

FORMATION OF PHYSICAL COMPETENCIES IN UNIVERSITY STUDENTS THROUGH TRACK AND FIELD EXERCISES

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Abstract

This study examines the pedagogical effectiveness of using track and field exercises to develop physical competencies among university students. The research investigates the role of athletics-based training in improving students' physical fitness, motor skills, functional capacities, and competencies related to maintaining a healthy lifestyle. During the pedagogical experiment, the effectiveness of running, jumping, relay, and general developmental exercises in fostering physical competencies was evaluated. The findings demonstrate that the methodology based on track and field exercises is an effective means of enhancing both professional and personal physical competencies among university students.

Keywords: track and field, university students, physical competence, physical fitness, motor skills, endurance, speed, agility, healthy lifestyle, pedagogical technologies.

Introduction

In the contemporary higher education system, preparing highly qualified specialists requires not only the development of professional knowledge and practical skills but also the formation of students' physical competencies. The modern labor market demands specialists who possess not only theoretical knowledge but also good health, high physical fitness, and sustainable work capacity. Therefore, organizing physical education classes in higher education institutions based on a competency-oriented approach has become an important scientific and practical priority.

Physical competence is an integrated personal characteristic that reflects an individual's ability to maintain health, develop physical qualities, organize motor activities effectively, and adhere to a healthy lifestyle. Along with promoting students' physical development, this competence contributes to strengthening their volitional qualities, decision-making abilities, self-management skills, and personal responsibility for maintaining their health.

Track and field is one of the most fundamental sports because it is based on natural human movements. It provides comprehensive development of essential physical qualities, including strength, speed, endurance, agility, and coordination. Running, jumping, and throwing exercises not only improve students' functional preparedness but also serve as highly effective pedagogical tools for developing physical competencies.

In recent years, considerable attention has been devoted to implementing competency-based approaches within physical education systems. This approach emphasizes not only the development of physical abilities but also students' conscious attitudes toward healthy living, independent exercise habits, the ability to regulate physical workloads, and self-monitoring of health conditions. In this regard, track and field exercises occupy a significant place as one of the primary instructional tools for competency-based physical education.

Research Objective

The purpose of this study was to determine the effectiveness of a methodology based on track and field exercises for developing physical competencies among university students and to provide scientific justification for the impact of competency-based physical education classes on physical fitness, motor skills, and healthy lifestyle formation.

Research Methods

This study was conducted during the **2025–2026 academic year** to determine the effectiveness of track and field exercises in developing physical competencies among university students. A total of **30 students** aged **18–22 years** participated in the research. The participants were randomly assigned to either a **control group (CG, n = 15)** or an **experimental group (EG, n = 15)**. Although both groups participated in physical education classes of identical duration and volume, the experimental group followed an improved methodology specifically designed to enhance physical competencies through track and field exercises.

Pedagogical Observation

The pedagogical observation method was employed throughout the study to systematically monitor students' physical activity levels, mastery of motor skills, quality of exercise performance, adaptation to training loads, and attitudes toward maintaining a healthy lifestyle. All observations were documented using standardized pedagogical observation records, ensuring objective evaluation throughout the experimental period.

Pedagogical Experiment

The pedagogical experiment lasted for **16 weeks**. Students in the experimental group attended **three 90-minute training sessions per week**. During each session, approximately **25–30 minutes** were devoted to specially designed track and field exercises aimed at developing physical competencies.

The training program included the following activities:

- short- and middle-distance running exercises;
- interval running drills;
- relay running activities;
- long jump and high jump exercises;
- coordination and agility development exercises;
- general strength-development exercises;
- movement-based tasks performed in small groups;
- independent physical activity components designed to promote a healthy lifestyle.

These exercises were specifically selected to promote the comprehensive development of students' physical competencies, strengthen independent exercise skills, improve functional capacities, and increase overall physical activity.

Testing Procedures

Students' physical competencies and physical fitness levels were assessed both **before and after** the pedagogical experiment using the following standardized tests:

1. **100-meter sprint test;**
2. **1000-meter endurance running test;**
3. **4 × 10-meter shuttle run test;**
4. **Standing long jump test;**
5. **Sit-and-reach flexibility test;**
6. **Questionnaire for assessing physical competencies.**

These assessment tools enabled a comprehensive evaluation of students' fundamental physical qualities as well as their knowledge, attitudes, and practical competencies related to maintaining a healthy lifestyle.

Statistical Analysis

The collected data were analyzed using standard methods of mathematical statistics. The **arithmetic mean ($\bar{X}$)**, **standard deviation (SD)**, **Student's t-test**, and the **level of statistical significance ($p < 0.05$)** were calculated. Statistical analysis was performed to determine the reliability and significance of the experimental findings.

Results and Discussion

At the beginning of the pedagogical experiment, no statistically significant differences were observed between the control group and the experimental group regarding physical competencies

or physical fitness indicators ($p > 0.05$). This confirmed that both groups had comparable baseline characteristics, ensuring the reliability of the experimental design.

Following the **16-week intervention**, students in the experimental group demonstrated substantial improvements in both physical competencies and physical fitness indicators. The most pronounced progress was observed in **speed, general endurance, agility, and independent exercise skills**, indicating the effectiveness of the competency-based track and field training program.

Table 1

Development of Physical Competencies among Students in the Experimental Group

Indicator	Before the Experiment	After the Experiment	Improvement (%)
100 m sprint (s)	15.3	14.4	5.9
1000 m run (s)	288	264	8.3
Standing long jump (cm)	206	222	7.8
Physical competence score (points)	71	89	25.4

The results presented in **Table 1** indicate that the greatest improvement was observed in students' **physical competence scores**, which increased by **25.4%** after the implementation of the experimental methodology. This finding suggests that the athletics-based instructional program contributed not only to enhancing students' physical abilities but also to improving their knowledge of healthy lifestyles, independent exercise habits, and responsibility toward maintaining regular physical activity.

The positive changes recorded across all assessment indicators demonstrate the effectiveness of competency-oriented track and field instruction in promoting students' comprehensive physical development. The considerable increase in physical competence scores reflects improvements in theoretical knowledge, practical skills, and the ability to organize independent physical activity effectively.

The results of the **100-meter sprint** and **1000-meter endurance run** further confirm that systematic track and field training is highly effective in developing both speed and aerobic endurance. Likewise, the improvement in the **standing long jump** test indicates significant enhancement of students' explosive strength and speed-strength abilities.

Pedagogical observations conducted throughout the experiment also revealed several positive behavioral and educational outcomes among students in the experimental group. Specifically, they demonstrated:

- increased participation and regular attendance in physical education classes;
- improved ability to perform independent physical exercises;
- a more conscious attitude toward maintaining a healthy lifestyle;
- enhanced skills in regulating and distributing physical workloads appropriately;
- improved movement technique and exercise execution;
- better teamwork and collaborative skills during physical activities;
- significantly increased motivation toward regular participation in physical exercise.

In addition to improving physical competencies, regular participation in track and field exercises positively influenced students' **functional capacities**. Throughout the experimental period, improvements were observed in cardiovascular and respiratory system performance, faster recovery following physical exertion, and increased overall work capacity. These physiological adaptations play a crucial role in strengthening students' health and supporting long-term physical activity.

Within the competency-based instructional framework, particular emphasis was placed on integrating theoretical knowledge with practical application. As a result, students developed

practical competencies in selecting appropriate physical exercises, monitoring training loads, evaluating their own functional condition, and planning healthy lifestyle activities independently.

The findings of this study are consistent with the scientific concepts proposed by **Matveyev**, Volodymyr Platonov, Tudor O. Bompa, and **Kerimov**, who emphasized that competency-oriented physical training significantly enhances the effectiveness of sports preparation and physical education. Their theoretical frameworks support the idea that systematic and scientifically organized physical training contributes to sustainable development of both physical fitness and professional competencies.

Overall, the findings of the pedagogical experiment demonstrate that the proposed methodology based on track and field exercises is highly effective in developing physical competencies among university students. Therefore, incorporating this competency-based methodology into higher education physical education curricula can be recommended as an effective strategy for improving students' physical preparedness, promoting healthy lifestyles, and fostering lifelong engagement in physical activity.

Conclusion

The findings of this study demonstrate that the competency-based application of track and field exercises effectively promotes the development of physical competencies among university students. The systematic incorporation of running, jumping, relay, and general physical conditioning exercises not only enhanced students' fundamental physical qualities—including speed, endurance, strength, agility, and coordination—but also improved their ability to engage in independent physical activity.

The results of the pedagogical experiment indicate that competency-oriented track and field training significantly increases students' motivation to maintain a healthy lifestyle, fosters a greater sense of responsibility for their own health, and develops sustainable habits of regular physical activity. Furthermore, the integration of theoretical knowledge with practical exercise enabled students to acquire essential competencies in planning, organizing, and evaluating their own physical fitness activities.

Based on the findings of this research, it is recommended that competency-based methodologies utilizing track and field exercises be more widely incorporated into physical education curricula in higher education institutions. These methodologies should be integrated with modern pedagogical technologies and adapted to students' individual characteristics and physical capabilities to maximize their educational effectiveness.

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