lubis, 2025). The key role of PE teachers in addressing young people's disengagement from physical activity has also been emphasized, consequently leading to lifelong benefits (Hein et al., 2012). Therefore, teachers employing more effective teaching styles can significantly improve students' engagement in physical

activity. The results confirmed the importance of teaching styles in PE classes (Rivas & Espada, 2021).

Mosston's Spectrum of teaching styles established a framework for possible relationships between teachers and students, emphasizing the central role of decision-making (Goldberger, Ashworth, & Byra, 2012). The spectrum includes eleven teaching styles, namely command, practice, reciprocal, self-check, inclusion, guided discovery, convergent discovery, divergent discovery, learner-designed individual program, learner-initiated, and self-teaching (Mosston & Ashworth, 2008). These styles are categorized based on the extent the teachers or students assume responsibility for the lesson. The five styles are classified as reproduction, where instruction focuses on replicating specific known skills and knowledge. The remaining six fall under production, where students are encouraged to discover new information, often unknown even to the teachers. This requires cognitive engagement in processes such as problem-solving, inventing, comparing, contrasting, and synthesizing (Chatoupis & Vegenas, 2018).

Experts have extensively studied the influence of teaching styles on learning outcomes, particularly in physical education and sports science, since the development of Mosston's Spectrum. Studies on teaching methodologies have been among the most analyzed topics in PE (Leo et al., 2023). Furthermore, the reproductive styles have proven effective in improving skill performance. An experimental study found that reciprocal style significantly improved basketball skills, such as jump shoot and dribbling (Alhayek, 2012). Similarly, inclusion style has improved volleyball skills, including finger passing, forearm passing, and underhand serving. Maria (2014) reported that direct method presented better results in developing movement skills among children aged 12 to 14. According to Dudley et al. (2011), command styles effectively increased children's physical activity levels and improved movement skill proficiency in primary schools. Inclusion style is specifically recommended for classes with participants who have special needs, such as dyslexia (Chatzipanteli, Konstantinidou, & Fotiadis, 2022).

Acting as a complement, production styles promote the development of motor coordination in relation to psychological factors. Morgan, Kingston, & Sproule (2005) emphasized that guided discovery fostered cognitive and affective responses compared to practice style. A recent study by Monacis et al. (2023) examining the effects of reproductive and productive teaching style interventions found that productive teaching styles significantly impacted self-perception and enjoyment of physical activity.

Few studies have begun to explore the combination of teaching styles. For instance, Cuellar-Moreno (2016) investigated the use of mixed reciprocal and guided discovery in teaching dance to primary school students. The results showed that the mixed style effectively improved technique and motor skills, comparable to command styles, while being more effective in strengthening students' attention capacity, satisfaction, and appropriate behavior. Similarly, Invernizzi et al. (2019) confirmed that a combination of teaching styles effectively improved fitness levels and motor competence, while also fostering enjoyment, physical activity levels, and students' perceptions of PE lessons in primary school children.

Based on discussions, this study aimed to compare the effectiveness of two teaching styles, namely inclusion

and guided discovery, lying at the threshold between reproduction and production styles, in improving motor skill abilities. To achieve this objective, an element of repetition was incorporated into the productive style by combining guided discovery with practice style to improve motor skill development more effectively.

Investigations on teaching styles in physical education have primarily focused on participants from PE classes. Moreover, studies involving teachers and prospective teachers remain limited. PETE programs are responsible for preparing future PE teachers (Davis, 2019). Recently, the program has faced numerous challenges, including mastering technology, foreign languages, diverse teaching skills, and professional development (Ward & van der Mars, 2020). Teachers also require psychological capital and social support to create a holistic PE teaching model (Jannah et al., 2024). Consequently, an experimental study was conducted on PETE students, who were prospective PE teachers. Mastery of basic sports movement skills is essential for prospective PE teachers. Therefore, the first year of PETE curricula generally introduced courseworks in Exercise and Sport. The Basic Football Skill course is one of the compulsory courses offered in the first semester at the Physical Education Study Program, Universitas Cenderawasih. One of its key learning outcomes is acquiring fundamental technical skills, including passing techniques. The objective of this study was to analyze the influence of different teaching styles, namely inclusion, guided discovery, and combined guided discovery-practice (combined-GDP), on football passing performance among PETE freshmen students at Universitas Cenderawasih, Indonesia. Based on discussions, the following study questions were proposed:

1. Does the implementation of different teaching styles have a significant influence on passing performance among PETE freshmen students?
2. Which teaching style can achieve a better passing performance among PETE freshmen students?

## Materials and Methods

### Study Participants

A quasi-experimental design was used in the Physical Education Study Program at Universitas Cenderawasih, Indonesia to achieve the objectives. A total of 66 male freshmen enrolled in the Basic Football Skills course during the first semester of the 2024/2025 academic year actively participated. In this study, all participants were randomly assigned to either inclusion, guided discovery, or combined guided discovery-practice group, with each consisting of 22 students. All participants provided informed consent, and the procedures received approval from the Health Research Ethics Committee of the Health Polytechnic of Jayapura (No. 168/KEPK-J/XII/2024).

### Study Organization

Football passing performance was assessed at both the beginning and end of the experimental teaching unit using the Loughborough Soccer Passing Test (LSPT) developed by Ali et al. (2007). During the test, participants were required to pass toward a target board following specific instructions



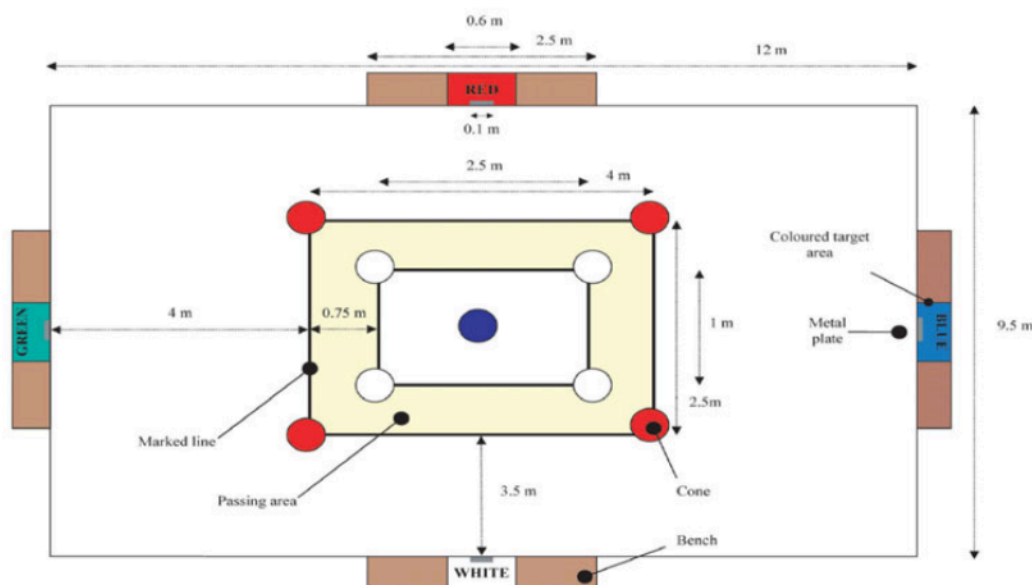


Fig. 1. Schematic representation of the LSPT; Copyright from Ali et al. (2007)

provided by Examiner 1, who was the only one aware of the predetermined passing sequence. Examiner 2 was responsible for recording penalty time points accumulated during the trials. Penalty time was assigned for the following errors: 5 s for missing the target completely or passing to the wrong target; 3 s for missing the color target area; 3 s for handling the ball; 2 s for passing the ball from outside the designated passing area; 2 s for the ball touching any cone; 1 s for each additional second besides the allocated 43 seconds to complete the test; and 1 s deducted from the penalty time when the ball hit the colour target. The final test score was calculated as the total time taken to complete the 16 passes, including any penalty time. A schematic representation of the LSPT is presented as follows.

A simple randomization procedure was applied to assign three classes into inclusion, guided-discovery, and combined guided discovery-practice (combined GDP) groups. Teaching units are described in Table 1.

**Table 1.** Teaching style descriptions

Inclusion	Teachers prepare a series of passing lessons, progressing from simple to complex levels. Students select a starting point from the available passing lessons and continue with the next level until all lessons are completed.
Guided Discovery	Teachers set learning targets for passing techniques and provide guidance through problem statements. Students think independently, make decisions, and execute passing techniques.
Combined GDP	Teachers set learning targets for passing techniques and provide guidance through problem statements. Students think independently, make decisions, and execute passing techniques. After students develop an understanding of passing, teachers provide direct guidance, followed by repetitive passing exercises to improve skills.

### Statistical analysis

The hypotheses were tested using one-way ANOVA, with a confidence level of 0.05. Before conducting variance analysis, assumption tests, including Shapiro-Wilk normality and Levene's homogeneity tests, were performed. Moreover, a Turkey post hoc test was conducted for multiple comparisons. All statistical analyses were performed using SPSS version 25 (SPSS Inc., Chicago, Illinois, USA).

### Results

Shapiro-Wilk normality test was conducted to determine whether the data followed a normal distribution before performing inferential statistical analysis. The significance value for all groups was greater than 0.05, confirming that the data were normally distributed. Furthermore, Levene's test resulted in  $0.688 > 0.05$ , confirming that the data were homogenous. These assumption tests validated the use of the data for hypothesis testing.

Before the study began, a preliminary LSPT was conducted to determine whether the groups were statistically different from one another. Since the study involved three different groups, one-way ANOVA was performed to assess the equivalence of students' passing skills before the intervention. The results, presented in Table 2, showed that the initial passing performance was similar across all groups before teaching process began ( $p > .05$ ).

**Table 2.** One-Way ANOVA Analysis of Pre-test Passing Performance

	Sum of Squares	df	Mean square	F	p
Between Groups	1136.455	2	567.337	2.068	0.135
Within Groups	17306.818	63	274.711		
Total	18443.273	65			

A dependent t-test was conducted to evaluate changes in passing performance within each group after

**Table 3.** Comparison of Pretest-Post-test Mean in Passing Performance from Different Teaching Styles

Teaching Styles Group	Pre-Test	Post Test	Mean Difference	SD	SE	t	p
Inclusion	111.50	96.318	15.1818	9.7083	2.069	7.335	0.000
Guided discovery	102.50	87.64	14.864	11.618	2.477	6.001	0.000
Combined GDP	102.91	67.41	35.500	14.796	3.155	11.254	0.000

the implementation of teaching styles. Based on Table 3, the mean difference showed a decrease in LSPT total scores, confirming an improvement in football passing performance. The t-value and significance level confirmed a statistically significant difference in passing skills before and after teaching process.

Based on Table 4, another one-way ANOVA was conducted to compare passing performance among the groups after teaching style implementation. The results showed that passing performance significantly differed between the groups ( $p < 0.05$ ).

**Table 4.** One-Way ANOVA Analysis of Post-test Passing Performance

	Sum of Squares	df	Mean square	F	p
Between Groups	9681.848	2	4840.924	25.630	0.000
Within Groups	11899.182	63	188.876		
Total	21581.030	65			

A post-hoc test was conducted to further investigate the differences between groups. This test was performed on the total post-test scores to determine the group with significant differences in passing performance. The results showed that each group differed significantly from the others ( $p < 0.05$ ). Therefore, a post-hoc analysis was necessary to identify where the differences occurred. Tukey post-hoc test was used due to the balanced data (Lee & Lee, 2018).

**Table 5.** Pairwise comparison of the final passing performance in different teaching style groups

I (Teaching Styles)	J (Teaching Styles)	Mean Difference (I-J)	SE	p
Inclusion	Guided discovery	8.682*	3.488	.016
	Combined GDP	28.909*	3.488	.000
Guided discovery	Inclusion	-8.682*	3.488	.016
	Combined GDP	20.227*	3.488	.000
Combined GDP	Inclusion	-28.909*	3.488	.000
	Guided discovery	-20.227*	3.488	.000

\*  $p < 0.05$

Table 5 presents the pairwise comparisons of the final passing performance across different teaching style groups. The comparisons showed statistically significant differences ( $p < 0.05$ ).

## Discussion

This study aimed to investigate the influence of different teaching styles, namely inclusion, guided discovery, and

combined guided discovery-practice (combined-GDP), on football passing performance. Variance analysis of initial passing performance confirmed that all students had similar passing skills before teaching intervention. The pre-test passing performance, measured using LSPT, showed mean values of 111.50, 102.50, and 102.91 seconds for inclusion, guided discovery, and combined-GDP groups, respectively. Since LSPT performance was based on total test completion time, including penalties for errors, lower scores confirmed better performance.

Several studies have used LSPT to differentiate performance levels among players although explicit clustering analyses of LSPT scores are limited. For instance, a study on adolescent football players classified participants based on skill level, reporting elite players with an average completion time of approximately 40 seconds, sub-elite players at 58 seconds, and non-elite players at 67 seconds (Moal et al., 2013). Another study evaluating LSPT performance among beginner-level adolescent football players found that competitive players completed the test in approximately 62 seconds, while recreational players required around 72 seconds (McDermott, Burnett, & Robertson, 2015). A study on male college students reported an average LSPT completion time of 74 seconds, with times exceeding 80 seconds under fatigue conditions (Lyons, Al-Nakeeb, & Nevill, 2006). In the current study, pre-test LSPT scores showed poor passing performance when compared to both soccer players and university-level students from previous investigations. The results showed freshmen PETE students at Universitas Cenderawasih lacked basic football techniques upon entering physical education program. This corresponded to the learning outcomes of the Basic Football Skills course, aiming to equip students with basic football techniques, including passing skills.

Each group showed an increase in passing performance after implementing different teaching styles, as expressed by pretest-posttest t-values of 7.335, 6.001, and 11.254 for inclusion, guided discovery, and combined-GDP, respectively. The results addressed study question #1, confirming that teaching style implementation significantly influenced passing performance among PETE freshmen students. To address study question #2, Tukey post-hoc test showed that the three-teaching styles resulted in different performance outcomes. Combined-GDP showed a highly significant difference compared to both inclusion and guided discovery groups with a significance value equal to 0. Meanwhile, the difference between inclusion and guided discovery was  $p = 0.016$ . Although this value still confirmed a statistical difference, p-values between 0 and 0.05 reflected varying degrees of significance (Lee & Lee, 2018). Therefore, the answer to study question #2 was that combined-GDP produced the best passing performance, followed by guided discovery, and inclusion. Combined-GDP helped students achieve performance levels comparable to non-elite players



(approximately 67 seconds), while guided discovery achieved performance similar to typical university students (87 seconds). Despite significant improvements, students taught using an inclusive style performed at a lower level (> 90 seconds).

The significant improvement in inclusion group can be attributed to the physicality and cognitive involvement of students, in line with a study conducted on university students in the USA (Sanchez, Byra, & Wallhead, 2012). However, observations showed students in inclusion group tended to select easier and less challenging lesson sequences, in line with (Chatoupis & Emmanuel, 2003). This might explain why, despite significant post-test improvements, inclusion group's mean post-test score remained the lowest compared to the other groups.

Regarding the guided discovery teaching style, previous studies have also shown its effectiveness in improving kinetic satisfaction and performance (Mahmoud, 2018), as well as motor skills (Newell & Rovegno, 2021). The results corresponded with a report that guided discovery promoted cognitive and affective responses (Morgan, Kingston, & Sproule, 2005). Studies comparing guided discovery to traditional command teaching styles found that guided discovery produced superior skill retention (Khouri et al., 2020). Although guided discovery encouraged students to explore and find solutions independently, this style could present challenges for students with limited motor skills. According to Newell & Rovegno (2021), careful task design and teachers guidance are essential for ensuring the effectiveness of guided discovery, particularly for learners with varying skill levels. Moreover, recent studies reported that its effectiveness depended on learners' initial skill levels (Moreno-Murcia, De Paula-Borges, & Trinidad, 2024). Students with lower initial competence may require more structured guidance to fully benefit from guided discovery methods.

Finally, the faster passing performance time of combined-GDP compared to inclusion and discovery learning groups further supported the conclusion that teaching style was the most effective for improving passing performance among PETE freshmen students. This study emphasized how incorporating repetition elements could address the limitations of guided discovery, particularly for students with poor initial skills. The optimized results showed that by the end of the learning process, PETE freshmen students could reach performance level of non-elite players.

## Conclusions

In conclusion, this study showed the combination of teaching styles was crucial for physical education teachers to improve student's learning achievements. Despite the wide teaching spectrum, combining different teaching styles could help balance the respective strengths and weaknesses. The results showed that while each teaching style contributed to improving performance, particularly in passing motor skills, a combination of teaching styles produced even more significant results. Combined-GDP specifically led to better passing performance outcomes compared to guided discovery and inclusion. Therefore, teachers should be well-versed in various teaching styles and understand how to effectively combine and adapt the styles to create new methods for supporting desired learning objectives.

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## Conflict of Interest

The authors declare no conflicts of interest.

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# Розуміння впливу комбінованих стилів викладання на результативність виконання пасів у футболі серед студентів-першокурсників програми підготовки вчителів фізичного виховання

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Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; Е – збір коштів

Реферат. Стаття: 7 с., 5 табл., 1 рис., 32 джерела.

**Історія питання.** Вибір та ефективність стилів викладання перебували у фокусі уваги попередніх досліджень. Тому необхідно провести подальші дослідження для розширення спектру стилів викладання шляхом вивчення їхніх комбінацій.

**Мета дослідження.** Це дослідження мало на меті вивчити вплив різних стилів викладання, зокрема, інклюзії, методики керованого відкриття та практики комбінованого керованого відкриття, на результативність виконання пасів у футболі серед студентів-першокурсників, які навчаються за програмою підготовки вчителів фізичного виховання (ПВФВ).

**Матеріали та методи.** Вибірка складалася з 66 студентів-першокурсників чоловічої статі, зарахованих на курс із засвоєння базових футбольних навичок у 2024/2025 академічному році за навчальною програмою «Фізичне виховання» в університеті Чендеравасі, Індонезія. Учасників було розподілено за методом рандомізації до груп інклюзії, керованого відкриття та практики комбінованого керованого відкриття, кожна з яких налічувала 22 студенти. Після підтвердження необхідних умов було проведено однофакторний дисперсійний аналіз з рівнем достовірності 0,05, після чого застосовано post hoc тест Тьюкі.

**Результати.** Кожна група, що навчалася за певним стилем викладання, продемонструвала покращення показників виконання пасів, що підтверджує значний вплив застосування стилю викладання на результативність передач у футболі серед студентів-першокурсників програми ПВФВ. Однофакторний дисперсійний аналіз виявив суттєві відмінності між групами ( $p < 0,05$ ). Після впровадження стилю викладання встановлено, що група, в якій застосовувалася практика комбінованого керованого відкриття мала найшвидший показник часу щодо результативності виконання пасів (67 секунд), порівнюючи з групами керованого відкриття (87 секунд) та інклюзії (96 секунд). Крім того, результати показали, що впровадження практики комбінованого керованого відкриття забезпечило поліпшення результативності виконання пасів.

**Висновки.** Результати цього дослідження підкреслили ефективність поєднання стилів викладання з метою підвищення результативності виконання передач у футболі серед студентів-першокурсників програми ПВФВ. Застосування практики комбінованого керованого відкриття призвело до покращення результативності виконання пасів, порівнюючи зі стилями керованого відкриття та інклюзії. Таким чином, поєднання стилів викладання сприятиме максимізації переваг і зменшенню обмежень щодо впровадження окремих стилів викладання, що, як правило, призводить до поліпшення результатів навчання.

**Ключові слова:** комбіновані стилі викладання, інклюзія, кероване відкриття, результативність виконання пасів.

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