



The Peculiarities of Improving the System of Comprehensive Acquisition of Professional and Technical Sciences Based on the Competence Approach

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<http://dx.doi.org/10.18415/ijmmu.v10i11.5335>

Abstract

This scientific work provides information about the peculiarities of improving the system of comprehensive acquisition of professional and technical sciences based on the competence approach.

Keywords: *Comprehensive Development; Professional; Technical Sciences; Competent Approach; Educational Technologies; Learning Principle; Educational Literature*

Introduction

The “Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030”, as approved by the Decree of the President of the Republic of Uzbekistan on October 8, 2019, emphasizes a gradual transition from an education system to an educational system that prioritizes the development of practical skills. This transition is driven by two key factors. Firstly, there is a strong emphasis on the training of qualified and competitive personnel for the real sectors of the economy, which has been identified as a priority task at the level of state policy. Secondly, the concept recognizes the importance of integrating modern teaching and learning processes from both pedagogical and psychological perspectives, highlighting the relevance of perceiving education as a technological process [1].

Discussion

Despite the fact that our nation has amassed specific expertise in producing engineers who are not only technically proficient but also competitive in the eyes of the labor market, globalization continues to advance at an alarming rate: advancements in technology, widespread availability of information, and the digitization of actual economic sectors—all in alignment with the demands of the current era of professional competencies. An urgent issue for the higher education system is to further develop competencies, improve the quality and efficiency of using foreign language and computer and Internet technologies, inspire young people to engage in innovative activities, instruct them on how to make the most optimal and necessary decisions in atypical situations, and elevate these processes to the level of reflection, reasoned thinking, and analysis.

It is also of the utmost importance, in the execution of such high-priority endeavors at the level of state policy, to enhance the competence-based system for program-complex subject mastery, which guarantees the integrity of both theoretical and practical competencies.

From this vantage point, it is crucial to ensure the following: firstly, during the transition to a person-oriented education system, an analysis of the present state of harmony between theory and practice in the enhancement of software-complex learning methodologies within the framework of independent education; and secondly, the establishment of requirements and didactic principles for subjects including “Engineering Graphics”, “Technical Mechanics”, and “Machine Details”. In order to ensure theoretical-practical harmony in professional-technical educational processes, the authors developed a new generation of educational literature based on modular educational technology, which is an individual-oriented approach. Subjects such as “Engineering graphics”, “Technical mechanics”, “Resistance of materials”, and “Machine details” serve as illustrations. Methodologies, mechanisms, and computerized educational technology that utilize English as the medium of instruction have been devised and are presently being implemented in educational settings [2,3,4,5,6,7].

Specifically, the following modifications have been made to the notion of a contemporary textbook in the new edition [8,9]:

Modern textbooks, developed in accordance with the State Education Standard and the Network Education Standard, encompass fundamental educational materials specified in the corresponding science program. They also promote the notion of national autonomy and are founded on the principles of didactics and educational integration, a particular research topic, and a research method. Consequently, they contribute to the development of literacy, knowledge, skills, and competence, which has evolved into a conviction. It is constructed using pedagogical-integrative and information technologies as its foundation. Its primary objective is to foster the growth of students’ creative capacities and instill specific human qualities through the extensive application of ICT tools. When required, it can also exhibit adaptability and diversity in alignment with contemporary innovative-integrative production. Ultimately, it serves as a reliable source of knowledge that guarantees favorable outcomes for individuals.

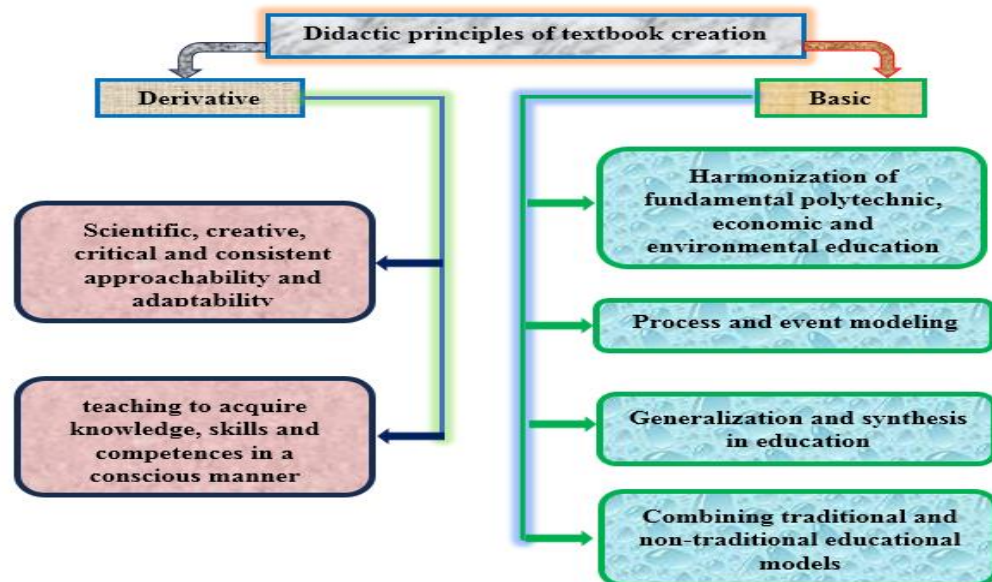


Figure 1. The didactic principles of textbook creation

By considering the four essential elements of the pedagogical system—“Teacher, textbook, educational processes, pupil, student”—analytically examined was the description of the actual didactic principles that are directly utilized in the development of a textbook that utilizes the competence approach

to enhance the software–complex mastering system. Consequently, the didactic principles governing the development of a textbook that adheres to both theory and practice are delineated as fundamental and derivative principles. The scientific perspective underpins the corresponding enhanced and generalized alternative (Figure 1).

The following new principles, which are based on the competence approach and aim to improve the system of software–complex mastering in vocational and technical sciences, are proposed as a result of ongoing research in this area. Their applicability to the development of educational literature for the next generation is justified.

The principle of aligning the demands of the integration process with the innovative environment in education is a complementary didactic relationship. Integration in pedagogy is not merely a mechanical amalgamation of subjects; rather, it is a synthesis conducted in accordance with a specific principle: the convergence of distinct systems, their interconnection, and, above all else, their alignment with a singular objective. Foreign experiences, for instance, provide confirmation that the study of materials mechanics and the science of mechanics, which is interdisciplinary, is conducted in close conjunction with pedagogy, information communication technologies, mathematics, geometry, engineering graphics, physics, and theoretical mechanics. Integrating innovative pedagogical and information and communication technologies; the processes of formation and development of a strong symbiotic relationship between higher education institutions, industry, and science at the level of current demands; and interdisciplinarity are all aspects of education integration that have a broad meaning. In the current era of rapid advancements in science and technology, it is imperative that higher education institutions establish a “Education–Science–Production Complex” and develop an independent educational process. This complex should be built upon a system that is founded upon “Knowledge through Science” technologies and aims to systematically enhance the innovation–integration mechanism between these sectors.

To begin with, new–generation textbooks and the software–complex mastery of educational materials and independent application of educational competencies in practice guarantee the continuity of educational programs in accordance with the current State Education Standards (SES), Network Education Standards (NES), or state requirements for the subject or set of subjects taught. Furthermore, it entails that students must possess a thorough understanding of the academic content outlined in the textbooks of the new generation in accordance with the science curriculum. Thirdly, it signifies an expansion in the capacity to progressively implement the indicators of proficiency acquired during the academic journey into the field of engineering.

Indeed, for specific activities, SES, NES, or state mandates serve as the primary mechanisms for guaranteeing educational excellence. As previously stated, educational standards serve as a regulatory legal document with universal applicability across all regions of the Republic of Uzbekistan. Moreover, they are unconditionally implemented across all state and non–state educational institutions, irrespective of departmental ownership and subordination. Furthermore, they constitute the sole foundation for the development of curricula designed for educational purposes.

The principle that systematic mastery of professional terms is essential is particularly relevant in the current era of globalization, which is transitioning to a high–tech and digital economy. This is further compounded by the innovative development of the economy and the expansion of the information space in society. To achieve the most intuitive mastery of a foreign language, students should gradually form and develop their communication skills in that language. Relevant fields of study include science, technology.

This can be elucidated as follows: in the execution of the primary objective delineated in this principle, it is anticipated that the other tasks will be carried out: the desired outcome is to develop proficiency in listening and comprehending the English language, as well as reading and understanding basic literature in the field. Additionally, it aims to achieve fluency in everyday conversational vocabulary, the ability to translate moderately difficult specialized literature, and familiarity with general terms related to professional activities. The objectives also include enhancing vocational guidance in conjunction with other specialized disciplines, adopting an individualized approach to language learning, fostering self-directed learning skills, accurately assessing one's abilities and needs, and effectively utilizing educational materials in independent study to further deepen knowledge and skills.

The imperative of fostering proficient English communication skills among technical-mechanical students is a pressing concern in contemporary education. It is essential for higher education institutions to equip students, irrespective of their area of specialization, with the necessary linguistic abilities to engage in effective cross-cultural communication. This proficiency is crucial for their future success as leaders in their respective fields.

The development of oral communication skills should be undertaken in a manner that aligns harmoniously and coherently with the enhancement of listening comprehension and speaking abilities. This approach should duly consider the professional responsibilities of students, encompassing effective communication with peers, sharing experiences with colleagues, delivering presentations within their respective fields, and staying informed about global affairs.

To effectively cultivate and instruct technical-mechanical students in the art of professional English communication, it is imperative that they demonstrate accurate usage of industry-specific terminology in their verbal discourse. According to the presented information, a three-stage system has been devised to facilitate the acquisition of field-specific terminology. The primary objective of this system is to progressively familiarize students with terms from the inactive lexicon and integrate them into their active vocabulary. During the initial stage, students are introduced to these terms under the guidance of a teacher. Subsequently, in the second stage, students are encouraged to independently incorporate these terms into their speech. Finally, the third stage aims to ensure that students possess the necessary proficiency to confidently utilize these terms in their oral communication. In order to effectively progress in this endeavor, it is crucial to engage in a systematic approach that involves the completion of exercises and activities that gradually increase in complexity. Furthermore, it is imperative to use the acquired knowledge and skills in practical settings.

The principle of integrating knowledge, practical skills, and competences in the study of technical sciences through the use of foreign languages is a fundamental aspect of education. It emphasizes the significance of understanding the societal and human relevance of these skills and competences. Rather than relying solely on rote memorization, this approach encourages learners to actively engage with educational materials, critically think about them, listen attentively, and apply them in practical contexts.

In the context of mastering technical subjects in foreign languages, this principle can be defined as the process of ensuring the coherence and integration of knowledge and practical skills through the collaboration between educators and students. The objective is to enhance students' integrative abilities, facilitate the timely retention of relevant educational materials, promote the acquisition of effective teaching and writing techniques, and enable students to express their thoughts in a logical and systematic manner during dialogue-oriented roundtable discussions. Additionally, this principle aims to develop students' ability to comprehend the ideas conveyed by their interlocutors in parallel, deliver presentations utilizing educational and methodological support, leverage the international Internet network, collect theoretical and practical data or information, systematize and summarize findings, draw analytical conclusions, and engage in active critical thinking. Furthermore, it emphasizes the importance of

attentively comprehending the essence of the learning materials and effectively applying them in practical situations.

The method can be elucidated as follows: when developing a textbook grounded in this principle, it is imperative to prioritize the incorporation of instructional resources that effectively engage learners, whether during classroom instruction or self-directed study. Additionally, to enhance the acquired knowledge obtained from the course materials and effectively apply it, it is advisable to incorporate instructional resources that foster student mastery. These resources should include exercises that promote active cognitive engagement rather than rote memorization. Furthermore, it is essential to facilitate a comprehensive understanding of the learned materials and objectively evaluate students' knowledge by providing question samples and assignments that enable fair, prompt, and proficient assessment.

Consequently, it is feasible to ascertain that students comprehend the significance of learning the knowledge, abilities, and competencies that are intended to be mastered, grasp their practical significance, and, of utmost relevance, effectively apply them in practical settings.

Conclusion

In conclusion, it can be inferred that based on the conducted research pertaining to the significance of enhancing the full mastery of technical mechanics and machine components through a competent approach:

1. The current research focuses on enhancing the approach to developing a new generation of educational literature. Specifically, it aims to refine the mechanisms for incorporating interactive methods and computerized educational technology into English language-based educational processes;
2. The competency approach serves as the foundation for proposing five educational principles that aim to enhance the process of mastering software-complex systems. It is argued that these principles can be effectively employed in the development of educational literature for the next generation;
3. The process of developing and enhancing practical skills and competencies within the technical, professional-technical, higher education, and professional education system is recognized as a multifaceted undertaking that necessitates careful consideration. The imperative to address this matter through educational reforms is grounded in a scientific and pedagogical perspective;
4. The leading factor in person-oriented educational processes is the “Innovative-integrative and technological education” mechanism, which has been determined to align with the needs of the competence approach.

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