

THEORETICAL AND SCIENTIFIC ANALYSIS OF DEVELOPING COMPETENCE IN FABRIC MATERIALS SCIENCE IN THE TRAINING OF TECHNOLOGICAL EDUCATION TEACHERS

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ANNOTATION. This article presents a theoretical and scientific analysis of the development of textile materials science competence in the training process of technology education teachers. It examines the concept of professional competence, its structural components, and its significance in pedagogical activities. The paper outlines effective methodological approaches for teaching the properties of textile materials, with a focus on interactive strategies and the integration of innovative technologies in the learning process. Particular attention is given to the formation of practical skills, analytical thinking, critical reasoning, and independent problem-solving among future teachers. Based on research findings, the article proposes mechanisms for building textile materials science competencies within teacher education programs.

Keywords: Technology education, textile materials science, teacher training, professional competence, innovative approaches, instructional methods, practical skills, interactive learning, critical thinking.

Introduction. The processes of globalization worldwide, along with the rapid development of science and technology, are imposing new and urgent tasks on the education system. In particular, the large-scale reforms being carried out in Uzbekistan and the priority goals set in the “Uzbekistan – 2030” strategy—such as transitioning to a digital economy and developing human capital—require a thorough improvement of the system for training pedagogical personnel. In this context, it is crucial to reconsider the role and content of technology education in general secondary schools and to prepare teachers who are capable of forming life and professional skills in students, equipped with modern knowledge and competencies.

One of the main directions within the technology subject is “Textile Materials Science”, which serves as a foundation not only for developing practical labor skills in students but also for fostering aesthetic taste, creative thinking, resource conservation, and rational use. Therefore, developing the competencies of future technology education teachers in this field is one of the most pressing issues of higher pedagogical education. This article analyzes the theoretical and scientific aspects of developing competencies in textile materials science for technology education teachers, examines the essence of the concept of competence, its components, and modern pedagogical approaches to their formation.

Currently, the education system is actively transitioning from the traditional “knowledge, skills, and abilities” (KSA) paradigm to a competency-based approach. This shift is deliberate. While the KSA approach focuses primarily on the acquisition of theoretical knowledge, the competency-based approach prioritizes the ability to apply acquired knowledge in practice and in non-standard situations. Competence (from Latin *competere* – to be worthy, to achieve) is the ability of an individual to effectively apply their existing knowledge, experience, values, and inclinations in a specific field of activity.

The Law on Education of the Republic of Uzbekistan, the National Program for Personnel Training, and other relevant regulatory documents adopted in recent years pay special attention to creating mechanisms for the continuous development of pedagogical staff’s professional

competencies. A future technology teacher is expected to possess not only deep knowledge of their subject but also the following qualities:

- Readiness for innovative activity: Ability to introduce new pedagogical and information-communication technologies into the educational process.
- Professional mobility: Ability to quickly adapt to changing labor market conditions and continuously improve professional knowledge and skills.
- Creative approach: Ability to organize lessons in non-standard forms and guide students toward creative exploration.
- Project activity management: Ability to implement practical and meaningful creative projects with students.
- Entrepreneurial skills: Ability to develop students' economic thinking and basic entrepreneurship skills.

From this perspective, the process of training technology teachers should be systematically and purposefully aimed at forming all components of professional competence.

The training of teachers in technology education is currently undergoing profound changes and updates. In particular, forming knowledge and skills in textile materials science is an important factor in ensuring the professional competence of teachers being trained in this field. Therefore, analyzing scientific literature on the topic allows studying theoretical views, methodological approaches, and practical experiences in this area.

In the education system of the Republic of Uzbekistan, the competency-based approach is considered a priority principle. Internationally, scholars such as A. Khutorskoy, J. Raven, and M. Zimnyaya evaluate the components of competence—knowledge, skills, motivation, and reflection—as an integrated system. Their studies emphasize the importance of mastering the practical aspects of the subject in the professional training of teachers.

Theoretical knowledge about textile materials has been mainly covered by Russian scholars such as S. P. Volkov, I. G. Shershenevich, and V. A. Zolotukhin. These sources provide detailed analyses of the physical and mechanical properties of textile fibers, their composition, and processing technologies. At the same time, textbooks published in Uzbekistan (for example, textbooks on “Textile Materials”) propose approaches adapted to local conditions.

Scientific works by N. Mavlonova, Sh. Toshpulatov, and A. Yoldoshev play an important role in pedagogical activities regarding interdisciplinary integration, practical training, and project-based teaching methods. Their research emphasizes the alignment of student activity with interactive approaches to enhance the quality of education.

Methodological guides developed based on international assessment programs such as PISA and TIMSS pay special attention to developing students' practical skills and functional literacy. These aspects are also crucial in the teacher training process, as modern technology education should closely resemble real production environments. Innovative curricula, digital laboratories, and teaching experiences using AR/VR technologies in the teaching of materials science have been developed in recent years in higher education institutions of Uzbekistan and are reflected in the literature. This highlights the necessity of enriching traditional approaches with modern technologies. The analysis of literature shows that preparing technology education teachers to be competent in textile materials science requires not only theoretical knowledge but also the integration of methodological, practical, and innovative approaches. Scientific sources call for a systematic, step-by-step approach and the use of teaching methods integrated into real professional environments.

The process of assessing a future teacher's competence in textile materials science should differ from traditional approaches. Evaluation should not be limited to testing theoretical knowledge

but must also include practical skills and value-based attitudes. Developing competencies in textile materials science for technology education teachers is not merely the transmission of knowledge. It is a complex pedagogical process aimed at forming a holistic professional mastery in future specialists, enabling them to connect theoretical knowledge with practice, think creatively and critically, and embody both national and universal values.

To achieve this, systematic work is required in the following areas:

- **Modernization of curricula:** Redesigning higher pedagogical education programs in technology based on a competency-based approach, incorporating the latest scientific achievements and innovative technologies in materials science.
- **Improvement of teaching methodology:** Moving beyond traditional lecture-seminar formats and integrating project-based learning, case studies, business games, and other interactive technologies into the core of the educational process.
- **Strengthening material and technical resources:** Equipping materials science laboratories in higher education institutions with modern instruments, digital technologies, collections of textile samples, and visual aids.
- **Promotion of scientific research activity:** Involving faculty and students in research on teaching methods in materials science, studying and restoring national handicrafts, and developing new materials.
- **Strengthening higher education–industry integration:** Establishing partnerships with textile industry enterprises to provide students with opportunities to gain experience in real production environments.

Only through such a comprehensive approach can we prepare competitive technology teachers for general education schools—teachers with profound knowledge in textile materials science, practical skills, and strong value-based attitudes, capable of educating a new generation in line with national spirit and contemporary demands. This, in turn, contributes to increasing young people's interest in professions, developing human capital, and ultimately supporting the socio-economic development of Uzbekistan.

The modern technology education system aims not only to provide theoretical knowledge but also to develop students' practical skills, creativity, and ability to solve problem situations. Successfully achieving this goal is directly linked to the professional competence of teachers working in this field. In particular, knowledge and skills in textile materials science should be considered an integral component within the technology education subject.

Analysis of scientific literature shows that many foreign and local studies have primarily examined the concept of competence at a general theoretical level. However, there is insufficient in-depth practical research dedicated to developing specific competencies in materials science. This situation, in turn, emphasizes the need to bring teacher training programs closer to practical application.

Current curricula and programs often emphasize theoretical knowledge, while practical training is not sufficiently systematic. As a result, future teachers are more prepared in theory but face challenges in competencies related to working with materials in real classroom settings, analyzing, comparing, and selecting them correctly from a technological perspective.

Additionally, to convey complex concepts such as the structure, properties, and processing technologies of textile materials to students using interactive and innovative methods, teachers themselves need to possess skills in working with these technologies. This highlights the necessity of expanding the use of modern information and communication technologies in the teacher training system.

Another important point of discussion is the accuracy and practical value of competency assessment criteria. In many cases, subjective approaches are observed when evaluating teachers' competence. This complicates the objective assessment of measures aimed at developing competence. These considerations indicate that developing the competence of technology education teachers in textile materials science is a pressing scientific and practical issue that requires the integrated alignment of technical knowledge, pedagogical methodology, innovative technologies, and assessment mechanisms.

It is important to analyze international experiences and develop approaches adapted to local conditions. Based on the above analysis and discussion, it can be concluded that developing competencies in textile materials science is an integral component of modern professional education in the technology education field. This competence includes not only technical knowledge and skills but also pedagogical approaches, analytical thinking, the effective organization of practical training, and the ability to apply modern innovative technologies. Analysis of scientific literature, practical experience, and international approaches indicates that teacher training programs need to be revised, oriented toward practical application, strengthened in interdisciplinary integration, and include a system for evaluating competencies based on clear criteria. In conclusion, the following points can be emphasized:

- Implementing modern technologies (AR/VR, digital laboratories) in teaching textile materials science increases teachers' practical competence.
 - In developing competence, not only theoretical knowledge but also practical training closely aligned with real production environments is crucial.
 - A systematic, step-by-step approach is necessary in preparing future teachers for professional activity, providing opportunities to develop their competencies at each stage.
- Overall, developing the competence of technology education teachers in textile materials science contributes not only to the quality of education but also to enhancing the efficiency of preparing industry-ready specialists.

REFERENCES

1. Kazakov, F., Rajabov, I., Umirov, J., Ruziyeva, D., & Aripova, A. (2021, November). Methods to improve hackles in the production of quality yarn. In *Journal of Physics: Conference Series* (Vol. 2094, No. 4, p. 042091). IOP Publishing.
2. Ruzieva D. CLASSIFICATION OF SOFTWARE EDUCATIONAL TOOLS FOR USE IN THE EDUCATIONAL SYSTEM //International Conference On Higher Education Teaching. – 2023. – Т. 1. – №. 10. – С. 41-45.
3. Ruzieva D. M. FEATURES AND ADVANTAGES OF THE STRUCTURE OF BAKED THREADS USED IN THE PREPARATION OF SEWING PRODUCTS //GOLDEN BRAIN. – 2023. – Т. 1. – №. 17. – С. 401-408.
4. Muminovna R. D. et al. O'ZBEKISTONDA XALQ AMALIY SAN'ATI VA MILLIY HUNARMANDCHILIKNING RIVOJLANISHI //Ta'limning zamonaviy transformatsiyasi. – 2024. – Т. 7. – №. 4. – С. 157-165.
5. Гафурова Н. Т., Арипова А. Н. К., Рузиева Д. М. РОЛЬ ЯЗЫКА В РАЗВИТИИ ВЫСШЕГО ОБРАЗОВАНИЯ //Архивариус. – 2021. – Т. 7. – №. 8 (62). – С. 20-23.
6. Islamovna B. S., Ubaidilloevna D. N., Norjona P. MODERN COMPETENCES OF ORGANIZING TECHNOLOGY COURSES //SAMARALI TA'LIM VA BARQAROR INNOVATSIYALAR. – 2023. – Т. 1. – №. 3. – С. 146-151.
7. ГАФУРОВА Н. Т., АРИПОВА А. Н. К., РУЗИЕВА Д. М. Учредители: Серенити-Груп, Буткевич Виктор Васильевич //АРХИВАРИУС Учредители: Серенити-Груп, Буткевич Виктор Васильевич. – 2021. – Т. 7. – №. 8. – С. 20-23.

8. Рузиева Д. М. СЕКРЕТЫ ШИТЬЯ И ЕГО СОВРЕМЕННЫЕ НАПРАВЛЕНИЯ //GOLDEN BRAIN. – 2023. – Т. 1. – №. 35. – С. 282- 286.
9. Muminovna R. D. Tabiiy Ipak Iplarining Xususiyatlarini Tahlil Qilish Asosida Ipak Tolali Gazlamalarining Sifati Va Assortimentini Oshirish Mezonlari //Miasto Przyszłości. – 2024. – С. 323-326.
10. Muminovna R. D. TA'LIM TIZIMIDA FOYDALANISHGA MO'LJALLANGAN DASTURIY TA'LIM VOSITALARI TASNIFI //Наука и технологии. – 2023. – Т. 1. – №. 3.
11. Muminovna R. D. GAZLAMALARNING KIRISHISHI VA UNGA TA'SIR QILUVCHI OMILLARNI O'RGANISH //Ta'limning zamonaviy transformatsiyasi. – 2024. – Т. 7. – №. 4. – С. 150-156.
12. Rayimova D. D. et al. Texnologiya ta'limi praktikumi fanini o'qitishda innovatsion ta'lim texnologiyalarini qo'llash imkoniyatlari //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 5. – С. 616-619.
13. Muminovna R. D. et al. TIKUVCHILIK MAHSULOTLARINI ISHLAB CHIQRISH JARAYONINI TAKOMILLASHTIRISH ISTIQBOLLARI //Global Science Review. – 2025. – Т. 4. – №. 6. – С. 126-130.
14. Muminovna R. D. TA'LIM TIZIMIDA FOYDALANISHGA MO'LJALLANGAN DASTURIY TA'LIM VOSITALARI TASNIFI //Наука и технологии. – 2023. – Т. 1. – №. 3.
15. Muminovna R. D. et al. AMALIY SAN'ATNING MO'JIZALARIDA NAQSHLAR RAQSI//FORMATION OF PSYCHOLOGY AND PEDAGOGY AS INTERDISCIPLINARY SCIENCES. – 2025. – Т. 4. – №. 37. – С. 110-115.
16. Muminovna R. D. et al. MILLIY-MADANIY AN'ANALAR VA QADRIYATLARIMIZNING TA'LIM MUASSASALARIDAGI YOSH AVLODNI TARBIVIALASHDAGI AHAMIYATI VA DOLZARBLIGI //SCIENTIFIC ASPECTS AND TRENDS IN THE FIELD OF SCIENTIFIC RESEARCH. – 2024. – Т. 2. – №. 21. – С. 351-356.
17. Muminovna R. D. INNOVATION TA'LIM SHAROITIDA OLIY TA'LIM MUASSASASI TALABALARINI ZAMONAVIY O'QITISH METODLARI ORQALI KASBIY MAHORATINI OSHIRISHDA FOYDALANISH TAMOYILLARI //PEDAGOGS. – 2024. – Т. 56. – №. 2. – С. 66-70.
18. Muminovna R. D. Improving the Organization of Practical Lessons in Technology Education//AMALIY VA FUNDAMENTAL TADQIQOTLAR JURNALI| JOURNAL OF APPLIED AND FUNDAMENTAL RESEARCH. – 2024. – Т. 3. – №. 5. – С. 58-62.
19. Muminovna R. D. GAZLAMALARNING KIRISHISHI VA UNGA TA'SIR QILUVCHI OMILLARNI O'RGANISH//Ta'limning zamonaviy transformatsiyasi. – 2024. – Т. 7. – №. 4. – С. 150-156.
20. Ruziyeva D. THE PLACE AND IMPORTANCE OF THE USE OF DIGITAL TECHNOLOGIES IN LECTURE LESSONS //International Journal of Artificial Intelligence. – 2025. – Т. 1. – №. 4. – С. 395-400.
21. Ruzieva D. PRINCIPLES OF USING MODERN TEACHING METHODS IN THE ENVIRONMENT OF INNOVATIVE EDUCATION INSTITUTIONS IN IMPROVING THE PROFESSIONAL SKILLS OF STUDENTS OF HIGHER EDUCATION //International Journal of Artificial Intelligence. – 2025. – Т. 1. – №. 1. – С. 768-772
22. <https://www.academicpublishers.org/journals/index.php/ijai>
23. <https://iopscience.iop.org/article/10.1088/1742-6596/2094/4/042091/pdf>
24. https://t.me/goldenbrain_journal.



25. https://t.me/Erus_uz.
26. www.mudarrisziyo.
27. www.tadqiqotlar.uz
28. www.pedagogs.uz
29. <https://wordlyknowledge.uz/index.php/IJSR>