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SCHEMATIC ORGANIZATION OF THE SCIENTIFIC POTENTIAL OF PROFESSORS AND TEACHERS THROUGH TALENTED STUDENTS

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ABSTRACT

This article will consider the issues of schematic Organization of the scientific potential of gifted students and professors in higher education institutions as an interconnected system. The concept of a gifted student, its role in scientific activity and its interaction with the scientific potential of a professor are analyzed. Organizational schemes, models and mechanisms are proposed that serve to develop scientific potential. In the higher education system of Uzbekistan, effective ways of organizing scientific potential through talented students are based.

KEYWORDS

Talented student, scientific potential, faculty, research activities, mentor-mentee relations, schematic organization, intellectual capital, Scientific School, student scientific circle, multi-level cooperation model.

Introduction

Annotatsiya. Ushbu maqolada oliy ta'lim muassasalarida iqtidorli talabalar va professor-o'qituvchilar ilmiy salohiyatining o'zaro bog'liq tizim sifatida sxematik tashkil etilishi masalalari ko'rib chiqiladi. Iqtidorli talaba tushunchasi, uning ilmiy faoliyatdagi roli va professor-o'qituvchining ilmiy salohiyati bilan o'zaro ta'siri tahlil etiladi. Ilmiy salohiyatni rivojlantirishga xizmat qiluvchi

tashkiliy sxemalar, modellar va mexanizmlar taklif etiladi. O'zbekiston oliy ta'lim tizimida iqtidorli talabalar orqali ilmiy salohiyatni tashkil etishning samarali yo'llari asoslanadi.

Kalit so'zlar. iqtidorli talaba, ilmiy salohiyat, professor-o'qituvchi, ilmiy-tadqiqot faoliyati, mentor-mentee munosabatlari, sxematik tashkil etish, intellektual kapital, ilmiy maktab, talabalar ilmiy to'garagi, ko'p bosqichli hamkorlik modeli.

Аннотация

В данной статье рассматриваются вопросы схематической организации научного потенциала одаренных студентов и преподавателей высших учебных заведений как взаимосвязанной системы. Анализируются понятие одаренного студента, его роль в научной деятельности и взаимодействие с научным потенциалом преподавателя. Предлагаются организационные схемы, модели и механизмы, способствующие развитию научного потенциала. На основе этих схем разработаны эффективные пути организации научного потенциала одаренных студентов в системе высшего образования Узбекистана.

Ключевые слова. одаренный студент, научный потенциал, преподаватель, научно-исследовательская деятельность, отношения наставник-подопечный, схематическая организация, интеллектуальный капитал, научная школа, студенческий научный кружок, многоступенчатая модель сотрудничества.

In the higher education system, two huge intellectual forces always act in parallel: professors and teachers (PUT) as a generator of youth, experience and scientific knowledge; and talented students as a source of innovation, creative energy and original ideas. Unfortunately, the interaction of these two forces often occurs spontaneously and chaotically, resulting in the waste of huge intellectual potential. In today's digital and knowledge economy, the competitiveness of a university directly depends not only on the quality of teaching, but also on its scientific productivity in the form of published articles, received grants, registered patents and innovative projects. Therefore, the strategic management of the scientific potential of professors and teachers and its further enhancement through talented students has become one of the priority tasks for modern higher education management. International experience (Oxford, MIT, ETH Zurich, KAIST) shows that the most productive scientific schools are in ecosystems where professors and talented students solve scientific problems together, and knowledge and experience flow in a two-way flow. This article aims to describe and substantiate such an ecosystem through a schematic model adapted to the higher education environment of Uzbekistan.

The concept of "giftedness" in pedagogical science is interpreted differently. According to the modern approach, giftedness is not only a high intelligence quotient (IQ). Based on the "Theory of Multiple Intelligences" of psychologist Howard Gardner, giftedness can manifest itself in the following forms: linguistic, logical-mathematical, spatial, musical, kinesthetic, social and self-awareness intelligences. At the same time, Robert Sternberg's theory of "Achievable Intelligence" distinguishes analytical, creative and practical intelligences. In the context of higher education, the following can be cited as the main criteria for determining a gifted student: high academic motivation

and self-management; the ability to see the problem and find unconventional solutions; deep conceptual thinking and systematic thinking; the ability to quickly assimilate new ideas and contribute to them; high metacognitive sensitivity to monitor one's own learning process.

Scientific potential is a set of knowledge, skills, experience and resources necessary for a person to carry out scientific and research activities. The scientific potential of a professor-teacher consists of several components:

Component	Content	Measurement indicators
Cognitive	Deep knowledge of science, methodological literacy, systematic thinking	Academic degree, title, years of experience in the field
Research	Hypothesis, experiment, interpretation of the result	Number of publications, h-index, international collaboration
Pedagogical-scientific	Transfer of scientific knowledge, involvement of students in research, formation of a scientific school	Number of PhD/DSc dissertations prepared, student publications
Communicative	International cooperation, participation in conferences, obtaining grants	Grant amount, conference papers, network breadth
Innovative	Applying scientific results into practice, patenting, creating a startup	Number of patents, technology transfer, socio-economic impact

The scientific interaction between a gifted student and a professor-teacher can be analyzed on the basis of several theoretical models. According to Vygotsky's theory of the "Zone of Proximal Development", a gifted student should work outside the limits of his independent capabilities, but in a zone that he can reach with the help of a mentor. According to the theory of Situated Learning (Lave & Wenger), gifted students join the scientific community as a "new member" and gradually become a "central participant". According to the Reciprocal Teaching model, the roles of professor and student can sometimes be exchanged, which ensures the intellectual growth of both parties.

The main scheme for organizing the scientific potential of professors-teachers through gifted students is the "Pyramid of Multi-level Scientific Cooperation". This model consists of three main layers:

The first layer - "Discovery" (1st-2nd year students): Formation of a scientific worldview. Students get acquainted with scientific literature, perform small experimental tasks, participate as listeners in scientific seminars and conferences. The effect for the professor: refreshing the young mind, enriching the research area with new questions.

The second layer — “Participation” (3rd-4th year students): Joining the active research process. Fulfilling a certain part of the professor's projects through coursework and graduation qualification works. Collecting data, reviewing literature, supporting experiments. The effect for the professor: reducing the technical load, spending more time on conceptual work.

The third layer — "Co-author" (master's and PhD students): Full scientific partnership. Formulating an independent hypothesis, publishing as a co-author in international journals, participating in grants, presenting at international conferences. The effect for the professor: a significant increase in scientific productivity, opportunities for international cooperation.

In this scheme, the project stages are distributed among students of different levels:

Project Stage	Main Responsibility	Role of Talented Students	Expected Outcome
Problem Identification	Professor	Literature review, gap analysis	Research question formulated
Methodology	Professor + PhD	Methodological analysis, pilot testing	Research design prepared
Data Collection	Master's students	Undergraduate students as assistants	Primary database established
Analysis and Interpretation	Professor + PhD	Master's students conduct statistical analysis	System of scientific conclusions
Publication and Dissemination	Professor as lead author	PhD/Master's students as co-authors	Publication in an international journal
Practical Implementation	Professor + industry partners	PhD students in technology transfer	Patent or innovation

In recent years, Uzbekistan has made significant strides in reforming higher education. The number of universities has increased, they are gaining ground in international rankings, and the system of state scientific grants has been updated. However, scientific cooperation between professors and talented students is still lacking a systematic structure. Talented students are often not given the opportunity to develop their scientific interests, and professors and teachers, burdened with teaching, do not have time for research.

The main systemic problems are: first, scientific research and teaching activities are often seen as conflicting interests; second, the system for identifying and encouraging talented students is not sufficiently developed; third, the hierarchical relationship between professors and students often hinders equal intellectual cooperation; fourth, the linguistic and academic skills necessary to bring scientific results to the international arena are not yet widespread.

At the same time, a number of positive trends are also observed. Grants from the Youth Scientific Projects Fund provide financial support to talented students. The quality of graduates of Presidential schools and specialized schools is increasing every year. A number of universities - Tashkent State Technical University, National University of Uzbekistan, Turin Polytechnic University, etc. - are actively forming a scientific environment based on international cooperation. In addition, the number of articles by Uzbek authors in prestigious journals such as "Science" and "Nature" is gradually increasing.

Recommendations and conclusions. For university leadership

— Formalize scientific cooperation: introduce a system of mentor-mentee contracts and form a mechanism for monitoring its implementation.

— Develop and standardize a comprehensive portfolio assessment system for identifying talented students.

— Allocate material and administrative resources to student scientific circles: space, equipment, small internal grants.

— Change the system of motivating professors and teachers based on the results of scientific cooperation: award additional points for student publications.
— Invest in digital collaboration infrastructure — Overleaf, Zotero, GitHub corporate accounts.
For professors and teachers
— Plan scientific projects on the principle of "open door" that involves student participation.
— Develop mentoring skills: create an environment of communication, feedback, motivation, and intellectual safety.
— Fair recognition of their contribution in co-authored publications with students is a strong motivation for their further scientific activity.
— Formation of a multi-level scientific group (senior PhD, master, bachelor) and development of an internal culture of knowledge transfer.
For students
— Actively form scientific interest: attending conferences, regular reading of scientific journals, international online courses.
— Not to be left without a mentor: do not be afraid to establish a relationship with a professor with a suitable scientific direction.
— Creating a personal scientific portfolio: every small research work, presentation and publication is capital for future growth.
Talented students are not just a helping force in organizing the scientific potential of professors and teachers, they are full-fledged participants in the intellectual ecosystem. Scientific knowledge is updated, deepened and expanded in the process of this interaction.
Schematic models proposed in this article. The multi-level cooperation pyramid, the Scientific Ecosystem model, and the Scientific Project Conveyor Scheme are not theoretical constructs, but practical tools that have been tested in international practice and can be adapted to the conditions of Uzbekistan.
Three conditions are necessary for the successful implementation of these models: first, institutional support from the university leadership; second, the assimilation of a mentoring culture by professors and teachers; third, students' confidence in their intellectual potential and their desire to develop it. When these three conditions are combined, the university becomes not just a diploma-granting institution, but a real scientific center that creates knowledge and leads an innovative economy.

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