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The Role of a New Generation of Textbooks in the Introduction of Competence Approach to the Education System (On the example of disciplines "Strength of materials" and "Technical Mechanics")

Abdimital Nabiev[1]; Zokhida Norkulovna Eshbaeva[2]; Mukaddas Musaxonovna Shokirova[3]

[1] Doctor of Pedagogical Sciences, Professor, Tashkent Chemical-Technological Institute, Uzbekistan

[2] Assistant, Navoi State Mining Institute, Uzbekistan

[3] Senior Teacher, Tashkent Chemical-Technological Institute, Uzbekistan

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Abstract

The article discusses the creation of a new generation of textbooks aimed at developing a symbiotic relationship between higher education, science and industry, as well as ensuring the unity of "Knowledge-skill-qualification-competency" in individual activities based on relevance. Also, in the didactic combination of theory and practice, a model of personal and professional qualities of the participants involved in the education of a harmoniously developed generation is recommended.

Keywords: *Person-Centered Learning Technology; New Generation Textbooks; Competence Approach; Practical Skills and Competencies; Signs of Competency; Communication; Creativity; Cognitive Flexibility; Personal and Professional Qualities; Guaranteed Outcome*

Introduction

In the training of highly qualified, competent personnel, the creation of a system that ensures harmony between HEI (higher education institution), science (institutes of the Academy of Sciences) and production (enterprise) was emphasized in the orders and decrees of the President of the Republic of Uzbekistan [1, 2, 3, 4].

In particular, in order to train competitive, competent personnel in new areas of technical and technological development, based on the needs and requirements of production, the golden triangle rule connecting knowledge transfer with education – "Science-education and production collaboration" is strictly defined.

In today's globalized information society, where technology is changing flexibly and dynamically in a market economy, the technology of teaching and learning must adapt to it. To do this, first of all, educational goals and objectives, educational programs must be dynamically changed, improved and updated without "hardening", but they are provided with methodological content and continuous communication with the labor market. Second, it is crucial to introduce a mechanism that will ensure the full transition of students from training to the educational process on the basis of innovative pedagogical technologies in accordance with the requirements of the SES. Thirdly, it is necessary to improve the form and content of the literature of the new generation and turn it into a source that meets the requirements of the principle of flexibility, which can combine the achievements of modern innovative science.

Indeed, if the textbook is considered primarily as a material carrier of educational content, in fact, it also serves as an organizer of educational processes. Since, the issue of training in the system of higher education requires that knowledge is not spontaneously - passively "transferred". More precisely, knowledge is offered to the learner, and the acquisition of knowledge is carried out in a conscious way to influence the abilities and interests of students in the framework of laboratory-practical training and independent learning through teacher support and coordination of the process. Naturally, such an approach ensures the combination of educational, i.e. learning-motivational motives with career choice or profession-specific motives.

In today's rapidly evolving and globalizing information society, it is natural to constantly improve the content of curricula and, if necessary, even radically reform them. The development trend of society corresponds to the improvement of educational processes, that is, knowledge grows dynamically and rises to new qualitative stages. Naturally, these days, when the educational process requires its own complexity, continuous improvement and continuity, educators and scientists have to prepare and re-educate not only the younger generation, but all active citizens in society - the socio-political environment in which they live, and consider tactical and strategic tasks aimed at ensuring the implementation of real-life requirements and regular updates.

Hence the urgency of creating a new generation of textbooks aimed at the formation and development of a strong and symbiotic relationship between science and industry at the level of modern requirements is brought forward.

In the information society, it is necessary to continuously, systematically and systematically improve the educational process in higher education, focusing on the solution of vital needs and existing problems.

It is known that due to the transition to the system of training at the bachelor's academic level, the duration of education is reduced by one year, so in all higher technical education institutions (HEIs) students study subjects in accordance with the relevant curriculum. At this point, it is necessary and sufficient to emphasize that we have absolutely no right to say that the workload has been reduced spontaneously without scientific justification.

On the contrary, we are responsible for ensuring that compliance with the requirements of state education standards (SES) and branch education standards (BES) is unconditional. In fact, taking into the consideration the rapid development of science and the rapid growth and frequent updating of scientific and technical information, improvements in engineering structures and technological processes, increasing the level of automation in control systems, in accordance with the requirements of the time, we must fully realize that the amount of academic load has been reduced.

However, the goal cannot be fully achieved through the organization of educational processes in authoritarian technology.

One of the urgent tasks in solving the existing scientific and pedagogical problems is the introduction of person-centered technologies in the educational process.

Although the use of person-centered innovative technologies reduces the workload, while maintaining the integrity of the content and quality of education, the educational process will be significantly accelerated in accordance with the requirements of the time, and efforts will be focused on achieving guaranteed results.

Therefore, first of all, the educational process should not only be a ready, ready-made means of acquiring knowledge, but also serve the active and purposeful exchange of information in harmony with the environment - life throughout life. Second, in accordance with the requirements of the competency approach, only when the combination of theory and practice is provided on the basis of the requirements of SES and BES, learners will develop signs of competence in their chosen field. In fact, this is one of the provard goals of the educational process.

"The emergence of the stagnation of innovative development has put the task of many countries to develop an optimal model of reforming the educational process. At the same time, the problem of training highly qualified personnel who can meet the requirements of an innovative economy has become a priority.

Today, with the rapid development of science and technology, it has been founded that it is important to develop an independent educational process in higher education and to create an "Education-Science-Production Complex" based on the formation of a system through "Knowledge through Science" technologies and to improve the innovation-integration mechanism between them [5, 6].

In the educational process, it is necessary to adapt the quartet - the unit of "Knowledge-skill-qualification-competency" (KSQC) to the activities of the individual, to dynamically improve his knowledge, from simple to complex, from specific to general, to systematically form practical skills and competencies. As a result of the gradual development of personal qualities, man strives for perfection.

Accordingly, on the basis of modern new generation textbooks, from a scientific, pedagogical and psychological point of view, it is expedient to briefly comment on each of the components that make up the integrity of the KSQC.

In technical and professional-technical education, the reflection of pedagogical-psychological "knowledge", i.e. the elements of real reality in the mind of the subject, has been in the gnostic position as the main direction for a long time. With this approach, the main task of education is the formation of systematized knowledge in students.

The process of knowledge formation is the process by which a person perceives (receives) learning materials through memory, comprehends and understands its content, memorizes it, and the application of knowledge is closely related to the systematization, identification and generalization of previously accepted.

In these days, when the unity of modern teaching and learning processes is considered as a rigorous technological process from a pedagogical point of view, it turns out that the application of new pedagogical technologies in accordance with modern requirements for person-centered educational processes is a very urgent problem.

Therefore, in the European Credit Transfer and Accumulation System (ECTS), the continuity of the Prerequisites and Postrequisites doctrines is paid special attention.

Skill is a set of actions aimed at the initial and guaranteed results, accumulated on the basis of certain theoretical and practical knowledge. Skill is the ability to automate operations or processes to the extent that they do not require "supposed" continuous control by the mind; in which case the operation is performed automatically at the level of mental actions, without the constant control of the mind.

The skill is formed as a result of exercises. Typically, the number of exercises in the activities of the educator-teacher and the learner-learner (exercises in the disciplines "Strength of Materials" and "Technical Mechanics" include problem-solving, independent study tasks and Olympiad tasks, calculations and course projects. presentation time, etc.) the timing and scope of implementation, of course, the rate of formation of automated actions, equipment compatibility, quality of materials, modernity, completeness and quality of educational algorithms or process-oriented maps, accuracy of purpose of actions and its implementation The presence of a motive for is closely related to factors such as the speed of the feedback system [7, 8].

Qualification or acquired qualification – such an important level of professional training of a specialist (employee) that it is a product of knowledge required to perform a particular job or scope of work and skills that are acquired automatically and sustainably (somehow firmly).

Since the 1980s, the meaning and scope of the concept of "qualification" has expanded significantly. Nowadays, in addition to the qualification description, the qualification of the specialist (employee) includes the professionally important qualities of the person, which are necessary for a wide range of professions and are called "basic skills".

It is expedient to understand basic skills firstly in the form of general professional knowledge, practical actions and skills and a set of personal abilities, personal qualities and professional qualities, and secondly, to recognize that professions belong to a certain group, i.e. only professionals.

The formation and development of basic skills is the main form and privilege of person-centered education and plays an important role in solving the problems of engineering practice, which plays a leading role in the economic growth of any country.

Now engineering practice as a key factor in the effective performance of certain professional activities requires a wide range of personal skills related to such abilities to coordinate their activities with the team and manage the team when necessary, to systematize and solve thoughtful and pending problems, to make targeted, rapid and optimal solutions and decisions, responsibility, sense of responsibility, reliability, communicativeness, ability to work together towards a set goal, creativity, cognitive flexibility, critical-analytical thinking.

Now, based on a professional approach, we will briefly focus on the next components of basic skills - personal and professional qualities.

In fact, quality is a comprehensive philosophical concept that represents a set of important features specific to an object (the real object being studied). Typically, these characters have a more stable character, giving a description of quality.

Taking into consideration that in many cases the basis of knowledge is practice, we are convinced that quality "shows" where theory and practice are harmonized, as well as experience and skill. As a result, the formation of individual competence signs is accelerated.

Practice also provides more economic benefits quickly than theoretical knowledge, as it can reflect not only nation-wide and universality, but also existence, bringing the learner closer to objective reality.

Recognizing the didactic connection of theory and practice, the authors recommend the following model of the personal and professional qualities of participants in the process of training socially active, qualified, competitive personnel directly involved in the education of a harmoniously developed generation based on these philosophical concepts.

A set of 26 essential human qualities that are intertwined by **personal qualities** such as literacy; witness; wisdom; boundless love, devotion to the material, spiritual-educational world and Motherland; looking to the future with confidence and pride; gratitude; honesty; patriotism; humanism; kindness to the younger generation; sincerity; kindness; compassion; spiritual-enlightenment height; civility; humility; conscientiousness; determination; responsibility; zeal; potential; aristocracy; courage; being forgiving, understanding, and faithful.

A set of 25 personal abilities and personal positive qualities is characterized by **professional qualities** such as intelligence; demanding; to be able to cultivate professional self-esteem in order to love the chosen profession, to remain loyal and faithful, and to master its secrets; skill; devotion; creativity; striving for innovation - support for innovation and technological processes in society; to be considerate and responsible and to recognize a sense of responsibility; to be quick to understand life situations and to treat them correctly, objectively and fairly, without giving in to emotions; social activity; self-control with restraint (patience); good organization; competence; capability; smartness; saving; risk if necessary; skill; communicativeness (communicativeness through solidarity); cognitive flexibility; strict adherence to labor legislation, culture and traditions and values inherited from generations; compliance with applicable regulations and procedures in the maintenance, integrity and use of the workplace, tools, devices and equipment; respect, reverence for and adherence to the requirements of “teacher-student” traditions.

We discuss professional skills and professional competence, which are a leading factor in the development of technologies for creating a new generation of textbooks in the system of technical, professional-technical, higher education and professional education and methods of their use in educational practice.

Indeed, professional skills, which are common in our daily lives and occupy a special place among the important universal professional qualities, are also formed and developed within the symbiotic relationship between universities, ASc institutes and industry in the form of an “educational triangle”.

In fact, skill (mastery, meticulousness, intelligence, dexterity) means the ability to perform certain actions on the basis of a set of theoretical and practical knowledge and skills acquired throughout a person's life. Skills are described as a complex mental structure, encompassing the emotional, intellectual, volitional, creative, emotional qualities of an individual, and are based on knowledge.

Like other professions, the professional skills of educators develop on the basis of practical skills, life experiences, formed on the basis of previously acquired theoretical and practical knowledge.

There is some research on the systematic classification of professional and pedagogical skills [9], according to which it is appropriate to divide those directly related to the areas of technical education into the following groups (Figure 1).

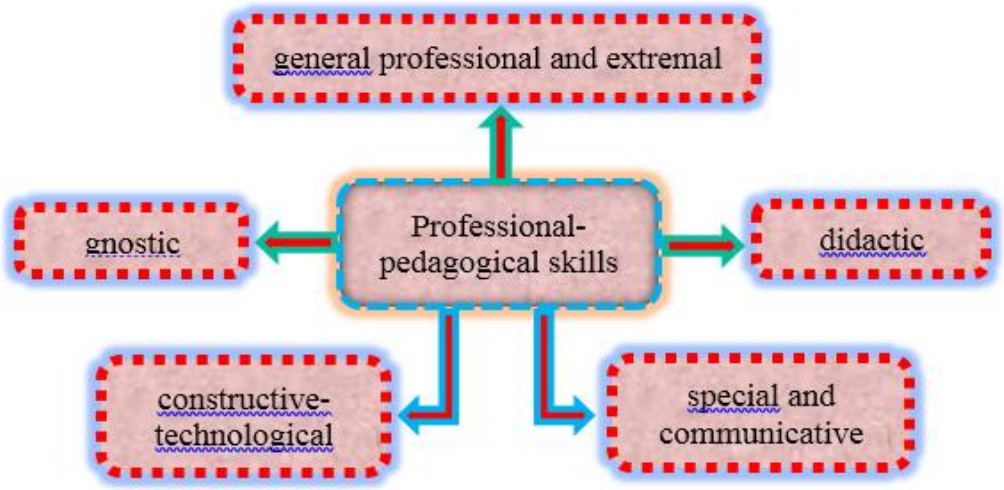

Figure 1. Classification of professional-pedagogical skills related to technical education directions (authors' development)

In general, professional pedagogical skills are the main and important qualitative indicator of the formation and development of competencies or signs of competence in qualified, competitive, efficient, enterprising, enterprising professionals who are trained in the education system.

Competence in the work of a specialist (employee), including engineers, educators, practical teachers and psychologists, means, first of all, personal qualities that indicate the aimed actions based on the knowledge, practical skills, qualifications, life experience, professional potential, talents and skills in the process of solving problems, and secondly, the ability to apply these indicators in a systematic, targeted manner.

The concept of basic competence is also widely used in the theory and practice of education. In general, it is useful to understand basic competencies as a whole, a set of practical knowledge, practical skills and abilities necessary for a particular professional activity, and to recognize the existence of a dialectical connection between them.

On the basis of the competency approach, we will focus on the signs of professional competence, which are directly related to the activities of engineers-educators, practical teachers and psychologists and are a high component of the individual.

Professional competence is a combination of positive personal qualities of specialists (employees), as well as engineers-teachers and masters of industrial education, such as dedication, professionalism, scientific-creative, analytical-critical approach, resourcefulness, entrepreneurship, entrepreneurship.

Naturally, pedagogical professional competence is reflected in the fact that the main direction of education in humane democratic states based on national and universal values is the formation of a person of high spirituality, a person of nature and society, well-versed in knowledge, skills and competencies.

Recognizing that the role of highly qualified pedagogical psychologists and production training masters with high scientific and pedagogical potential, creative, highly cultured and enlightened, qualified for their profession, selfless, fair, organized, hardworking, socially adaptable to work is incomparable in the process of innovative education, a new generation of textbooks are modelled as an up-to-date textbook in a new edition within the model of an integrated system of educational technology.

An up-to-date textbook - a source of knowledge which is created in accordance with the requirements of the State Education Standard and the Branch Education Standard, covering the basic teaching materials specified in the relevant science program; embedded in the idea of national independence; based on didactic principles, with specific research topics and pedagogical-oriented research methods, aimed at the formation of competencies, which are the basic set of knowledge, skills and abilities, the independent search for the necessary educational materials for independent mastering by students, the development of creative abilities and the formation of certain personal qualities of students; created on the basis of psychological and information technologies, and, if necessary, in accordance with modern innovative production; can demonstrate the properties of flexibility and variability, and, most importantly can lead the individual to guaranteed results.

The essence of this definition is the basis for the classification of the main components of the professional competence of the author-creator of a new generation of textbooks, innovative pedagogical technologies, theories, concepts; scientific and pedagogical researcher, able to provide education aimed at ensuring the harmony of theory and practice and intellectuals, who fully ensure students' transition from teaching to the educational process according to the SES requiremants, is as follows:

- economic and socio-legal competence - the human factor, which is the highest value in legal (in accordance with the requirements of the Constitution) interaction with social organizations and institutions, enterprises and people operating in real sectors of the economy - protection of human interests and human resources (the acquisition of knowledge and skills provided for in the current educational standards in the planning and management of issues such as training, vocational training, employment) and the ability to communicate professionally without corruption;

- spiritual-educational competence - all the spiritua-leducational impact (event) aimed at the spiritual development, worldview, formation of the moral image of a certain person, ensuring his active participation in social and educational life in these days when the education system in our country is radically improving in accordance with international requirements and standards) a deep understanding of the content and purposeful efforts, aspirations, persuasiveness aimed at improving their quality and effectiveness, which educated person has intelligence and spirituality;

- special competence - the ability to independently perform a particular type of activity, the ability to solve exemplary professional problems and objectively and fairly evaluate the results of their work, modern knowledge and skills not only in their field, but also in new areas of human resource planning and management ability to own independently;

- methodological-psychological competence - planned practical-professional demonstration of motivation for self-professional and personal improvement, aimed at implementing the results of the analytical study of acmeological-oriented educational continuity and continuity on the basis of acmeological approach, taking into account the specific differential features of existing educational technologies ability to present learning materials in the dynamics of science, sequence and consistency;
- intellectual competence - the position in the professional activity with intellectual and physical labor in the systematic improvement of theoretical knowledge, practical skills and abilities through the field, professional skills, work experience, as well as the creative mastery of ICT and foreign languages, depending on the requirements of the time, ability to further strengthen one's capacity and show effective results in this regard;

- scientific-creative and innovative competence - the results of the intellectual potential of the individual, such as scientific and creative thinking, rationalization, inventions, discoveries in accordance with the requirements of a market economy, aimed at further improving the quality

and efficiency of supply of goods (goods and services), theoretical and organizational skills aimed at full understanding and, in this regard, innovative potential and activity (usually innovative activity, motivational, reflexive, ie Latin "reflexio" - return, reflection, the ability to understand one's own actions on the basis of knowledge), ability to carry out technological (practical) activities.

The European credit transfer system is designed to assess the mastery of the discipline "Strength of Materials", a key component of the science "Technical Mechanics" in the combination of theory and practice, recognizing the control of KSQC in the educational process and the uniqueness of this quartet. It is recommended to use in practice the "system of expert criteria for assessing the formation of signs of competence" (Figure 2).

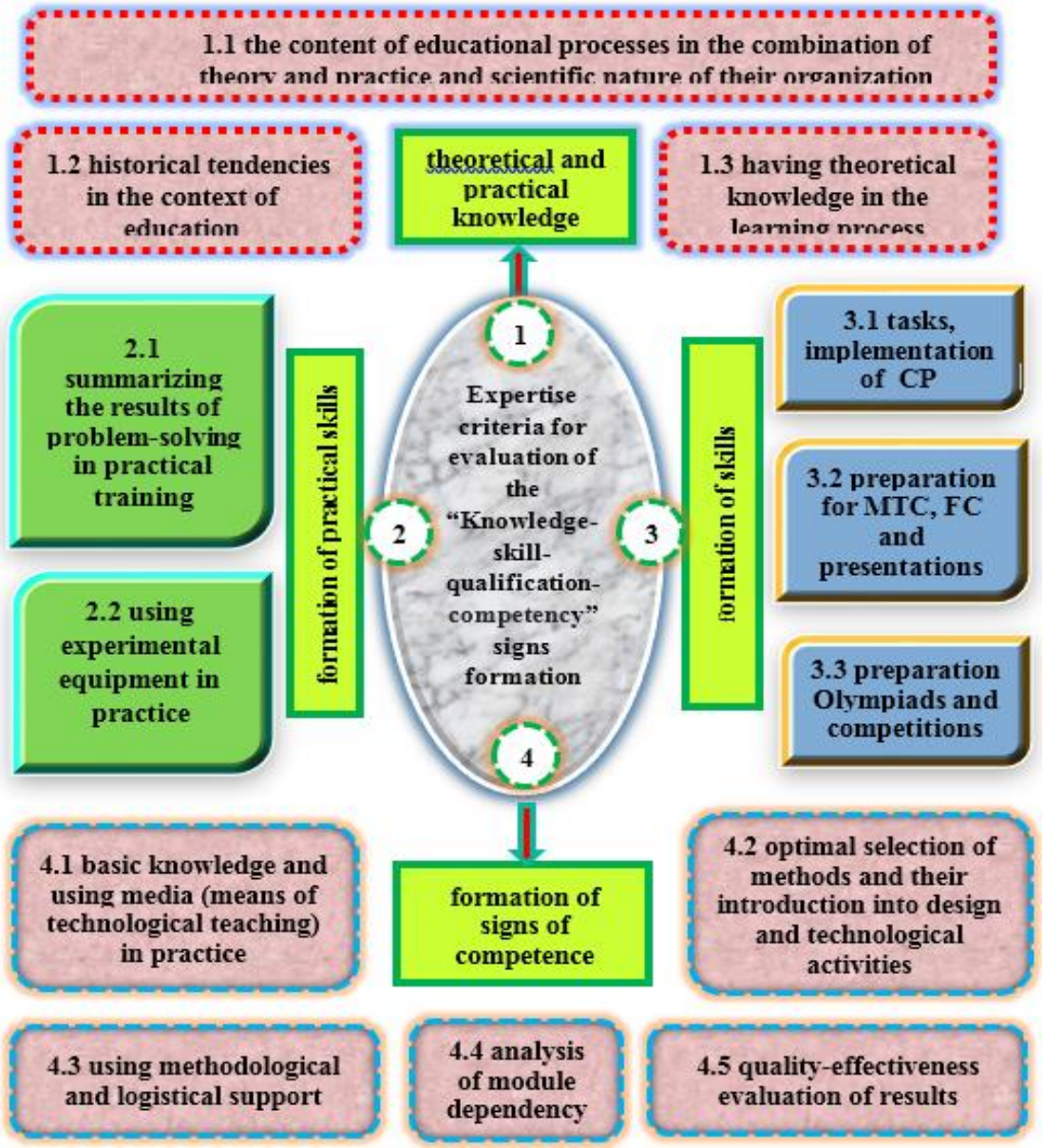

Figure 2. System of expert criteria for assessing the formation of knowledge, practical skills, competencies and competencies in the discipline "Strength of Materials" (authors' development)

Conclusions and Suggestions

1. Considering the gradual formation and improvement of practical skills and competencies in the system of technical, professional-technical, higher education and professional education as a complex process that requires special attention, to make efforts in this direction through educational reforms;
2. Taking into consideration that the formation of skills as a result of exercises and that skills are the product of knowledge, automatic and sustainable skills required to perform a particular job or scope of work, to view exercises as a key factor in forming and developing skills and competencies;
3. To focus on the systematic implementation of a combination of practical skills and professional skills in the creation of a new generation of textbooks based on theoretical and practical knowledge;
4. To consider the mechanism of application of new pedagogical technologies in accordance with the requirements of the time as a leading factor in the process of person-centered educational processes in ensuring the unity of modern teaching and learning processes;
5. It is necessary to improve the professional profile of a modern teacher based on the recommended personal and professional qualities.
6. Assessing the signs of professional pedagogical competence as the highest component of the person, in solving problems related to the profession:

   • personal qualities that lead to guaranteed results in education on the basis of knowledge, practical skills, life experience, professional potential, talents and abilities;

   • recognition of personal quality indicators as the ability to systematically, dynamically and purposefully apply in practice.

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