Learning models, self-efficacy, and the influence on students' learning outcomes of basic techniques in soccer

Modelos de aprendizaje, autoeficacia e influencia de las técnicas básicas del fútbol en los resultados de aprendizaje de los estudiantes

Authors

Iyan Nurdiyan Haris [1]
Mesa Rahmi Stephani [2]
Ernawati [3]
Tri Maniarta Sari[4]
Riezka Eka Mayasari[5]
Basrawi[6]
Syarif Hidayat Nasir[7]
Irsan Rahman[8]
Syamsul Rijal[9]
Muh. Nurtanzis Sutoyo[10]

[1, 3, 4, 5, 6, 7, 8, 9, 10] Universitas Sembilanbelas November (Indonesia)
[2] Universitas Pendidikan Indonesia (Indonesia)

Corresponding author:
Iyan Nurdiyan Haris
iyanhariss@usn.ac.id

How to cite in APA

Nurdiyan Haris, I., Rahmi Stephani, M., Ernawati, E., Maniarta Sari, T., Eka Mayasari, R., Basrawi, B., Hidayat Nasir, S., Rahman, I., Rijal, S., & Nurtanzis Sutoyo, M. (2025). Learning models, self-efficacy, and the influence on students' learning outcomes of basic techniques in soccer. *Retos*, *65*, 686–697. https://doi.org/10.47197/retos.v65.111243

Abstract

Introduction: Whilst many studies have explored various learning models in physical education, their implementation often pays little attention to the development of affective abilities, including the lack of grouping affective skills into different levels.
Objective: Therefore, the current work is aimed at analyzing how different learning models affect the learning progress of basic soccer techniques at different levels of self-efficacy ability.
Methodology: This study applied a two-way factorial experimental design, dividing learning methods into two groups: peer tutoring and demonstration. In addition, the motor ability level was divided into two categories: high and low. A total of 60 junior high school students, grade 7, were selected through cluster random sampling to participate in the study. The participants in this study were divided into four groups that received treatment for about six weeks. Data regarding self-efficacy ability were collected through a self-efficacy scale, while data regarding basic skills in soccer were taken from the Johnson soccer test, including passing, dribbling, and shooting. Afterwards, the data were analyzed using two-way factorial ANOVA and followed by Tukey's post-hoc test.
Results: The results shows that the modeling-based inquiry learning model resulted in higher learning levels than the inquiry learning model ($P < 0.05$). In addition, there was a significant interaction between the two learning models and the level of self-efficacy ability ($P < 0.05$).
Conclusions: Finally, the modeling-based inquiry learning model proved to be more effective than the inquiry learning model for students with high self-efficacy ability level ($P < 0.05$).

Keywords

Physical education; inquiry learning model; modeling; self-efficacy; basic soccer techniques.

Resumen

Introducción: Muchos estudios han explorado varios modelos de aprendizaje en educación física, pero su implementación a menudo presta poca atención al desarrollo de las habilidades afectivas, incluida la falta de agrupamiento de las habilidades afectivas en diferentes niveles.
Objetivo: Por lo tanto, el propósito de este estudio es analizar cómo los diferentes modelos de aprendizaje afectan el progreso del aprendizaje de las técnicas básicas del fútbol en diferentes niveles de capacidad de autoeficacia.
Metodología: Este estudio aplicó un diseño experimental factorial de dos vías, dividiendo los métodos de aprendizaje en dos grupos: tutoría entre pares y demostración. Además, el nivel de habilidad motora se dividió en dos categorías: alto y bajo. Un total de 60 estudiantes de secundaria, grado 7, fueron seleccionados a través de un muestreo aleatorio por conglomerados para participar en el estudio. Los participantes en este estudio se dividieron en cuatro grupos que recibieron tratamiento durante aproximadamente seis semanas. Los datos sobre la capacidad de autoeficacia se recopilaron a través de una escala de autoeficacia, mientras que los datos sobre las habilidades básicas en el fútbol se tomaron de la prueba de fútbol de Johnson, incluidos los pases, el regate y el tiro. Posteriormente, los datos se analizaron utilizando ANOVA factorial de dos vías y seguido de la prueba post-hoc de Tukey.
Resultados: Los resultados muestran que el modelo de aprendizaje basado en la indagación resultó en niveles de aprendizaje más altos que el modelo de aprendizaje basado en la indagación ($P < 0,05$). Además, hubo una interacción significativa entre los dos modelos de aprendizaje y el nivel de capacidad de autoeficacia ($P < 0,05$).
Conclusiones: Además, el modelo de aprendizaje basado en la indagación demostró ser más eficaz que el modelo de aprendizaje basado en la indagación para estudiantes con un alto nivel de capacidad de autoeficacia ($P < 0,05$).

Palabras clave

Educación física; modelo de aprendizaje basado en la indagación; modelado; autoeficacia; técnicas básicas de fútbol.

Introduction

One of the aims of physical education is to encourage physical activity and sport as a learning objective. Furthermore, it contributes to students' cognitive and social well-being (Santoso & Santoso, 2024). In this subject students are encouraged to engage in a variety of sporting activities, both individually and in teams. This gives them the opportunity to develop positive values both as individuals and as part of a team (Wong & Oh, 2023). Many sports encourage positive values, with soccer being one frequently taught in junior high school physical education classes. Soccer not only teaches physical skills and coordination, but also values such as teamwork, discipline, leadership and hard work. Therefore, through participation in soccer and other sports, students can develop social skills and positive values that will help them in their daily lives. Soccer learning can help students develop motor skills and sport-specific movement patterns (Kokstejn et al., 2019). Additionally, according to Sepdanius et al., (2024), basic movement skill could be significantly ehanced through using problem-based learning, which has important relevance in learning basic soccer techniques (Suherman & Nugroho, 2022). Therefore, it is essential for each student to learn and gain hands-on experience through real game scenarios. Nevertheless, often the teaching done by physical education teachers is considered an unsatisfactory experience by most students. This leads to a decrease in interest and participation in physical activity and sports during childhood and adolescence. (Haerens et al., 2015). As such, physical education experts and practitioners have paid serious attention to this (Belansky et al., 2016). This means that the learning model applied in physical education lessons has been considered a barrier to students' development in understanding the concept and mastery of sports skills, including psychomotor, cognitive and affective dimensions (Abdulla et al., 2022). The latter approach indicates that students should not be left to learn alone (Trendowski & Woods, 2015; Goodyear & Dudley, 2015). Other reports have also proposed various effective learning models to improve learning outcomes (Fuaddi et al., 2020), including student-centered learning (Metzler, 2017) and inquiry-based learning (Simonton et al., 2021)

The 2013 curriculum, which is grounded in the scientific method, requires the use of learning models that lead to scientific, one of which is the inquiry learning model, including in PE learning. The inquiry learning model is a learning model that uses the problem-solving process as a learning approach. The inquiry learning model "the teacher frames the problem by using questions, giving students some time to create and investigate one or more solutions or answers that make sense", further stated that the inquiry learning model in addition to being able to develop cognitive and psychomotor students is also able to develop affective students (Metzler Michael W., 2017). Other research also shows that the inquiry learning model can improve students' critical thinking skills and learning outcomes (Østergaard, 2016).

In addition to the inquiry learning model, modeling also has an impact on improving student learning outcomes. Theories and research findings indicate that peer modeling involving multiple individuals (multiple models) is more effective in enhancing student learning outcomes than modeling conducted by a single individual (single model). For example, Perry and Bussey say that modeling by more than one person (multiple modeling) will strengthen vicarious experience, which will improve learning outcomes (Bandura, 2021). Indicator modeling and teacher support are crucial in improving student learning outcomes (Sparks et al., 2016). Modeling-assisted learning influences students' gymnastics performance in Tunisia (Bouazizi et al., 2014).

The relationship between self-efficacy and learning outcomes is explained by several studies as a very close relationship (e.g., Ihsan et al., 2024). The results show that students with good self-efficacy are able to bring encouragement from within themselves to do positive things, especially in terms of behavior change and learning outcomes (Phan, 2012). Self-efficacy can accurately predict students' academic achievement or learning outcomes. This information about self-efficacy can also be utilized by teachers and educational technicians to select learning models that have an effect in stimulating an increase in self-efficacy (Lane et al., 2004). The involvement of self-efficacy also occurs in the decision-making process and the development of soccer players (Musculus et al., 2018). Self-efficacy and soccer skills also influence the student learning experience (Zulkifli & Kulinna, 2018). Another impact of self-efficacy in the learning process is to familiarize students with good time management in doing assignments. Students with high self-efficacy are able to select relevant and important information without spending a long time. They are able to set the priority scale of each task given. Those with high self-efficacy are also able to develop strategies in developing cognitive abilities as well as metacognitive abilities (practice,

elaboration, organization, critical thinking, and self-regulation) (Komarraju & Nadler, 2013). The advantages of students with high self-efficacy levels are also able to effectively use the resources they have including time, learning environment, seeking learning assistance, and learning strategy rules. All of these abilities have an impact on high final learning scores (Zimmerman & Kitsantas, 2005).

To the best of our knowledge, very few studies have investigated the application of different learning models based on the level of self-efficacy on the learning outcomes of basic football techniques in the context of physical education. Football, as one of the most popular sports globally, plays a crucial role in students' physical and psychosocial development. It promotes cardiovascular fitness, motor skills development, teamwork capabilities, and strategic thinking among students (Bonetti et al., 2024; Krustrup et al., 2018). Moreover, football serves as an effective medium for character building, social interaction, and the development of essential life skills such as leadership, communication, and decision-making (Bessa et al., 2019; Fransen et al., 2015).

Earlier research in this field has encountered several limitations. First, most studies have focused primarily on the technical aspects of football without considering the psychological factors, particularly self-efficacy, that significantly influence learning outcomes (Bandura & Schunk, 1981). Second, existing research has largely examined traditional teaching methods, leaving a gap in understanding how modern pedagogical approaches like modeling-based inquiry and inquiry-based learning might enhance football skill acquisition (Sierra-Díaz et al., 2019). Third, there is limited understanding of how different learning models might interact with students' self-efficacy levels in the specific context of football instruction (González-Víllora et al., 2019). Fourth, most studies have been conducted in specialized sports settings rather than regular school physical education contexts, limiting their applicability to general education settings (Harvey et al., 2018).

Therefore, the purpose of this study was to analyze the effect of different learning models on learning outcomes of basic football techniques, considering the level of self-efficacy. The learning models studied include modeling-based inquiry and inquiry. Self-efficacy levels were then divided into high and low categories. Analysis of these factors is expected to provide useful insights for implementing learning models that take into account levels of self-efficacy in the context of physical education and sport in the school environment.

Method

Participants

This study is a factorial experiment using a two-way ANOVA design. This study considered two main factors, namely the learning model (A) consisting of modeling-based inquiry (A1) and inquiry (A2), and the level of self-efficacy (B) divided into high (B1) and low (B2). In this study, four treatment groups were formed: modeling-based inquiry for participants with high and low self-efficacy levels (A1B1 and A1B2), and inquiry learning model for participants with high and low self-efficacy levels (A2B1 and A2B2). This design is described in detail in Table 1. The study involved 60 students from a public junior high school in Indonesia, who were selected through cluster random sampling technique. The participants included seventh-grade boys and girls from two separate classes. During the study, they attended physical education classes voluntarily, and were willing to comply with the study requirements.

Procedure

Participants were divided into two intervention groups, Modeling Based Inquiry and Inquiry Based Model, by the ranked assignment based on the self-efficacy scores. Each group consisted of 30 students. The results of the self-efficacy scale were then ranked using the 50% top 50% bottom method. The highest 15 sequences and the lowest 15 sequences were used as samples. Based on this division, 4 groups were obtained, each group consisted of 15 samples. The groups were those treated with modeling-based inquiry learning model with high self-efficacy (A1B1) and low (A1B2), groups treated with inquiry learning model with high self-efficacy (A2B1) and low (A2B2). (see Figure 1 and Table 1)

Figure 1. Procedure for dividing group

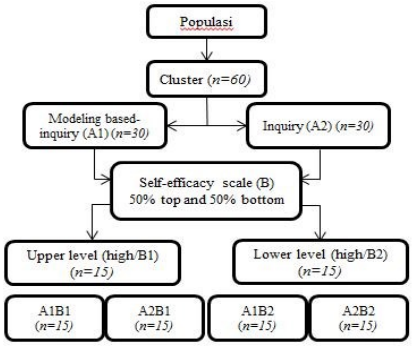


Table 1. Two-way factorial ANOVA design and number of participants for each group

Self-Efficacy Level (B)	Learning Models (A)				Total (*n*)
	Modeling based-inquiry	*n*	Inquiry	*n*	
High (B1)	A1B1	15	A2B1	15	30
Low (B2)	A1B2	15	A2B2	15	30
Total	A1	30	A2	30	60

After organizing the groups in a two-way factorial design, the modeling and inquiry-based learning models were applied to evaluate the learning outcomes of basic football techniques. This learning model is conducted for about 6 weeks, with three meetings per week, following the physical education and sports schedule. Each meeting consisted of an opening of about 15 minutes, core learning for about 90 minutes (including learning materials on passing, dribbling, shooting, combinations of passing, dribbling, shooting, and 2 vs 2 and 3 vs 3 games) and closing for about 15 minutes.

The application of both learning models aimed to achieve learning outcomes of basic soccer techniques. The difference lied in the role of students and teachers in learning. In the modeling-based inquiry learning model, students acted as models, either in the form of single mastery (one model with high skills) or multiple coping (several models with diverse abilities). Whereas in the inquiry learning model, this role was taken by the teacher. In the core activities, learning materials regarding basic soccer techniques (passing, dribbling, and shooting) were delivered with variations, both in individual and group forms. These materials were sorted from low to high level of difficulty, starting from the first meeting to the last meeting. To maintain sample compliance and ensure complete data collection, several strategies were implemented. First, researchers obtained formal consent from both school authorities and parents/guardians. Second, attendance was monitored at each session, followed by any absences through communication with students and parents. Third, make-up sessions were provided for students who missed regular sessions due to valid reasons (e.g., illness). These strategies resulted in a high retention rate, with only minimal missing data (< 5%) throughout the study period.

Instrument

Collecting data on student self-efficacy, this study used a self-efficacy scale developed by researchers based on (Bandura & Wessels, 1994) theory. This self-efficacy scale consisted of 32 statements. The rating scale on this scale used a Likert scale consisting of 4 response options, namely strongly disagree, disagree, agree, and strongly agree. The items in the scale were developed in two types, namely favorable items and unfavorable items. Scoring of favorable items started from a score of 1 on the STS response to a score of 4 on the strongly agree response. Conversely, the scoring of favorable items started from a score of 4 on the namely strongly disagree response to a score of 1 on the strongly agree response. Meanwhile, basic techniques in soccer games were measured using the Johnson soccer test, which includes passing, dribbling, and shooting. Each participant was asked to perform passing, the number of legal passes and holding the ball, for 30 seconds. Count 1, obtained from one passing activity to the wall (target) (see Figure 2.a). In the dribbling test, the time taken by the testee from the "Yes" signal until he crossed the finish line, the time was recorded in seconds (see Figure 2.b). Shooting test, each student was given the opportunity to shoot 3 times from a distance of 16.5 meters to a target that had been given a number, the maximum score was 21 and the minimum score was 0 (see Figure 2.c). The scores from these three tests (passing, dribbling, and shooting) were then summed and averaged to get the learning

results of basic soccer techniques. These tests were adapted from the Football Skills Test Battery (FSTB) developed by Ali et al. (2007). The validity coefficient for passing test was r = 0.82, dribbling test r = 0.78, and shooting test r = 0.81. Test reliability coefficients using test-retest method showed high consistency with passing test ICC = 0.85, dribbling test ICC = 0.83, and shooting test ICC = 0.87 (Ali et al., 2007; Russell et al., 2010).

Data analysis

The features of each treatment group were analyzed using descriptive statistics. Analytical requirement testing was performed based on standardized residual values (for normality) and Levene's test (for homogeneity). After that, this study conducted a two-way factorial ANOVA test and Tukey's follow-up test to analyze significant differences in treatment effects or groups. This analysis was performed using SPSS version 26 software.

Results

The results of learning basic soccer techniques in the A1B1 group showed a better performance than the other groups, with an average value of 10.48 ± 2.66, as listed in Table 2 and Figure 3. Meanwhile, the values for the different research groups were as follows: 8.53 ± 2.26 (A1B2), 10.96 ± 3.29 (A2B1), 7.58 ± 1.85 (B2), 8.46 ± 1.85 (A2), 6.62 ± 1.47 (A2B2), 16.80 ± 1.71 (A1), and 10.48 ± 2.66 (B1). Furthermore, Table 3 and Figure 4 show the testing results for analytical requirements, where the data met the criteria required for hypothesis testing (P > 0.05).

Table 2. Data description from each group

Group	n	Basic Techniques	Min	Max	Mean ± SD	
					Per technique	Overall
A1	30	Passing	7	13	10.80 ± 1.92	10.48 ± 2.66
		Dribbling	3	10	7.67 ± 2.14	
		Shooting	7	21	12.97 ± 3.40	
A2	30	Passing	5	11	8.37 ± 2.03	8.46 ± 1.85
		Dribbling	3	10	6.67 ± 2.09	
		Shooting	5	21	10.36 ± 4.03	
B1	30	Passing	9	13	11.20 ± 1.40	10.43 ± 1.44
		Dribbling	7	10	8.77 ± 0.97	
		Shooting	5	21	11.33 ± 4.03	
B2	30	Passing	5	10	7.97 ± 1.87	7.58 ± 1.85
		Dribbling	1	8	5.57 ± 1.79	
		Shooting	5	12	9.20 ± 2.25	
A1B1	15	Passing	11	13	12.33 ± 0.72	12.42 ± 3.13
		Dribbling	8	10	9.33 ± 0.72	
		Shooting	13	21	15.60 ± 2.50	
A2B1	15	Passing	9	13	10.07 ±0.88	10.96 ± 3.29
		Dribbling	8	11	8.20 ± 0.86	
		Shooting	11	21	14.60 ± 2.41	
A1B2	15	Passing	7	10	9.27 ± 1.44	8.53 ± 2.26
		Dribbling	3	8	6.00 ± 1.73	
		Shooting	7	12	10.33 ± 1.68	
A2B2	15	Passing	7	13	9.67 ± 1.23	11.00 ± 1.47
		Dribbling	5	10	7.87 ± 1.81	
		Shooting	8	21	15.47 ± 2.22	

Dependent variable: Basic techniques in soccer.

Figure 3. Average learning outcomes of basic techniques in soccer for each group

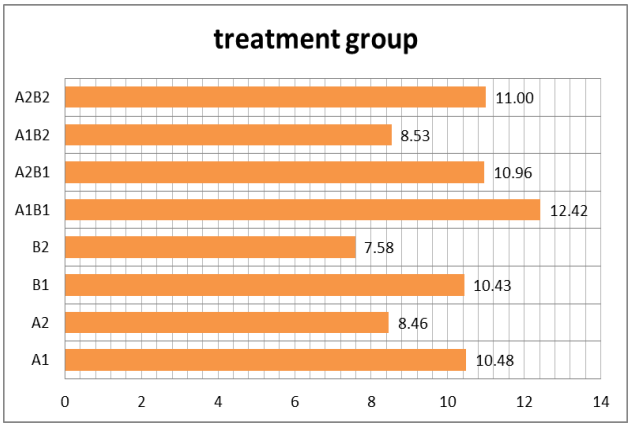
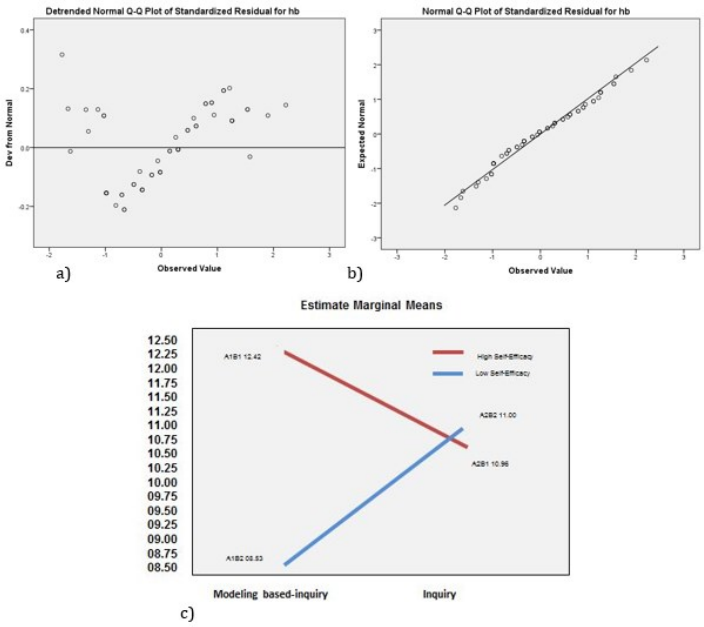


Table 3. Testing requirements analysis

Normality				Homogenity			
Source	statictic	df	P	Source	df1	df2	P
Kolmogorov-Smirnov	0.093	60	0.200	Levane's	3	56	0.297
Shapiro-Wilk	0.973	60	0.212				

The data were normally distributed and homogeneous (P > 0.05)

Figure 4. (a) Plot graphic, (b) Detrended normal plot, and (c) Interaction



As seen in Table 4, the results of the two-way ANOVA test showed a significant difference between the learning outcomes of basic soccer techniques in groups A1 and A2 (P < 0.05), where group A1 showed better performance than A2 (with an average of A1 and A2 being 10.48 > 8.46). In addition, there was a significant difference between groups B1 and B2 (P < 0.05), where group B1 showed better results than B2 (with the average of B1 and B2, 10.43 > 07.58). Another significant interaction was also identified between groups A and B (P < 0.05), as shown in Table 4 and Figure 4.

As outlined in Table 5, Tukey's post-hoc test analysis showed that the results of learning basic football techniques in group A1B1 were better than A2B1 (P < 0.05) (with an average of A1B1 and A2B1, 12.42 > 10.96). Furthermore, the results of learning basic techniques in soccer groups A1B2 and A2B2 did not show significant differences (P> 0.05) (with an average of A1B2 and A2B2, 8.53 < 11.00).

Table 4. Tests of between-subjects effects

Source	Type III Sum of Squares	df	Mean Square	F	P
Corrected Model	1300.183[a]	3	433.394	44.451	0.000
Intercept	56610.817	1	56610.817	5806.238	0.000
Learning Models (A)	79.350	1	79.350	8.138	0.006
Efficacy (B)	1170.417	1	1170.417	120.043	0.000
Learning Models (A) *efficacy	50.417	1	50.417	5.171	0.027
Error	546.000	56	9.750		
Total	58457.000	60			
Corrected Total	1846.183	59			

Dependent Variable: Basic techniques in soccer

Table 5. Tukey's post-hoc test analysis

(I) Post Hoc	(J) Post Hoc	Mean Difference (I-J)	Std. Error	P	95% Confidence Interval	
					Lower Bound	Upper Bound
	A1B2	10.6667*	1.14018	0.000	7.6476	13.6857
A1B1	A2B1	4.1333*	1.14018	0.003	1.1143	7.1524
	A2B2	11.1333*	1.14018	0.000	8.1143	14.1524
	A1B1	-10.6667*	1.14018	0.000	-13.6857	-7.6476
A1B2	A2B1	-6.5333*	1.14018	0.000	-9.5524	-3.5143
	A2B2	.4667	1.14018	0.977	-2.5524	3.4857
	A1B1	-4.1333*	1.14018	0.003	-7.1524	-1.1143
A2B1	A1B2	6.5333*	1.14018	0.000	3.5143	9.5524
	A2B2	7.0000*	1.14018	0.000	3.9809	10.0191
	A1B1	-11.1333*	1.14018	0.000	-14.1524	-8.1143
A2B2	A1B2	-.4667	1.14018	0.977	-3.4857	2.5524
	A2B1	-7.0000*	1.14018	0.000	-10.0191	-3.9809

Dependent Variable: Basic techniques in Soccer, Tukey HSD, the error term is Mean Square (Error) = 9.750. The mean difference is significant at the .05 level.

Discussion

This study in fact shows that the modelling-based inquiry learning model is better than the inquiry learning model in improving students' learning outcomes of basic football techniques. The difference between modeling-based inquiry and ordinary inquiry is the variety of information sources that can be presented to students. If in ordinary inquiry, the source of information is only obtained from questions asked by the teacher and from that question by students used as information in completing the movement task, then in modelling-based inquiry, the source of information is enriched by presenting a model either in the form of a direct demonstration by the teacher or student or by presenting it in the form of a video related to the movement task. Modelling-assisted learning in the form of videos is proven to be able to streamline learning and improve student learning outcomes (Maleki et al., 2010). Other findings also show that modelling using multiple sources is more effective in improving motor skills (Andrieux & Proteau, 2014), which is in line with Ihsan's et al (2024), that physical training affects otor skills.

The source of information obtained by students by following up on teacher questions in ordinary inquiry still has the potential to cause confusion in students, while in modeling-based incuri the questions posed to students are followed by explicit demonstration or modeling so as to increase understanding and reduce student confusion. (Andrieux & Proteau, 2013). Modelling-based learning provides an opportunity for students to observe the motion task being demonstrated (Park, 2015). The activity of paying attention to the demonstration will minimize doubts as well as provide confidence in the student that he is able to perform the motion (Brookhart, 2017). This is in accordance with the Bandura theory that in modeling there is vicarious experience (experience gained from others), so modeling-based learning provides space for students to get this vicarious experience (Bandura, 2009). The modeling supplement inserted into the inquiry learning model is a dual process that includes demonstrating the desired skills and behaviors while describing the actions or decisions students take in performing their movement tasks (Salisu & Ransom, 2014).

In addition to comparing two learning models, this study also explores the interaction between learning models and student efficacy. The application of various learning models in physical education can increase student participation in class and provide a better learning experience for them (Russell et al., 2020). In addition, the implementation of different learning methods in physical education and sports classes can improve student learning achievement (Ihsan et al., 2024). The ability of teachers to enhance their professionalism, particularly through the application of learning models, has a significant impact

on physical literacy, self-efficacy and leads to student learning outcomes (Sum et al., 2018). Physical education learning by paying attention to student self-efficacy has an impact on student satisfaction in learning (Pan, 2014). The relationship between self-efficacy and learning outcomes by several studies is described as a very close relationship. students with high self-efficacy are able to bring encouragement from within themselves to do positive things, especially in terms of behavior change and learning outcomes (Phan, 2013). There is a close relationship between self-efficacy in supporting academic tasks, further stated that self-efficacy can also be used to predict student success in higher education (Gore, 2006).

The key finding of this study was that students who had high levels of self-efficacy achieved better learning outcomes of basic football techniques when they were provided with the modelling based. However, for students who have low level of self-efficacy, this study found no significant difference between the two learning models. This indicates that students with low levels of self-efficacy achieved better learning outcomes when they were taught with the inquiry approach. Modeling-based learning has a significant impact on improving learning outcomes because modeling maximizes the use of students' cognitive power (Blandin et al., 2018). In addition, the modeling effect has a great influence especially in the early stages of the learning process because at that stage students will look for the best way to practice the given motion task (Edwards, 2011).. Modeling can significantly improve motor skills and modeling is a major factor in improving students' motor skills (Hebert & Landin, 1994); (Want & Harris, 2001). The inquiry learning model is more effective in influencing learning outcomes in students with low efficacy. Given that the self-efficacy variable is consistent across both groups being compared, it is reasonable to conclude that the improvement in students' learning outcomes is influenced by the addition of modeling in the inquiry learning model. Self-efficacy and learning outcomes are closely related.

Many studies have discussed the relationship between the two. Some state that self-efficacy can accurately predict students' academic achievement (Joo et al., 2013). Other findings also show that self-efficacy can increase students' physical activity (Ali et al., 2018). Additional modeling supplements to the inquiry learning model provide a large multiplier effect on improving learning outcomes in students who have high efficacy. This is because in modeling inquiry, the sources of information obtained by students are diverse. Modeling-based learning is proven to be able to streamline learning and improve student learning outcomes (Al-Abood et al., 2001). Modeling by utilizing various sources is more effective in improving motor skills (Bouazizi et al., 2014). In modeling-based learning, there is an imitation process that can facilitate motion accuracy, especially for students with high self-efficacy (Unenaka et al., 2018).

This study has several limitations that should be considered when interpreting the results. First, the study was conducted in a single school setting, which may limit the generalizability of the findings to other educational contexts or populations. Second, the intervention period was relatively short, making it difficult to assess the long-term effects of both learning models on students' basic football techniques. Third, this study only focused on three basic football techniques (passing, dribbling, and shooting), while football involves more complex technical and tactical elements.

For future research, several recommendations are made. First, researchers should consider conducting longitudinal studies to examine the sustained effects of modeling-based inquiry and inquiry learning models on students' football skills development. Second, future studies could explore the implementation of these learning models across different age groups and skill levels to better understand their effectiveness in various developmental stages. Third, investigating the impact of these learning models on students' tactical understanding and decision-making abilities in football would provide a more comprehensive understanding of their effectiveness. Fourth, future research could examine the role of other psychological factors besides self-efficacy, such as motivation, anxiety, and self-confidence, in mediating the effectiveness of these learning models. Finally, researchers could investigate the potential benefits of combining these learning models with technology-enhanced learning tools to further optimize the learning process in physical education settings.

Conclusions

In short, this study highlights that there is an interaction between learning models and students' self-efficacy. For students with a high level of self-efficacy, the learning outcomes of basic football techniques were better when using the modeling-based inquiry learning model than the regular inquiry model. However, for students with a low level of self-efficacy, both learning models provide comparable results, although the inquiry model provides slightly better results. Therefore, physical education teachers need to pay attention to the individual characteristics of each student, especially the level of self-efficacy, in choosing the right learning model, especially in the context of learning basic soccer techniques. Physical education involves psychomotor, cognitive and affective aspects, all of which are important for achieving learning objectives. Hence, attention to self-efficacy is important in planning learning in physical education. Future studies will require larger samples to be able to significantly differentiate between high and low levels of self-efficacy.

References

Abdulla, A., Whipp, P. R., & Teo, T. (2022). Teaching physical education in 'paradise': Activity levels, lesson context and barriers to quality implementation. *European Physical Education Review, 28*(1), 225–243. https://doi.org/10.1177/1356336X211051188

Al-Abood, S. A., Davids, K., & Bennett, S. J. (2001). Specificity of task constraints and effects of visual demonstrations and verbal instructions in directing learners' search during skill acquisition. *Journal of Motor Behavior, 33*(3), 295–305. https://doi.org/10.1080/00222890109601914

Ali, A., Williams, C., Hulse, M., Strudwick, A., Reddin, J., Howarth, L., Eldred, J., Hirst, M., & McGregor, S. (2007). Reliability and validity of two tests of soccer skill. *Journal of Sports Sciences, 25*(13), 1461–1470. https://doi.org/10.1080/02640410601184376

Andrieux, M., & Proteau, L. (2013). Observation learning of a motor task: Who and when? *Experimental Brain Research, 229*(1), 125–137. https://doi.org/10.1007/s00221-013-3598-x

Andrieux, M., & Proteau, L. (2014). Mixed observation favors motor learning through better estimation of the model's performance. *Experimental Brain Research, 232*(10), 3121–3132. https://doi.org/10.1007/s00221-014-4000-3

Bandura, A. (2009). Social cognitive theory in cultural context. *Applied Psychology, 51*(2), 269–290. https://doi.org/10.1111/j.1464-0597.2009.00310.x

Bandura, A. (2021). *Psychological modeling: Conflicting theories*. Routledge.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*(3), 586–598. https://doi.org/10.1037/0022-3514.41.3.586

Bandura, A., & Wessels, S. (1994). *Self-efficacy* (Vol. 4). NA.

Belansky, E. S., Cutforth, N., Kern, B., & Scarbro, S. (2016). Disseminating evidence-based physical education practices in rural schools: The San Luis Valley Physical Education Academy. *Journal of Physical Activity and Health, 13*(9), 1002–1009. https://doi.org/10.1123/jpah.2015-0233

Bessa, C., Hastie, P., Araújo, R., & Mesquita, I. (2019). What do we know about the development of personal and social skills within the sport education model: A systematic review. *Journal of Sports Science & Medicine, 18*(4), 812–821. https://doi.org/10.1007/s13110-019-00156-x

Blandin, Y., Lhuisset, L., & Proteau, L. (2018). Cognitive processes underlying observational learning of motor skills. *Psychology of Sport and Exercise, 34*, 1–10. https://doi.org/10.1016/j.psychsport.2017.10.002

Bonetti, L., Vestberg, T., Jafari, R., Seghezzi, D., Ingvar, M., Kringelbach, M. L., Filgueiras Goncalves, A., & Petrovic, P. (2024). Decoding the elite soccer players psychological profile. *BioRxiv*, 2024–2028. https://doi.org/10.1101/2024.03.17.532024

Bouazizi, M., Azaiez, F., & Boudhiba, D. (2014). Effects of learning by video modeling on gymnastic performances among Tunisian students in the second year of secondary level. *IOSR Journal of Sports and Physical Education, 1*(5), 5–8. https://doi.org/10.9790/6737-017581

Brookhart, S. M. (2017). *How to give effective feedback to your students*. ASCD.

Edwards, H. E. (2011). *Motor control and learning: From theory to practice*. Belmont, CA: Wadsworth Cengage Learning. Publisher: Yolanda Cossio Acquisitions Editor.

Fransen, K., Vanbeselaere, N., De Cuyper, B., Vande Broek, G., & Boen, F. (2015). Perceived sources of team confidence in soccer and basketball. *Medicine and Science in Sports and Exercise, 47*(7), 1470–1484. https://doi.org/10.1249/MSS.0000000000000609

Fuaddi, F., Tomoliyus, T., Sukoco, P., & Nopembri, S. (2020). The enjoyable physical education learning to improve students' motivation and learning achievement. *Physical Education, Sport and Health Culture in Modern Society, 1*(49), 50–59.

González-Víllora, S., Sierra-Díaz, M. J., Pastor-Vicedo, J. C., & Contreras-Jordán, O. R. (2019). The way to increase the motor and sport competence among children: The contextualized sport alphabetization model. *Frontiers in Physiology, 10*, 569. https://doi.org/10.3389/fphys.2019.00569

Goodyear, V., & Dudley, D. (2015). "I'ma facilitator of learning!" Understanding what teachers and students do within student-centered physical education models. *Quest, 67*(3), 274–289. https://doi.org/10.1080/00336297.2015.1032653

Gore, P. A. (2006). Academic self-efficacy as a predictor of college outcomes: Two incremental validity studies. *Journal of Career Assessment, 14*(1), 92–115. https://doi.org/10.1177/1069072705281367

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise, 16*, 26–36. https://doi.org/10.1016/j.psychsport.2014.08.001

Harvey, S., Pill, S., & Almond, L. (2018). Old wine in new bottles: A response to claims that teaching games for understanding was not developed as a theoretically based pedagogical framework. *Physical Education and Sport Pedagogy, 23*(2), 166–180. https://doi.org/10.1080/17408989.2017.1422823

Hebert, E. P., & Landin, D. (1994). Effects of a learning model and augmented feedback on tennis skill acquisition. *Research Quarterly for Exercise and Sport, 65*(3), 250–257. https://doi.org/10.1080/02701367.1994.10607625

Ihsan, F., Nasrulloh, A., Nugroho, S., & Yuniana, R. (2024). The effect of shadow training and muscle endurance on agility of badminton athletes aged 12–17 years. *Retos, 54*, 36–45. https://doi.org/10.47197/retos.v54.103003

Joo, Y. J., Lim, K. Y., & Kim, J. (2013). Locus of control, self-efficacy, and task value as predictors of learning outcome in an online university context. *Computers & Education, 62*, 149–158. https://doi.org/10.1016/j.compedu.2012.10.015

Kokstejn, J., Musalek, M., Wolanski, P., Murawska-Cialowicz, E., & Stastny, P. (2019). Fundamental motor skills mediate the relationship between physical fitness and soccer-specific motor skills in young soccer players. *Frontiers in Physiology, 10*, 596. https://doi.org/10.3389/fphys.2019.00596

Komarraju, M., & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs, goals, and effort regulation matter? *Learning and Individual Differences, 25*, 67–72. https://doi.org/10.1016/j.lindif.2013.01.005

Krustrup, P., Williams, C. A., Mohr, M., Hansen, P. R., Helge, E. W., Elbe, A., De Sousa, M., Dvorak, J., Junge, A., & Hammami, A. (2018). The "Football is Medicine" platform—scientific evidence, large-scale implementation of evidence-based concepts, and future perspectives. *Scandinavian Journal of Medicine & Science in Sports, 28*(S1), 3–7. https://doi.org/10.1111/sms.13171

Lane, J., Lane, A. M., & Kyprianou, A. (2004). Self-efficacy, self-esteem and their impact on academic performance. *Social Behavior and Personality: An International Journal, 32*(3), 247–256. https://doi.org/10.2224/sbp.2004.32.3.247

Maleki, F., Nia, P. S., Zarghami, M., & Neisi, A. (2010). The comparison of different types of observational training on motor learning of gymnastic handstand. *Journal of Human Kinetics, 26*, 13–19. https://doi.org/10.2478/v10078-010-0043-0

Metzler, M. (2017). *Instructional models in physical education*. Taylor & Francis.

Metzler, M. W. (2017). *Instructional models for physical education* (3rd ed.). Routledge.

Musculus, L., Raab, M., Belling, P., & Lobinger, B. (2018). Linking self-efficacy and decision-making processes in developing soccer players. *Psychology of Sport and Exercise, 39*, 72–80. https://doi.org/10.1016/j.psychsport.2018.09.001

Østergaard, L. D. (2016). Inquiry-based learning approach in physical education: Stimulating and engaging students in physical and cognitive learning. *Journal of Physical Education, Recreation & Dance, 87*(2), 7–14. https://doi.org/10.1080/07303084.2015.1119076

Pan, Y.-H. (2014). Relationships among teachers' self-efficacy and students' motivation, atmosphere, and satisfaction in physical education. *Journal of Teaching in Physical Education, 33*(1), 68–92. https://doi.org/10.1123/jtpe.2013-0049

Park, S.-K. (2015). Exploring the argumentation pattern in modeling-based learning about apparent motion of Mars. *Eurasia Journal of Mathematics, Science and Technology Education, 12*(1), 87–107. https://doi.org/10.12973/eurasia.2015.1283a

Phan, H. P. (2012). Relations between informational sources, self-efficacy and academic achievement: A developmental approach. *Educational Psychology, 32*(1), 81–105. https://doi.org/10.1080/01443410.2011.625612

Phan, H. P. (2013). Examination of self-efficacy and hope: A developmental approach using latent growth modeling. *Journal of Educational Research, 106*(2), 93–104. https://doi.org/10.1080/00220671.2012.667008

Russell, M., Benton, D., & Kingsley, M. (2010). Reliability and construct validity of soccer skills tests that measure passing, shooting, and dribbling. *Journal of Sports Sciences, 28*(13), 1399–1408. https://doi.org/10.1080/02640414.2010.506035

Salisu, A., & Ransom, E. N. (2014). The role of modeling towards impacting quality education. *International Letters of Social and Humanistic Sciences, 32*, 54–61. https://doi.org/10.18052/www.scipress.com/ilshs.32.54

Santoso, N., & Santoso, N. P. (2024). Case study: Problem-based learning model for soccer basic movement skills and learning activity. *Retos, 61*, 578–582. https://doi.org/10.47197/retos.v61.103246

Sepdanius, E., Sidi, M. A. B. M., Saputra, E., Afriani, R., Gemaini, A., & Ayubi, N. (2024). Exploring factors affecting physical health perception through sports participation: A PLS-SEM approach. *Retos, 51*, 1526–1535. https://doi.org/10.47197/retos.v51.102520

Sierra-Díaz, M. J., Gonzalez-Villora, S., Pastor-Vicedo, J. C., & López-Sánchez, G. F. (2019). Can we motivate students to practice physical activities and sports through models-based practice? A systematic review and meta-analysis of psychosocial factors related to physical education. *Frontiers in Psychology, 10*, 2115. https://doi.org/10.3389/fpsyg.2019.02115

Simonton, K. L., Layne, T. E., & Irwin, C. C. (2021). Project-based learning and its potential in physical education: An instructional model inquiry. *Curriculum Studies in Health and Physical Education, 12*(1), 36–52. https://doi.org/10.1080/25742981.2020.1819792

Sparks, C., Dimmock, J., Lonsdale, C., & Jackson, B. (2016). Modeling indicators and outcomes of students' perceived teacher relatedness support in high school physical education. *Psychology of Sport and Exercise, 26*, 71–82. https://doi.org/10.1016/j.psychsport.2016.06.005

Suherman, W. S., & Nugroho, S. (2022). The effect of game experience learning model and fundamental movement skills on psychosocial skills in youth soccer players. *Journal of Physical Education & Sport, 22*(5). https://doi.org/10.7752/jpes.2022.05.09

Sum, K. W. R., Wallhead, T., Ha, S. C., & Sit, H. P. C. (2018). Effects of physical education continuing professional development on teachers' physical literacy and self- efficacy and students' learning outcomes. *International Journal of Educational Research, 88, 1–8*. https://doi.org/10.1016/j.ijer.2018.01.001

Trendowski, T. N., & Woods, A. M. (2015). Seven student-centered principles for smart teaching in physical education. *Journal of Physical Education, Recreation & Dance, 86*(8), 41–47. https://doi.org/10.1080/07303084.2015.1090593

Unenaka, S., Ikudome, S., Mori, S., & Nakamoto, H. (2018). Concurrent imitative movement during action observation facilitates accuracy of outcome prediction in less-skilled performers. *Frontiers in Psychology, 9*, 1262. https://doi.org/10.3389/fpsyg.2018.01262

Want, S. C., & Harris, P. L. (2001). Learning from other people's mistakes: Causal understanding in learning to use a tool. *Child Development, 72*(2), 431–443. https://doi.org/10.1111/1467-8624.00300

Wong, J. Y. L., & Oh, P. H. (2023). Teaching physical education abroad: Perspectives from host cooperating teachers, local students, and Australian pre-service teachers using the social exchange theory. *Teaching and Teacher Education, 136*, 104364. https://doi.org/10.1016/j.tate.2023.104364

Zimmerman, B. J., & Kitsantas, A. (2005). Homework practices and academic achievement: The mediating role of self-efficacy and perceived responsibility beliefs. *Contemporary Educational Psychology, 30*(4), 397–417. https://doi.org/10.1016/j.cedpsych.2005.05.003

Zulkifli, A. F., & Kulinna, P. (2018). Self-efficacy, soccer skills and the influence on students' learning experience. *Biomedical Human Kinetics, 10*(1), 1–7. https://doi.org

Authors' and translators' details:

Iyan Nurdiyan Haris	iyanhariss@usn.ac.id	Author
Mesa Rahmi Stephani	mesarahmistephani@gmail.com	Author
Ernawati	Ernaern3012@gmail.com	Author
Tri Maniarta Sari	trimaniarta@gmail.com	Author
Riezka Eka Mayasari	maysariesop@gmail.com	Author
Basrawi	Basrawisakieb@gmail.com	Author
Syarif Hidayat Nasir	snas0454@uni.sydney.edu.au	Author
Irsan Rahman	irsanrahman@gmail.com	Author
Syamsul Rijal	rijal_law@usn.ac.id	Author
Muh. Nurtanzis Sutoyo	mns.usn21@gmail.com	Author