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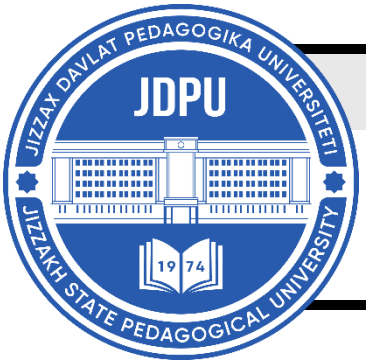

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SOCIO-ECONOMIC FACTORS OF INCREASING YOUTH'S INTEREST IN PHYSICS

M.K. Kodirov
Samarkand State University named after Sharof Rashidov
Samarkand, Uzbekistan

X.S. Xaydarov
Samarkand State University named after Sharof Rashidov
Samarkand, Uzbekistan

X.R. Quybakov
Samarkand State University named after Sharof Rashidov
Samarkand, Uzbekistan

ABOUT ARTICLE

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Abstract: This article analyzes the socio-economic factors influencing the formation of students' motivation to choose highly qualified engineering professions and the achievement of quality education through the teaching of physics in secondary schools and academic lyceums. The study demonstrates that the low quality of physics instruction is primarily associated with the knowledge and skills of the teacher, the level of organization of the educational process in schools, the condition of laboratory equipment, and, most importantly, the student's motivation to learn.

Introduction. In recent years, globalization, the increased transparency of information on the internet, and the influence of mass culture have significantly changed the upbringing and worldview of young people. Nowadays, instead of pursuing higher education and acquiring professions that contribute to societal development and provide a decent living, many young people prefer careers in professional sports or show business, which promise high income and public recognition in a short time. The organization of billion-dollar championships in football,

hockey, basketball, boxing, karate, and other sports, the signing of multimillion-dollar contracts by many athletes, and the holding of high-value festivals in show business, as well as the commercialization and globalization of education, further popularize these trends.

Similar trends are observed in our country: students' attitudes toward education and their choice of professions are changing in secondary schools, academic lyceums, and higher education institutions. The general interest in culture, education, and science, which shapes the social and cultural structure of society, is somewhat declining. This trend is particularly evident in the teaching of physics.

Although physics plays a crucial role in the development of technical sciences such as mathematics, chemistry, and biology, students' interest and social motivation in this subject remain insufficient. Physics is often perceived as secondary or even tertiary compared to mathematics, history, philology, and foreign languages. One reason is that entrance exams to higher education prioritize mathematics, foreign languages, and literature, while physics is primarily included only in physics-mathematics and technical-engineering tracks.

The government recognizes the importance of physics for intellectual development and societal progress. The President of Uzbekistan emphasized in his address to the Oliy Majlis on December 29, 2020:

"Almost all discoveries and technologies in the world have been fundamentally based on physics. Without mastering the laws of physics, it is impossible to achieve results in fields such as mechanical engineering, electrical engineering, IT, and energy-saving technologies" [1].

Furthermore, the 2021 decree PQ-5032 outlines measures to improve physics education and promote research and innovation, highlighting the importance of preparing competitive specialists in technical fields [2].

Negative Factors Affecting Students' Interest in Physics

Several key factors negatively affect students' motivation to study physics:

1. Difficulty in understanding concepts – many students struggle with physics laws, concepts, and formulas, reducing interest in the subject.
2. Lack of understanding of practical applications – students often fail to see connections between theoretical knowledge and everyday life.
3. Insufficient support from parents and peers – family support is crucial to motivate students and create favorable conditions for learning.
4. Heavy workload – managing multiple subjects simultaneously leaves little time for physics preparation.

5. Difficult relationships with teachers or classmates – interpersonal conflicts negatively impact learning.

6. External motivational factors – rewards, incentives, or punishments can undermine internal motivation.

7. Selective interest in certain subjects – preference for other subjects may reduce focus on physics.

According to Y.A. Komensky, education should be deep, reliable, and meaningful, not superficial. Motivation is key: curiosity and the drive for knowledge are the foundation of effective learning.

Types of Motivation

P.Ya. Galperin classifies motivation as:

1. External motivation – driven by external factors (grades, rewards, punishment).
2. Competitive motivation – driven by the desire to compete with peers.
3. Internal motivation – knowledge itself is interesting and satisfying for the learner.

Motivation can also be categorized by levels:

Level Description

High Strong interest in learning, responsible, performs all tasks diligently.

Good Positive attitude and stable participation in learning activities.

Moderate Positive attitude to school but low academic motivation.

Low Reluctant attendance, distracted in class, poor performance.

Negative Unable to adapt to school, conflicts with teachers and peers, avoidance of learning.

Survey on Physics Motivation at Samarkand State University Academic Lyceum

A study was conducted among 115 first- and second-year students in the technical-science track. Key survey results (percentages indicate student responses) are as follows:

Question Options Responses (%)

1. Purpose of choosing this track a) I want to be a physics teacher 10%

b) I want to be a physicist-engineer 27%

c) I plan to enter a natural sciences university 60%

d) Chose because entrance scores were low 3%

e) Accidentally (parental pressure) 0%

2. Attitude toward physics a) Interested in physics 86%

b) Not interested 0%

c) Study because it is required for tests 14%

3. Knowledge and skill of school physics teacher a) High 48%

b) Provides only theoretical knowledge 32%

c) Unsatisfactory 20%

4. Participation in physics Olympiads a) Participated 40%

b) Did not participate 52%

c) Olympiads not held 8%

5. Physics lab equipment a) Well-equipped 42%

b) Does not exist 15%

c) Poorly equipped 43%

6. Organization of learning process a) Well-organized 51%

b) Poorly organized 18%

c) Additional lessons/clubs available 20%

d) Boring 11%

7. Lyceum learning organization a) Well-organized 99.13%

b) Poorly organized 0%

c) Same as school 0.87%

8. Physics teaching quality a) High 97%

b) Not high 1%

c) Same as school 2%

9. Lyceum physics teacher knowledge a) High 99%

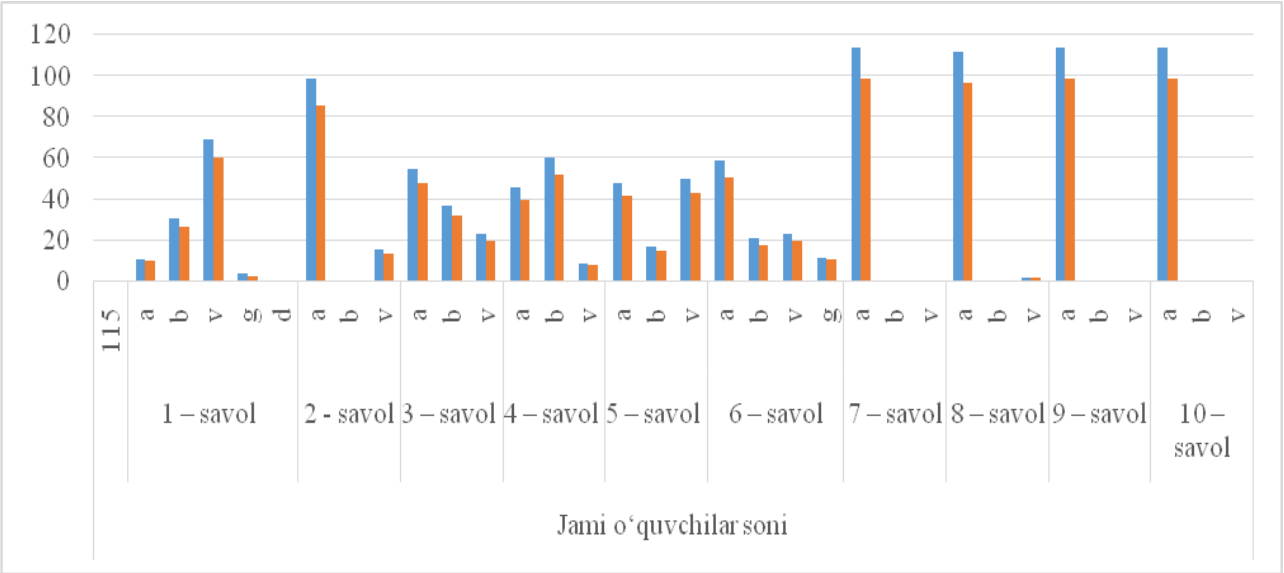
b) Only theoretical knowledge 1%

c) Unsatisfactory 0%

10. Physics lab in lyceum a) Well-equipped 99%

b) Nominal 0%

c) Poorly equipped 1%



Analysis of Survey Results and Recommendations

The analysis of the survey results indicates that students enrolled in the academic lyceum primarily chose the institution for its focus on exact sciences (technical fields). Specifically, 10% of students aimed to become physics teachers, 27% sought to pursue careers as physicists or engineers, and 60% intended to enter higher education institutions in exact sciences (technical fields). Notably, none of the students reported attending the academic lyceum by chance (Question 1).

According to the survey, 86% of students expressed interest in physics (Question 2). However, 20% considered the physics teachers at their schools insufficiently knowledgeable or skilled, and 32% noted that the teachers provided only theoretical instruction (Question 3).

The study also revealed that 52% of students did not participate in physics olympiads at school, while 8% reported that no olympiads were organized (Question 4). Furthermore, 58% indicated that their schools either lacked a physics laboratory or had only a nominal one (Question 5). Additionally, 18% reported that the learning process was poorly organized, and 11% described it as boring (Question 6).

In contrast, 99% of students in the academic lyceum highlighted the well-organized learning process, the high level of physics instruction, the competence of teachers, and the availability of well-equipped physics laboratories (Questions 7–10). While this positive evaluation reflects the lyceum's prestige, it is important to acknowledge that students' assessments may also be influenced by subjective cultural and social norms. It is worth noting that one student stated that the quality of instruction in the academic lyceum was no different from that at their school (Questions 7 and 8).

Based on observations and analyses, it can be confidently stated that the attractiveness of the Samarkand State University (SamDU) Academic Lyceum, students' motivation to pursue careers in physics, technical, and engineering fields, and the quality of physics instruction are largely determined by the following factors:

1. State Policies and Reforms – The expansion of state grants for natural science education, including preferential grants, and the allocation of admission quotas primarily on the basis of state funding at the master's level.

2. Selection of Talented Students – A systematic approach to identifying and selecting gifted students from general secondary schools, conducted in two stages: regional physics olympiads and a transparent, merit-based admission process to the academic lyceum.

3. Scientific Environment and Modern Laboratories – Exposure of lyceum students to research schools and laboratories within the SamDU Institute of Engineering Physics, including access to unique scientific equipment such as the MT-22S electronic accelerator-based Nuclear Physics Laboratory, a 48-cm diameter Grubb Parsons optical telescope, and solar radiotelescopes.

4. Professional Staff and Parental Collaboration – Engagement of distinguished professors and instructors, along with structured events for parents regarding students' academic progress and career planning.

As a result, the university has increased the rate of academic lyceum graduates entering higher education institutions from 33% in 2000 to 92% in the 2024/2025 academic year—nearly a threefold increase. Most importantly, the institution's attractiveness has significantly risen.

Prospects for Development:

National reforms aim to establish cooperation between local universities and prestigious technical universities from Germany, Japan, China, Russia, Italy, Turkey, South Korea, and Singapore. Through the "Network–Enterprise–University" chain, industrial partners are assigned to universities to implement dual education programs. Initially, ten higher education institutions will open "Advanced Engineering Schools" offering two-year applied master's programs, with candidates selected according to industry requirements. These programs are financially supported by partner enterprises and the state. The number of technical universities in the country will gradually consolidate from 36 to 20, ensuring at least one technical university in each region [6].

Challenges Affecting Students' Motivation to Pursue Technical Careers:

- Insufficient awareness about engineering careers, their diversity, and opportunities.
- Low income and perceived lack of prestige in engineering professions.
- Parents' lack of motivation or accurate understanding of industry prospects.
- Limited guidance from schools or educational institutions regarding career pathways.
- Peer influence and negative attitudes toward technical professions.
- Uncertainty regarding employment opportunities and labor market competitiveness.

Recommended Measures:

- Provide students with comprehensive information about engineering careers, opportunities, and employment prospects.
- Organize meetings with successful engineers and arrange practical excursions to workplaces.
- Conduct outreach to parents highlighting the importance and future prospects of engineering careers.
- Support students interested in technical fields both financially and methodologically.
- Implement initiatives to enhance the social prestige of engineering professions.

Innovative Pedagogical Approaches in Physics Education at SamDU Academic Lyceum:

- During lectures such as "Wave Nature of Light," teachers present problem-based scenarios and facilitate discussions to engage students actively in solving scientific problems.
- Practical lessons are integral to physics education, transforming abstract concepts into concrete understanding and fostering both knowledge and personal qualities needed in life and professional activities.
- Laboratory work is conducted with detailed instructions, guiding students to analyze problems, propose solutions, and understand the causes and consequences of physical phenomena.

Problem-Based Learning:

- Enhances interest in physics and develops critical thinking.
- Promotes independent learning, hypothesis formulation and verification, practical application of knowledge, and skills in observation, attention, and imagination.
- Ultimately, these approaches increase students' engagement and creative potential in learning [7–11].

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