

## THE DEVELOPMENT OF SPEED QUALITIES IN SENIOR SCHOOL STUDENTS THROUGH INNOVATIVE METHODS

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### Abstract

This article scientifically analyzes the effectiveness of innovative pedagogical methods in developing speed qualities among senior school students. The study examines physical education lessons organized using digital technologies, interactive exercises, plyometric training, and differentiated approaches. A pedagogical experiment was conducted using control and experimental groups, and speed development dynamics were assessed through standardized tests. The results demonstrated statistically significant improvements in speed indicators within the experimental group ( $p < 0.05$ ). The findings confirm the necessity of integrating innovative teaching technologies into physical education curricula.

### Keywords

speed qualities, senior school students, innovative methods, physical education, digital technologies.

### Introduction

In modern general secondary education, one of the primary objectives of physical education is the development of students' physical qualities, particularly speed. Speed qualities play a crucial role in motor activity, sports performance, and everyday functional capacity. Due to the intensive physical development occurring during senior school age, scientifically grounded and purposeful development of speed qualities is considered a relevant pedagogical issue.

### Literature Review and Methods

The study was conducted as a pedagogical experiment involving students from grades 9–11. Participants were divided into control and experimental groups based on age, physical fitness, and health status. The research duration was 10 weeks, with physical education classes held three times per week. The control group followed a traditional curriculum, while the experimental group participated

in lessons based on innovative pedagogical methods, including plyometric exercises, short-distance sprinting, reaction-speed games, and digital technologies.

### Results and Discussion

The results of the pedagogical experiment revealed significant improvements in all measured speed indicators in the experimental group. At the beginning of the study, no statistically significant differences were observed between groups ( $p > 0.05$ ). Following the intervention, the experimental group demonstrated a 6.4% improvement in the 30-meter sprint test, while the control group showed only a 2.1% improvement. Reaction time indicators also improved significantly in the experimental group.

Table 1. Changes in Speed Indicators

Indicator	Group	Initial ( $X \pm \sigma$ )	Final ( $X \pm \sigma$ )	Change (%)
30 m sprint (s)	Control	$4.78 \pm 0.21$	$4.68 \pm 0.19$	2.1
30 m sprint (s)	Experimental	$4.76 \pm 0.20$	$4.46 \pm 0.18$	6.4
Reaction time (ms)	Control	$310 \pm 15$	$304 \pm 14$	1.9
Reaction time (ms)	Experimental	$312 \pm 16$	$285 \pm 13$	8.7

### Conclusion

The study confirms that innovative pedagogical methods are highly effective in developing speed qualities among senior school students. The integration of digital technologies, interactive exercises, plyometric training, and differentiated approaches leads to statistically significant improvements in speed, reaction time, and agility ( $p < 0.05$ ). These findings support the widespread implementation of innovative methods in general secondary school physical education programs.

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