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RESEARCH ARTICLE

The Effect of Model-Based Basketball Teaching on Psychomotor Learning

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Abstract

This study aimed to examine the effects of the Flipped Learning Model and the Tactical Games Model on the psychomotor learning levels of primary school students in basic basketball instruction. A quasi-experimental pre-test–post-test design was used. The sample consisted of 24 students (18 females, 6 males) from 5th and 6th grades in Sultandağı, Afyonkarahisar, during the 2023–2024 academic year. Students participated in a 12-week basketball training program. Data were collected using the "Psychomotor Achievement Observation Form in Basketball" (Savaş, 2016) and analyzed using SPSS. Normality tests were applied, followed by Dependent Samples T-Test for within-group comparisons and Independent Samples T-Test for between-group comparisons. Both the Flipped Learning group (n=12) and the Tactical Games group (n=12) showed statistically significant improvements from pre- to post-test (t=-16.538 and t=-10.970, respectively; $p \leq 0.05$). However, the comparison between the two groups showed no statistically significant difference in outcomes (t=0.12; $p > 0.05$), despite mean scores being similar (Flipped: $\bar{x}$=53.58; Tactical: $\bar{x}$=53.08). These findings suggest that both teaching models positively influence psychomotor learning in basic basketball, yet neither model proved superior. The results underscore the potential of both approaches in physical education to enhance students' psychomotor development.

Keywords: Flipped learning model, Tactical games model, Teaching models, Physical education and Sport, Basketball.

1. Introduction

All individuals who make up societies have guided their lives by going through education and training processes in every period of their lives. The fact that there are differences in the learning levels of people going through the same processes reveals the importance of unearthing, testing and applying different methods in education and training processes. There is no single and definitive way to achieve the desired learning outcomes in students. For this reason, qualified instructors must know and be able to apply different teaching models, strategies and styles related to the teaching of their field of expertise (Mirzeoğlu, 2017). Another factor that affects effective learning is the student's active participation in the lesson. In learning environments where the learner can express himself more easily and have interaction, the learner can structure his own learning. In the student-centered tactical games learning model within the constructivist approach, the learner produces tactical solutions and decisions which enable to understand the game by providing tactical awareness. These produced tactical solutions enable learners to discover how to apply them to special situations that arise in games by being developed through well-designed games. In order to structure knowledge meaningfully, there is a focus on the understanding of play in the development of the learner by seeking answers to the questions "Why do I do it?" and "Why do we play?" (Aracı, 2007).The course starting with playing games continues with skill training by increasing students'

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tactical awareness. The process is completed by using the tactics learned in the previous games and the new game. (Alagül & Gürsel, 2017**)**. In line with today's needs, the field of technology is growing day by day, therefore the importance of utilizing technology in classroom and out-of-class environments in education is increasing. The importance of using technology in education has been understood more especially during global epidemics such as Covid. Teachers' evaluating problem-solving activities in an interactive environment and not wasting time explaining the subject emerged the idea of flipped learning model. (Frydenberg, 2012). In the flipped learning model, learning takes place in the home environment, not in the classroom environment, as in traditional teaching, and homework to reinforce learning is carried out with activities in the classroom environment, unlike the traditional teaching model. (Bishop & Verleger, Mok Meriçelli, 2021 p. 276). When the academic literature was examined, it was seen that studies were conducted in various sports branches and age groups where teaching models were used in teaching physical education and sports, but there was no study on the basketball branch at the secondary school level. It was aimed to reveal the effects of basic basketball teaching with different teaching models applied to primary school students on psychomotor learning in this study.

2. Material and Methods

2.1 The Research Model

In this study, the pretest-posttest model with a random control-comparison group, one of the real experimental designs among the quantitative research methods, was used. The purpose of experimental research is to test the effect of the differences created by the researcher on the dependent variable and the cause and effect relationship. Although experimental studies can be carried out with a single group, they are often applied with more than one group. At least one of these multiple groups may be the experimental group and the other may be the control group or comparison group. In real experimental designs, the placement of previously determined subjects into the experimental or control group is done randomly. (Büyüköztürk et al, 2017). Random assignment of participants to groups strengthens the equivalence of the groups, but a pre-test is applied to concretely demonstrate the equivalence of the groups. Measuring the dependent variable before the experimental procedure is called pre-test, and measuring it after the experimental procedure is called post-test. The pretest-posttest design is used to explain the differences or similarities between the relationship between the pretest scores of the groups and the posttest. (İlhan & Gezer, 2021).

In this study, in which the effects of two different teaching models used on psychomotor learning in basketball teaching were compared, the participants were randomly assigned to the experimental and comparison groups, and a causal association was made by performing pretest-posttest of the groups before and after the application.

2.2 The Study Group

Due to the time and economic limitations of the research, the principle of easy accessibility was taken into consideration in creating the study groups. With this in mind, the study group consisted of a total of 24 students, 18 women and 6 men, who participated voluntarily in the 5th and 6th grades of the Sultandağı district of Afyonkarahisar province in the 2023-2024 academic year and had not received basketball instruction before. Participants were randomly divided into two separate groups of 12 people.

2.3 Intervention

Basic basketball training was given for 2 lesson hours (40+40 minutes) per week for 12 weeks. One of the groups was given 12-week basic basketball training prepared with the Flipped Learning Model, and the other group was given 12-week basic basketball training prepared with the Tactical Games Model. While the lesson plans were being prepared by the researcher, the basic basketball training designed by Kuru and Savaş (2008) for teaching basic basketball skills was used. 12-week lesson plans to be used in teaching basic basketball skills were prepared by the researcher in accordance with the flipped learning model and tactical games model. Course content videos, which are a necessity of the flipped learning model, were created and recorded by the researcher and then delivered to the participants. Whereas the videos were delivered to the participants who did not have internet access via materials such as USB and DVD, they were shared with the participants who had internet access through various social media platforms such as YouTube and WhatsApp. (Korkusuz, 2024). The prepared videos allowed students to take the course content whenever and wherever they wanted and to follow it at the pace they wanted (Staker & Horn, 2012).

2.4 Data Collection

In the research The "Psychomotor Domain Behavior (Observation) Form" for the basketball branch

developed by Savaş (2016) was applied to determine the students' psychomotor achievement skills in basketball before and after the implementation of the 12-week lesson plans and programs prepared with different teaching models.

2.5 Basketball Psychomotor Domain Behavior Form

After dribbling the ball twice with the right hand from position 1, the participant throws a chest pass to (C) and does a V-cut and comes to position 2. He receives the pass from (C) in position number 2 and does a jab step to the left and then shoots a right lay-up. Then he makes box out and rebound moves and throws an overhead pass to (C) again. After that he moves towards position 3 and receives the pass from (C) and after dribbling the ball twice with his left hand, he changes hands between his legs (from left hand to right hand). After getting the ball in his right hand, he moves towards position number 4. While going to position number 4, he makes two frontal hand changing moves, first from the right hand to the left hand and then from the left hand to the right hand, and reaches position number 4 by dribbling the ball with the right hand again. He changes hands between his legs again here (from right to left hand) and moves to position number 5 by dribbling the ball with his left hand and shoots a left layup. After the left layup is completed, he makes box out and rebound moves again and moves towards position number 6 by dribbling with his left hand. In position number 6, he changes hands from behind and moves towards position number 7 with his right hand. At position number 7, he makes a reverse move with his right hand and moves towards position number 8. When he approaches position number 8, after the stutter step, he shoots a jump shot and completes the movements.

The items in the behavior rating scale of the 20-item movement observation form including all basic movement skills for basketball, are scored between 0-5 points.

The items including the movements:

1. Dribbling with right hand
2. Chest pass
3. V-cut
4. Receiving the pass
5. Jap step
6. Dribbling and right layup
7. Box-out and rebound
8. Overhead pass
9. Cut to the left side
10. Receiving the pass and dribbling with the left hand
11. Dribbling between legs with left hand
12. Dribbling by changing hands from the front (from right hand to left hand)
13. Dribbling by changing hands from the front (from left to right hand)
14. Dribbling between legs with the right hand
15. Left hand layup
16. Box-out and rebound
17. Dribbling by changing hands from behind with the left hand
18. Reverse (dribbling) with the right hand
19. Stutter step (dribbling)
20. Jump shot

According to this rating scale, zero score is evaluated as "not observed", 1 point as "poor", 2 points as "fair", 3 points as "good", 4 points as "very good" and 5 points as "excellent" (Güçoğlu & Savaş 2020; Sural & Savaş, 2016).

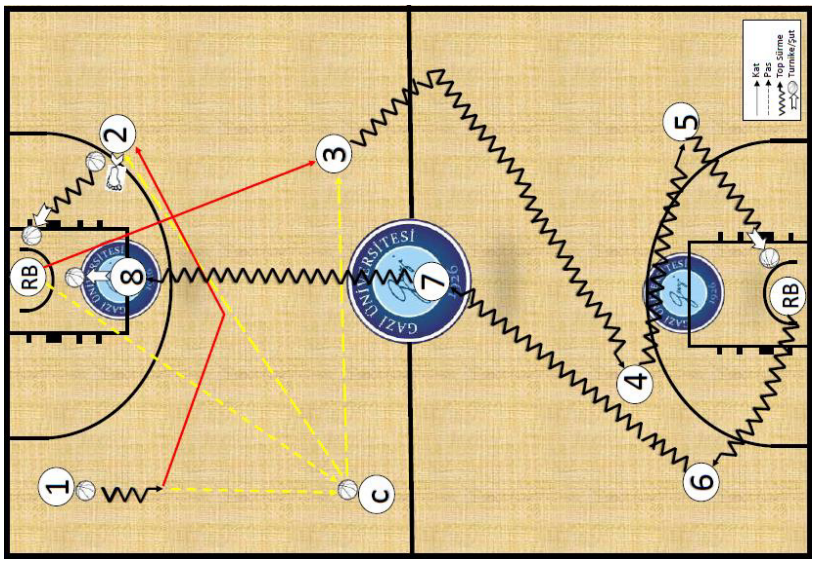

Figure 1. *Basketball Psychomotor Domain Behavior Achievement*

3. Results

SPSS 27.0 software package was utilized for data analysis in this research.In table 1, it was determined whether the flipped learning model and tactical games model groups showed a normal distribution or not by giving the skewness, kurtosis values, standard errors of these values and Shapiro wilk values.

Table 1. *Flipped learning model and tactical games model pre-test normal distribution test*

Model	N	Skewness	Skewness Std. Error	Kurtosis	Kurtosis Std. Error	Shapiro Wilk z
Flipped learning model	12	-.11	.63	-1.46	1.23	.16
Tactical games model	12	.46	.63	-.26	1.23	.60

p≤0,05

Table 1 shows that the skewness value of the flipped learning model is .63, the kurtosis value is -1.468 and the Shapiro wilk value is .16 [$z_{flipped}$=.16, p≤0,05]. It is seen that the skewness value of the tactical games model is .63, the kurtosis value is .26 and the shapiro wilk value is .60. [$z_{tactical}$=.16, p≤0,05]. When testing normality, descriptive statistics (skewness and kurtosis coefficients, etc.), graphs or hypothesis tests (Kolmogorov Smirnov, Shapiro Wilk, etc.) are used (Pituch & Stevens, 2016). It is accepted that there is a normal distribution when the Kurtosis and Skewness values are -1.5 to +1.5 (Tabachnick and Fidell, 2013). It is recommended to use the Shapiro-Wilk test when the sample size is below 30, and the Kolmogrov-Simirov test when it is above 30. (Büyüköztürk, 2013).

The number of participants, arithmetic mean, standard deviation, t value and p value regarding whether there is a significant difference between the pre-test and post-test data of the flipped learning model, which is observed to be normally distributed, are given in Table 2.

Table 2. *Flipped learning model dependent samples T test*

	N	$\bar{X}$	S	Sd	t	p
Pre-test	12	17.75	3.61			
Post-test	12	53.58	4.62	11	-16.53	0.00

p≤0,05

In Table 2, as a result of the dependent samples t test conducted to determine the effect of the flipped learning model on psychomotor learning in basic basketball teaching, whether there is a difference between the average of basketball psychomotor observation measurement scores made before and after the basic basketball teaching applications prepared with the flipped learning model, a significant difference was observed [$t_{(24)}$=-16.538, p≤0,05] between the average of the measurement scores made before the application ($\bar{x}_{pre\text{-}test}$=17.75) and the average of the measurement scores made after the application ($\bar{x}_{post\text{-}test}$=53.58). This shows that flipped learning model applications in basic basketball teaching have a significant effect on psychomotor learning.

The number of participants, arithmetic mean, standard deviation, t value and p value regarding whether there is a significant difference between the pre-test and post-test data of the tactical games model, which is observed to be normally distributed, are given in Table 3.

Table 3. *Tactical games model dependent samples t test*

	N	$\bar{X}$	S	Sd	t	p
Pre-test	12	19.00	5.56			
Post-test	12	53.00	12.97	11	-10.97	0.00

p≤0,05

In Table 3, in order to determine the effect of the tactical games model on psychomotor learning in basic basketball teaching, as a result of the dependent samples t test conducted to determine whether there is a difference between the average of basketball psychomotor observation measurement scores made before and after the basic basketball teaching applications prepared with the reverse tactical games model, there is a significant difference [t(24)=-10.97, p≤0.05] between the average of the measurement

scores made before the application ($\bar{x}_{pretest}$ = 19.00) and the average of the measurement scores made after the application ($\bar{x}_{posttest}$= 53.00). This shows that tactical games model applications in basic basketball teaching have a significant effect on psychomotor learning.

The number of participants, arithmetic mean, standard deviation, t value and p value regarding whether there is a difference between the flipped learning model and tactical games model applications, which are two different groups observed to be normally distributed, are given in Table 4.

Table 4. *Flipped learning model and tactical games learning model independent samples T test.*

Model	N	$\bar{X}$	S	Sd	t	p
Flipped learning model	12	53.58	6.31	22	.12	0.90
Tactical games model	12	53.08	12.97			

p≤0,05

In the independent samples t test conducted to reveal whether the flipped learning model and tactical games model applications, which are two different groups observed to be normally distributed, have a significant effect on psychomotor learning, no significant difference was observed [$t_{(22)}$=.12, p≤0,05] between the average of the measurement scores of the participants to whom the flipped learning model was applied in basic basketball teaching ($\bar{x}_{flipped}$=53.58) and the average of the measurement scores of the participants to whom the tactical games model was applied ($\bar{x}_{tactical}$=53.08). In this case, the significance levels of the effects of flipped learning model and tactical games model applications on psychomotor learning in basic basketball teaching are similar.

4. Discussion

In this research, the effect of the flipped learning model and the tactical games model in basketball teaching on students' basketball skills in the psychomotor domain (various dribblings, passing, receiving the pass, cut, running without the ball, layup shot, rebounding, changing hands, reversing, stutter step, jump shot) were examined. Information regarding this purpose was obtained with the basketball psychomotor domain behavioral achievement form developed by Savaş (2016). In this study, it was determined that the flipped learning model and the tactical games model improved students' psychomotor domain behaviors. When the experimental groups were compared with each other, it was determined that the approaches had a similar positive effect.

When the literature was examined, it was observed that there were many studies on the tactical games model and method and these studies mostly determined the effect of the tactical games model on cognitive, affective and psychomotor learning areas. Moreover, in the studies conducted by Austin et al. (2004), French et al. (1996), Güneş(2017), Harrison et al. (2004), Turner ve Martinek (1999), where the effects of basketball and other branches on psychomotor learning were investigated, it was seen that tactical games models and methods had a positive effect on psychomotor learning. The findings of this study are parallel to studies in the literature.

In the literature research on the flipped learning model, it has been seen that the number of studies has increased in recent years but the majority of the flipped learning model studies examined academic achievement in the cognitive field in subject areas such as foreign language education, mathematics and medicine and concentrated on undergraduate students (Özbay & Sarıca, 2019). In their 6-week study with university students, Hatami and Savaş (2024) compared the flipped learning model and the traditional teaching model in basketball teaching and revealed that the basketball skills of both groups increased at a statistically significant level, and that there was a statistically significant increase in some psychomotor skill levels such as left-handed turning, running without the ball (cut), and changing direction in favor of the experimental group. The positive effect of the flipped learning model on basketball psychomotor learning supports the findings of our study.

Hu et al. (2023) conducted a 16-week study on the massive open online course "MOOC+" for basketball courses in colleges and universities, in terms of educational innovation, and investigated the participants' collaboration ability, basketball skill level, study participation and self-regulated learning through traditional teaching and MOOC+ massive open online course applications. In the study, while there was no significant difference in the cooperation ability, basketball skill level, and study participation values of the experimental and control groups before the intervention, a significant difference was found

after the intervention. The positive effect of mass open online course applications on measurement values including basketball skills such as half-court dribbling technique, free throw, play, passing and receiving passes supports the findings of our study. In a similar study conducted by Wang et al. (2024), the effect of traditional learning and blended learning on exercise attitude and basketball skills was revealed. As a result of a 16-week application using the massive online open course "MOOC+" system, they revealed that both teaching models improved students' exercise attitudes and basketball skills, but there was a statistically significant increase in favor of the experimental group.

5. Conclusions

As a result of the data obtained in the findings section of this study, it was determined that both the flipped learning model and the tactical games model had a positive effect on the development of psychomotor skills in basketball among students aged 10 to 12. This conclusion was drawn through the evaluation of pre-test and post-test scores of the groups taught using these two model-based instructional approaches. Despite the effectiveness of both models, the analysis showed no statistically significant difference between the flipped learning and tactical games models in terms of their impact on psychomotor learning outcomes.

Furthermore, the discussion section highlights a significant gap in the literature concerning the use of the flipped learning model in physical education and sports teaching. While the flipped model has gained attention in general education, its application in motor learning and sport-specific contexts remains relatively underexplored. Our study addresses this gap by demonstrating the potential benefits of implementing the flipped learning model in the teaching of sports-related psychomotor skills.

In contrast, the tactical games model has been more widely researched in the context of physical education. However, most of the existing studies compare it predominantly with traditional teaching methods. What sets our research apart is that it compares two alternative, model-based approaches—one of which is well-established in the field (tactical games), and the other which is emerging and less commonly used (flipped learning). This comparison not only enriches the existing literature but also provides practical insights for educators considering innovative teaching strategies.

In conclusion, the findings of this study contribute to the growing body of knowledge on model-based teaching approaches in physical education and highlight the value of diversifying instructional methods. Further research is recommended to examine the influence of these models on other domains of learning beyond psychomotor development, such as cognitive and affective outcomes, in various sports and educational settings.

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