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THE EFFECT OF PHYSICAL EDUCATION AND GAMES TEACHING COURSE ON SOME PHYSICAL FITNESS PARAMETERS OF TEACHER CANDIDATES[i]

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Abstract:
This study was conducted to examine the effect of the Physical Education and Games Teaching course on certain physical fitness parameters of teacher candidates. The study group consisted of a total of 54 teacher candidates, including 27 who were enrolled in the Physical Education and Games Teaching course and 27 who were not (control group), all of whom were studying at the Faculties of Education of universities. Participants were divided into two groups: an experimental group and a control group. The study was conducted with second- and third-year students who had taken the Physical Education and Games Teaching course and first-year students who had not taken the course. In the study, balance, agility, flexibility, and vertical jump tests were administered to determine the participants' physical fitness components. Statistical analyses of the obtained data were performed using the IBM SPSS 25.0 statistical package programme. The Shapiro-Wilk Test was used to examine whether the variables in the research data showed a normal distribution. Matched pairs showing a normal distribution were analysed using the Paired Sample t-test. As a result, it was found that the Physical Education and Games Teaching course had a positive effect on balance and flexibility performance ($p<0.05$) but no significant change in agility and vertical jump parameters ($p>0.05$). In the control group, there was no statistically significant difference between the pre-test and post-test scores for all variables of balance, agility, flexibility, and vertical jump ($p>0.05$). The findings indicate that the Physical Education and Games Teaching course is effective in improving balance and flexibility performance among teacher candidates but does not have a significant effect on agility and vertical jump performance.

Keywords: Physical Education, teacher candidate, games teaching, physical fitness

[i] BEDEN EĞİTİMİ VE OYUN ÖĞRETİMİ DERSİNİN ÖĞRETMEN ADAYLARININ BAZI FİZİKSEL UYGUNLUK PARAMETRELERİ ÜZERİNE ETKİSİNİN İNCELENMESİ

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Öz:
Bu araştırma, Beden Eğitimi ve Oyun Öğretimi dersinin öğretmen adaylarının bazı fiziksel uygunluk parametreleri üzerindeki etkisini incelemek amacıyla gerçekleştirilmiştir. Ön test-son test kontrol gruplu deneysel desenle gerçekleştirilen araştırmanın çalışma grubunu, üniversitelerin Eğitim Fakültelerinde öğrenim gören ve Beden Eğitimi ve Oyun Öğretimi dersini alan 27, almayan (kontrol) 27 olmak üzere toplam 54 öğretmen adayı oluşturmuştur. Katılımcılar, deney ve kontrol grubu olmak üzere iki gruba ayrılmıştır. Çalışma, Beden Eğitimi ve Oyun Öğretimi dersini almış olan 2-3. sınıf ve dersi almamış olan 1. sınıf öğrencileri ile yürütülmüştür. Araştırmada, katılımcıların fiziksel uygunluk bileşenlerini belirlemede denge, çeviklik, esneklik ve dikey sıçrama testleri uygulanmıştır. Elde edilen verilerin istatistiksel analizleri IBM SPSS 25.0 istatistik paket programı kullanılarak gerçekleştirilmiştir. Araştırma verilerine ait değişkenlerin normal dağılım gösterip göstermediği Shapiro-Wilk Testi ile incelenmiştir. Normal dağılım gösteren eşlendirilmiş diziler, Paired Sample t testi ile analiz edilmiştir. Sonuç olarak; Beden Eğitimi ve Oyun Öğretimi dersinin denge ve esneklik, performansları üzerinde olumlu etkisi olduğu ($p<0,05$) ancak çeviklik ve dikey sıçrama parametrelerinde anlamlı bir değişim olmadığı ($p>0,05$) bulunmuştur. Kontrol grubunda ise denge, çeviklik, esneklik ve dikey sıçrama değişkenlerinin tamamında ön test ve son test puanları arasında istatistiksel olarak anlamlı bir fark bulunmamıştır ($p>0,05$). Elde edilen bulgular, Beden Eğitimi ve Oyun Öğretimi dersinin öğretmen adaylarında, özellikle denge ve esneklik performansını geliştirmede etkili olduğunu, ancak çeviklik ve dikey sıçrama performansı üzerinde anlamlı bir etki oluşturmadığını göstermektedir.

Anahtar kelimeler: Beden Eğitimi, öğretmen adayı, oyun öğretimi, fiziksel uygunluk

1. Introduction

Education is a fundamental phenomenon that has held an important place in individuals' lives since the beginning of human history. Education is considered an indispensable element for societies to sustain their existence, for individuals to live together in harmony, to share their thoughts, and to develop their social relationships (Sarıdede Kaya, 2018). Education is defined as the process of creating positive changes in individuals' behaviour in a planned, deliberate and application-based manner (Ertürk, 1973). This process encompasses the acquisition of the knowledge, skills and values necessary for individuals to sustain their lives through various educational institutions. In other words, education is a dynamic process that aims to systematically develop individuals in line with predetermined objectives (Fidan, 1993).

The effective and successful implementation of the educational process depends on the correct selection of appropriate methods and techniques to be used in this process and on teachers having sufficient pedagogical knowledge regarding teaching approaches appropriate to the age and developmental levels of children (Demirel, 2009). In this

context, play is considered to be an integral part of real life and one of the most effective learning processes for children. It can be purposeful or aimless, rule-based or rule-free, but in all cases, children participate willingly and enjoyably. Play forms the basis of physical, cognitive, linguistic, emotional, and social development (Kaya & Elgün, 2015). In addition to its affective characteristics such as enjoyment and pleasure, play also enables children to gain experience, participate actively, learn by doing and experiencing, and develop their research and discovery skills. Furthermore, play plays an important role in children's social development processes and contributes to their socialisation (Çelik & Şahin, 2013). Play supports the emergence of children's knowledge, skills and abilities; it is stated that this process contributes to the development of interest and positive attitudes towards learning (Sevinç, 2009).

In the educational process, play is widely used by families and educators as an effective teaching method that supports physical, emotional, social, and cognitive development in a multifaceted way, beyond being merely a means of entertainment for children (Özer *et al.*, 2006). Through play, children's interest, participation, and commitment to the learning process increase, which strengthens the permanence of learning (Russ, 2003). Today, there is a clear shift in education systems from traditional teaching approaches to child-centred teaching approaches. In this context, when play is evaluated as a way for children to experience life and learn, it can be said that the use of this enjoyable and child-centred method in educational environments is a pedagogical necessity (Zabelina & Robinson, 2010).

Physical fitness is considered a fundamental health indicator in terms of individuals being able to carry out their daily life activities without difficulty and perform at their highest level in sports.

Physical fitness encompasses a multidimensional structure consisting of various biomotor characteristics such as muscle strength, flexibility, endurance, balance, and coordination. Maintaining and developing these components is of great importance both for improving athletic performance and for sustaining overall health (Özer, 2020). Individuals with a high level of physical fitness have the capacity to move for longer periods without being tired (Zorba, 1999). These individuals can sustain physical activities with less fatigue and perform more effectively in daily life. While physical fitness is seen as an important factor for sedentary individuals in terms of disease prevention, maintaining a healthy lifestyle, and preventing mental health issues, for athletes, a high level of physical fitness is considered a fundamental requirement for improving and maintaining athletic performance (Zorba & Saygın, 2017).

The element of movement inherent in play supports the development of all systems in the body; it increases the working capacity of muscle, bone, and joint functions, making significant contributions to improving health and physical fitness (Demir and Filiz, 2004).

Physical education and play teaching courses are considered an important tool for developing the physical fitness components of teacher candidates. These courses, which include play-based activities, contribute to increasing the physical competence of teacher

candidates and providing them with exemplary experience that they can use in their professional practice.

This study aims to examine the effect of the Physical Education and Games Teaching course on the physical fitness levels of teacher candidates. A review of the literature reveals that studies on physical fitness have predominantly focused on physical education teachers who regularly engage in sports, student athletes, or student groups. In this context, the present study, which covers teacher candidates who do not regularly engage in sports and directly addresses the impact of the Physical Education and Games Teaching course, is expected to fill this gap in the literature and make a unique contribution to the field.

2. Method

This section will present information on the research model, study group, data collection tools, study protocol, and data analysis.

2.1 Research Model

In this study, a pre-test-post-test control group experimental design was used as the actual experimental design. In this model, experimental and control groups were formed; measurements were taken from participants in both groups before and after the application process in order to examine the change comparatively (Büyüköztürk *et al.*, 2008). This study was conducted with ethical approval and informed consent in accordance with the rules of the Declaration of Helsinki.

2.2 Research Group

This study was conducted in the autumn semester of the 2023–2024 academic year with second- and third-year students who had taken the Physical Education and Games Teaching course and first-year students who had not yet taken this course. The research group consisted of students enrolled in the preschool teaching and classroom teaching programmes at the Faculties of Education of Bursa Uludağ University (n = 10) and Marmara University (n = 17). The sample size was determined using power analysis.

The participation criteria for the research were defined as the participants being enrolled in the Faculties of Education and voluntarily participating in the study.

2.3 Data Collection Tools

In this study, balance, agility, flexibility, and vertical jump tests were administered to determine the participants' physical fitness levels. The tests were conducted at the Sports Hall of the Faculty of Sports Sciences at Marmara University in the Beykoz district of Istanbul and at the Sports Hall of the Faculty of Sports Sciences at Uludağ University in the Görükle district of Bursa. The tests were administered in accordance with standard protocols and after the necessary explanations were provided.

2.3.1 Body weight measurement

Participants' body weights were measured using electronic scales. Measurements were taken with participants wearing sports clothing and without shoes.

2.3.2 Height measurement

Participants' heights were determined using a stadiometer calibrated for accuracy and precision. During measurement, participants were instructed to stand barefoot, with heels together, knees straight, and body upright; the values obtained were recorded in centimetres (cm).

2.3.3 Flamingo balance test

This was performed to assess participants' static balance skills. Prior to the test, participants were given a trial run to ensure they understood the procedure correctly. During the test, participants were asked to maintain their balance on the platform on one foot, and the time they were able to remain balanced was recorded. The test was performed twice, with a 5-minute rest period between repetitions, and the lowest value obtained from the measurements was used for evaluation.

2.3.4 5 × 10 metre agility test

This was administered to determine participants' agility performance. Participants were asked to run a total distance of 10 metres between two markers placed 5 metres apart, five times back and forth. The importance of quick and controlled turns was emphasised during the test; running times were measured using a photocell system. The best time obtained from the two repetitions was used in the analysis.

2.3.5 Sit-and-reach flexibility test

Participants' flexibility levels were assessed using the sit-and-reach flexibility test. A measuring bench was used during the test; participants were asked to place their feet flat on the front of the bench and extend their bodies forward without bending their knees. Two attempts were made, and the highest value obtained from the measurements was used for evaluation.

2.3.6 Vertical jump test

Participants' explosive strength levels were assessed using the vertical jump test. The test was performed on a precise surface using a Jump Meter device. Participants were asked to jump upwards with maximum force without taking a step or bouncing; the jump height was recorded in centimetres. The test was performed in two trials, and the highest value was evaluated.

2.4 Study Protocol

The teacher candidate students in the experimental group took the Physical Education and Games Teaching course for 14 weeks, 2 hours per week, during the autumn semester

of the 2023–2024 academic year. At the beginning of the study, in the first week, pre-test measurements were taken from all participants in the experimental and control groups, and the implementation process began. The student teachers attended the course regularly throughout the term. During the implementation process, the course content was based on game-based physical activities and basic movement skills, using a game teaching approach. Prospective teachers in the control group did not take the Physical Education and Game Teaching course during the relevant period. After the completion of the 14th week, post-test measurements were taken from all participants in the experimental and control groups the following week, completing the process. The effect of the course on the physical fitness parameters of prospective teachers was evaluated by comparing the pre-test and post-test results of the experimental and control groups.

2.5 Data Analysis

Statistical analysis of the data was performed using the IBM SPSS 26.0 statistical package programme. The variables in the research data were defined as mean ± standard deviation. The Shapiro-Wilk test was used to examine whether the variables showed a normal distribution. It was determined that the pre-test and post-test values showed a normal distribution, and the analyses were performed using parametric tests. The t-test (Independent sample t-test) was used to compare two independent groups, and the Paired Sample t-test was used to compare two dependent groups. Levene's statistic was used to determine the homogeneity of variance. A significance level of 0.05 was used as a criterion to interpret whether the obtained values were significant.

Table 1: Descriptive information of the study and control groups

Groups	**Age**	**Weight (kg)**	**Height (cm)**
	$\bar{x}$ ±SS	$\bar{x}$ ±SS	$\bar{x}$ ±SS
Experiment Group (n = 27)	21.4 ± 1.6	71.8 ± 12.4	168.0 ± 7.2
Control Group (n = 27)	20.9 ± 1.4	72.7 ± 11.8	169.0 ± 6.8

Table 1 presents the demographic characteristics of the experiment and control groups. The experiment group consisted of participants with a mean age of 21.4 ± 1.6 years, a mean height of 168.0 ± 7.2 cm, and a mean body weight of 71.8 ± 12.4 kg. The control group had a mean age of 20.9± 1.4 years, a mean height of 169.0 ± 6.8 cm, and a mean body weight of 72.7 ± 11.8 kg. The groups were found to have similar values in terms of age, height, and body weight, indicating that they were comparable in terms of demographic characteristics.

3. Findings

Table 2: Comparison of participants' balance scores before and after the intervention

	N	Pre-test	Post-test	t	p
		$\bar{x}$	sd		
Experiment Group	27	42.6 ± 6.8	49.3 ± 7.1	-5.21	**,000***
Control Group	27	43.1 ± 7.0	44.0 ± 6.9	-1.12	.271

*(p<0.05)

Table 2 shows that the final test balance scores of the experiment group increased at a statistically significant level compared to the pre-test scores (p<0.05).

In the control group, no significant difference was found between the pre-test and final test values (p>0.05). These findings indicate that the physical education and games teaching course is effective in improving the balance of performance of student teachers.

Table 3: Comparison of participants' agility scores before and after the intervention

	N	Pre-test	Post-test	t	p
		$\bar{x}$	sd		
Experiment Group	27	16.42 ± 1.85	16.18 ± 1.79	1.21	.236
Control Group	27	16.55 ± 1.91	16.47 ± 1.88	0.64	.526

*(p<0.05)

Upon examining Table 3, it was determined that there was no statistically significant difference between the pre-test and post-test agility scores of the experiment and control groups (p>0.05). This finding indicates that the implemented programme had no significant effect on agility performance.

Table 4: Comparison of participants' flexibility scores before and after the programme

	N	Pre-test	Post-test	t	p
		$\bar{x}$	sd		
Experiment Group	27	23.8 ± 4.9	29.6 ± 5.2	-6.04	**.001***
Control Group	27	24.1 ± 5.1	24.4 ± 5.0	-0.58	.566

*(p<0.05)

Upon examining Table 4, it was determined that the flexibility post-test scores of the experiment group increased at a statistically significant level compared to the pre-test scores (p<0.05).

In the control group, no statistically significant difference was found between the pre-test and post- test flexibility scores (p>0.05). These findings indicate that the implemented programme is effective in improving flexibility performance.

Table 5: Comparison of participants' vertical jump scores before and after the intervention

	N	Pre-test	Post-test	t	p
		$\bar{x}$	sd		
Experiment Group	27	45.2 ± 6.1	45.8 ± 6.3	-0.94	.356
Control Group	27	44.7 ± 6.4	44.9 ± 6.2	-0.31	.759

*(p<0.05)

Upon examining Table 5, when comparing the vertical jump pre-test and post-test scores of the experiment and control groups, no statistically significant difference was found in either group (p>0.05). This finding indicates that the implemented programme did not have a significant effect on vertical jump performance.

4. Discussion and Conclusion

A review of the literature reveals a lack of studies that experimentally examine the effect of applied courses, particularly those included in university-level teaching programmes, on physical fitness parameters. This study was conducted with the aim of contributing to the field by examining the effects of the Physical Education and Games Teaching course on four different physical fitness parameters: balance, agility, flexibility, and vertical jump.

The findings revealed that the post-test balance scores of the experimental group increased at a statistically significant level compared to the pre-test scores (p<0.05). In the control group, no significant difference was found between the pre-test and post-test values (p>0.05). When comparing the agility pre-test and post-test scores of the experimental and control groups, no statistically significant difference was found in either group (p>0.05). It was determined that the flexibility post- test scores of the experimental group increased at a statistically significant level compared to their pre-test scores (p<0.05). In the control group, no statistically significant difference was found between the pre-test and post-test flexibility scores (p>0.05). When comparing the vertical jump pre- test and post-test scores of the experimental and control groups, no statistically significant difference was found in either group (p>0.05).

The observation of a significant increase in the balance performance of the experimental group in the present study is consistent with many studies in the literature that reveal the positive effects of sports and regular physical activity on balance. Saraçoğlu (2018), in his study comparing the balance and posture performance of male students who participated in sports and those who did not, reported that the balance performance of the groups participating in sports was significantly higher than that of

the control group. Similarly, Arslanboğa (2023) reported in their master's thesis that children participating in different sports had lower error rates in the flamingo balance test compared to the sedentary group, with a significant difference in favour of the groups that participated in sports. Furthermore, Can (2021), who examined the effect of basic badminton training on balance performance, found that at the end of the eight-week training period, the experimental group achieved
statistically significantly better results in the flamingo balance test than the control group.

On the other hand, some studies report that the improvement in balance performance did not reach a statistically significant level or that no difference was observed between the groups. Topsakal *et al.* (2019), in their study examining the effect of basic movement skill training on balance performance, noted that although they could not detect a significant difference in pre-test–post-test comparisons, the post-test averages were better. Similarly, Işık (2019) reported no significant difference in flamingo balance test results between 15–18-year-old students who participated in school sports and those who did not. However, studies conducted by Arı and Çolakoğlu (2021) and Bilim *et al.* (2016) determined that individuals who regularly engage in sports perform significantly better on the flamingo balance test compared to those who do not engage in sports. These differences may be attributed to the age group of the sample, the duration of the programme implemented, the characteristics of the sport, and the variety of measurement tools used.

When examining studies addressing physical fitness parameters, it is seen that regular and planned physical activities have positive effects on agility. Aynacıyan (2020) stated that educational games applied regularly significantly improved agility performance and emphasised that game-based approaches are effective on coordinative characteristics such as agility. Similarly, Topsakal *et al.* (2019), in their study examining the effect of basic movement skill training on agility performance, stated that the training applied could contribute to the development of motor skills related to agility. On the other hand, some studies focusing on physical fitness components closely related to agility performance have also revealed that individuals who participate in sports perform better than sedentary groups. Pense and Serpek (2010), in their study comparing female basketball players aged 14–16 with sedentary individuals, found significant differences in favour of the athletes in the 30-second sit-up test. Similarly, research conducted by Kalkavan *et al.* (1996) determined that the 30-second sit-up performance of students participating in different sports was significantly higher than that of the sedentary group. Işık (2019) also reported significant differences in favour of the groups participating in sports in the 30-second sit-up test in his study comparing the physical fitness of students who participated in school sports and those who did not. These findings show that regular participation in sports plays an important role in the development of physical fitness components that support agility performance.

There are numerous studies in the literature examining the effects of regular physical activity and sports participation on flexibility performance. Aynacıyan (2020) stated that regularly applied educational games significantly improved flexibility

performance and emphasised that game-based activities were effective in increasing joint range of motion. Similarly, Pişkin (2018) reported that eight weeks of court tennis training had positive effects on flexibility levels. Düzgün *et al.* (2009), in their study comparing adolescents who regularly engage in sports with those who do not, found that girls who engage in sports have higher flexibility levels than their sedentary peers. These findings indicate that regular and planned physical activities support flexibility development.

On the other hand, some studies have reported different results in terms of flexibility parameters. Boztepe *et al.* (2020) found statistically significant differences in favour of the experimental group between the pre-test and post-test values of the sit-and-reach test right parameter in students who regularly played educational games. In contrast, Çiçek *et al.* (2018) reported no significant difference between groups in terms of the sit-reach flexibility test in their study comparing swimmers and sedentary children. Some studies in the literature comparing individuals who engage in sports and sedentary individuals have indicated that the flexibility levels of the groups who engage in sports are higher (Kalkavan *et al.*, 1996; Polat *et al.*, 2003). These differences between studies may be attributed to the age groups of the participants, the sports disciplines practised, the duration of training, and the measurement methods used.

Studies examining physical fitness parameters indicate that regular and targeted training can have positive effects on vertical jump. Yakalı (2020), in his study examining the effects of a functional exercise programme applied to sedentary women on certain physical fitness parameters, reported that functional training significantly increased vertical jump performance. Similarly, Çiçek *et al.* (2018), in their study comparing swimmers and sedentary children, found that vertical jump performance was significantly higher in the athlete group. Furthermore, another study comparing 14–16-year-old female basketball players with sedentary individuals reported that the group that exercised performed significantly better in the vertical jump test (Pense & Serpek, 2010).

This study shows that the Physical Education and Games Teaching course can contribute to pre-school and primary school teacher candidates being able to implement teaching practices through play more effectively by supporting their physical fitness levels. It is thought that teacher candidates with improved physical fitness can integrate play-based learning activities into classroom practices more effectively and safely, even if they do not conduct their lessons directly within the scope of physical education. Future research should examine other factors affecting leisure satisfaction and develop strategies to improve students' quality of life.

4.1 Recommendations

1) The content of Physical Education and Games Instruction courses should be planned to include game-based activities aimed at developing physical fitness components such as balance and flexibility.

2) It is thought that teacher candidates whose physical fitness levels have improved will be able to use games and practical teaching methods more effectively in their lessons.
3) Future research should examine the effects of game-based lessons on both physical fitness and teaching practices.

Conflict of Interest Statement
The author declares no conflicts of interest.

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