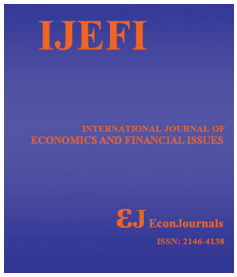

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# Pedagogical Bases of Formation of Key Information Technology Competencies Polytechnic Institute Graduates

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**ABSTRACT**

The article based on the analysis of the literature and experience in the field of economic education is considered a system of key concepts on the topic, as well as features of the introduction of competence approach in teaching practice polytechnic institute, the problem of realization competence approach in higher education, the formation of key information technology competencies, ensuring high availability polytechnic institute graduates to solve problems in the practice of the specialty, modern requirements to the society and the state system of vocational education at all levels, the task of creating these pedagogical conditions, which would help improve the quality of training of future specialists. This article lists didactic, psycho-pedagogical, organizational and pedagogical conditions that are necessary to improve the level of information technology training of future specialists. Their implementation will create the necessary information technology economist competence.

**Keywords:** Economic Reforms, Economic Education, Polytechnic Education, Competence, Professionalism
**JEL Classifications:** A10, A29, Q15

## 1. INTRODUCTION

Currently conducted large-scale economic reforms in an environment where there is a need to overcome the phenomena such as the low efficiency of the economic system, forestalling the emergence of economic crises, the need to raise the well-being of citizens and meeting their growing needs, as well as the elimination of the backlog in our economic development in Russia of the world's leading powers.

According to some scientists in the field of pedagogy (Arkhangelsky, 1974; Batysheva, 1998) is particularly important professional education in economics, in the course of development of economic knowledge is systematized, forming an understanding of the basic economic laws and economic transformation taking place in our country and abroad.

During the training of future professionals - economists must take into account that, without comprehension of economic laws as the law of demand, law of supply, law of diminishing returns, the law of increasing marginal costs, the law of increasing requirements and others in the modern market relations cannot find the ability and the ability to produce goals, identify benchmarks, to coordinate the tasks and functions of the workers in any field of activity.

Major economic reforms and a changing socio-economic relations in the country, has increased the urgency of training of competent specialists with higher economic education - graduates of polytechnics involved in the preparation of economists for the production, which differ in the level and structure of competencies in a variety of activities based on the promising market needs labor.

At the present stage of economic education is going through a difficult period. Mainly, this is due to the fact that there was a quality gap of educational activities of professional training institutions and competent experts of real labor market needs.

Learners for admission to polytechnic institute offered profession, often very narrow, not demanded in the labor market, especially in the private sector, or in front of a very general, non-specific, such as "Management," "Economics and Management" (Osadchy and Akhmetshin, 2015; Vasilev and Akhmetshin, 2014). In addition, it should be noted that during the economist training is not always taken into account the desire of students to obtain professional knowledge, which further action may create the basis for the organization and conduct of its business and start their own business, which leads to an increase in the number of young professionals who do not have feasibility of themselves in their specialty.

## 2. LITERATURE REVIEW

Based on the analysis of the literature and experience in the field of economic education, we can conclude that it is based on the idea of the need to design such pedagogical learning environment, in which the content of the educational process would be focused on the development of professionally significant qualities of the person of the future expert: Competence, responsibility, mobility, flexibility, adaptability, competitiveness.

Analysis of the literature showed that in the last decade made a number in the field of economic education research in the following areas:

- The creation of models of organization of the process of economic education in higher secondary schools.
- Focus on youth economic specialties (Shelekhova et al., 2015).
- Preparation of the future experts of an economic profile in higher education (Sapienza and Zingales, 2013).
- Personal development specialist in the field of economy (Sheppard, 2006).

A certain level of professional training of the economic formation of the subject of many works of leading scientists in the field of pedagogy.

From the analysis conducted by research leading scientists - teachers and practices of vocational schools it can be concluded that the problem of the organization and the impact of pedagogical conditions of formation of key competences from the experts-economists is relevant and requires further study.

In the course of the conducted analysis of scientific papers it revealed that more poorly understood the specifics of the use of competency approach (Barmuta et al., 2015) at training professionals in economics (Nadtochy et al., 2016) high school, not sufficiently substantiated the content of teaching, choice of methods, tools and organizational forms of information technology training. It is also not fully explored the structure and content of key competencies. However, analysis of the problem of formation of competence shown that the process of personal development of a professional economist of high school largely depends on the organization and content of its information technology training.

## 3. MATERIALS AND METHODS

Before proceeding to the systematic study of the stated problems, it is necessary to determine the existing terminology, based on a concept. In the modern scientific - teaching, information technology and the economic literature there is a different interpretation of many of the terms and concepts of the theoretical basis of preparation of experts with backgrounds in economics, applied in teaching practice for the formation and development of key information technology competencies.

With regard to the problem of the research system will allocate the key concepts. To it are the following: Economy, economic reforms, polytechnic education, competence, core competencies, competence approach, professionalism, professional readiness, professional competence.

The problem is that before to create the necessary conditions for the formation of professional competencies required to determine the purpose of implementation of competence approach in teaching practice polytechnic institute.

The purpose of the introduction of competence approach in teaching practice polytechnic institute shall comply with the interests of students, teachers, employers and society as a whole, to give clear guidance to teachers and students.

An important goal of higher education is the formation of an internal student readiness for independent planning and realization of the prospects of their professional and personal development. You must help him to understand the flow of incoming information.

In the process of formation of professional core competencies of information technology student learns not only the system of special knowledge, skills, methods of professional activity, but also of certain universal values, i.e., possession of the elements of the spiritual and material culture. According to Krajewski, to such elements of culture are as follows (Krajewski, 1973):

- Knowledge of the world (nature, society, manufacturing, etc.,) and methods of work.
- Experience of the known methods of activity, embodied in the skills and abilities.
- Experience of search activity, expressed readiness to meet new challenges and tasks.
- Experience of emotional and personal relationship to the world and activities.

In our opinion, the future economists in practice should be able to communicate with colleagues, give them and receive from them the knowledge and skills that are passed as a result of communication. In addition, the system forms, methods and means of communication determines the form of the educational process at the polytechnic institute.

The problem is that during the preparation of the higher school specialist insufficient attention is paid to the culture of his speech, working with books and other information carriers, the use of computers and information technology. Future economists in practice, as the leader of a small team, must possess not only professional knowledge and skills, but also act as a teacher, and for that he must be the bearer of information technology culture.

As we can see, a pedagogical problem of formation of key information technology competence of future economists in the polytechnic institute is divided into a number of private, that must be addressed in order to improve the efficiency of the educational process, these include the following:

- Challenge the need for reform of the educational process polytechnic institute, related to changes in our society, its transition to a new post-industrial stage of development, characterized by a change in the previously used forms of pedagogical activity on the new - information technology, where information becomes the main product.
- The problem of defining the goal of implementation of competence approach in teaching practice polytechnic institute.
- Changes in the content of the problem towards its fundamental nature.
- The problem of defining the pedagogical conditions for self-realization of the individual in the learning process, and later in working life.
- The problem of changing the content and forms of work of teaching staff in the direction of development of creative potential of students, their personal qualities, as well as to increase their level of readiness to solve problems arising in the practice of the profession.
- Gain a problem of training, aimed at the formation of information-technological culture of the future expert - senior management.
- The problem of determining the composition and content of the key information technology competencies to implement pedagogical practices polytechnic institute.

In our study, in order to achieve these goals, it is necessary to detail more fully disclose the concept of competence-based approach. Note that in pedagogical science, in its present state are a lot of traditional approaches used in the educational process. For example, IA Winter classifies traditional approaches in teaching practice, for the following reasons:

- Scientific disciplines: Philosophical, psychological, pedagogical, anthropological, interdisciplinary, etc.
- On the application object: Activity, cultural, personal, etc.
- For the organization review (analysis): A systematic, comprehensive, structural, etc.

It should be noted that different approaches are not mutually exclusive (although some may develop and improve the previous), and implemented in teaching practice, depending on the goals and objectives of the educational process.

On the basis of the pedagogical literature on the analysis it appears that the competence approach, by definition, is a systemic, multidisciplinary. It is characterized by personality and activity aspects, i.e. it has a practical, pragmatic and humanistic orientation. Also, the competence-based approach based on competency paradigm is the fact that the main result of vocational education should be a system of knowledge, skills and experience, which includes the requirement to the list of declared state of key competencies in intellectual, socio-political, communication, information and other areas.

## 4. RESULTS AND DISCUSSION

Modern requirements state and society to the system of vocational education at all levels, pose in front of educational institutions the task of creating these pedagogical conditions, which would help improve the quality of training of future specialists. This also applies to the preparation of future economists and accountants at the polytechnic institute. Development of economic knowledge and its application in practice contributes to the prosperity of society and the stability of the country as a whole.

Currently, the professional activities of specialists of economic profile is complete without the use of computer technology, which greatly simplifies and accelerates the processing of information, create new opportunities, increasing productivity. Therefore, it is necessary the creation of pedagogical conditions in the educational process polytechnic institute, which would provide the information - technological competence of future economists.

It was necessary to clarify some of the characteristics and scope of the concept of teaching conditions to meet the challenges of our study, because in modern literature by many scientists, they are treated differently and given different definitions. Referring to the value of the scientific term "didactic" (from the Greek "*didaktikos*" - instructing relating to training) is a branch of pedagogy, developing the theory of education and training.

Andreev said that "didactic conditions it is the circumstances of the learning process, which are the result of purposeful selection, design and implementation of elements of content, methods (methods), as well as organizational forms of learning in order to achieve the objectives of teaching" (Andreev, 1996).

Consider the content side of the concept of didactic conditions, the implementation of which will allow to form a polytechnic institute in the future economists and accountants middle management an adequate level of professional competence. In this case, first of all, it must be carried out the principle of the unity of the scientific and practical training underlying the training of future economists. The solution to this problem is possible if the content, methods and organizational forms of teaching activities of teachers and students are personally meaningful to them, i.e. training will be wearing a personal orientation.

Student-centered learning approach has a number of significant differences from the traditional – knowledge-based. For example, Bondarevskaya defines knowledge-based learning as a student-alienated, in which dominated idea that the main purpose of training is to master certain knowledge, skills and abilities.

In traditional teaching, according to Bondarevskaya, there is a "dominance evaluation of the trainees on the performance indicators; the emergence and growth of school failure, drop-out as a consequence of it; undifferentiated approach to the students, the presentation of the same requirements for all students, regardless of the characteristics of their individual development" (Bondarevskaya, 2004).

Student-centered learning, in contrast to the traditional, based on the principles of individualization and differentiation of learning. From the perspective of a student-centered learning in a student at the polytechnic institute have formed self-experience and personal responsibility, based on an integrated system of universal information knowledge and skills, key information technology competencies that define the current quality of education.

Scientific understanding of student-centered learning has a different conceptual and conceptual structure depending on whether in the framework of a science, this concept is considered.

For example, in the field of philosophy of education. Investigates student-centered approach by subject categories, freedom, self-development, integrity as a form of self-manifestation of personality.

Research in psychology enrich the concept of student-centered education concepts of the specific nature of the personal level of the human psyche, a semantic field, reflection, experience and dialogue as the mechanism of formation of personal experience.

Research in the field of didactics are considering a student-centered approach to the position:

- The objectives and content of education
- Methods and forms of learning organization
- The activities of teachers and students in the educational process
- Criteria for the effectiveness of the educational process.

Thus, having analyzed and examined the distinguishing features of didactic conditions to be created at a student-oriented and knowledge-based learning, we can say that at the present stage of the feasibility of the transition from traditional to student-centered learning based on competence is confirmed theoretically and in practice.

Taking into account the methodological interpretation of the concept of professional competence leading scientist's teachers, we have identified the professional competence in the preparation of the future bachelors of economics, as an integral property of the person focused on continuous self-improvement, self-education in the intellectual and practical activity in the specialty.

Organizational-pedagogical and psycho-pedagogical conditions of realization are the means of teaching conditions, as the learning process should be organized and thus it is required to take into account features of students' thinking.

Based on the analysis of literary sources and the pedagogical practice work, we have identified the following didactic conditions of formation of key information technology competencies by means of new information technologies:

1. First didactic condition is to be installed in the course of training interdisciplinary communication information technology sciences disciplines with special training. For example, the study of discipline Information systems in economy implies not only the possession of knowledge from the field of computer science, but also the knowledge of many industries, such as the economic statistics, management, economic theory, finance and credit, accounting records. Therefore, for a more effective learning and a holistic economic experience learning process should be accompanied by the formation of the system of scientific knowledge, which provide interdisciplinary communication.
2. Second didactic condition - due to the need to develop knowledge transfer skills from one discipline to another. It plays an important role in the synthesis of a new student subjective knowledge. In the study of special subjects in economics with the use of new information technologies is not enough to possess only economic or technological knowledge. You must be able to transfer knowledge from one discipline to another. It contributes to the formation of knowledge transfer skills and experience from one area to another professional activity.
3. Third didactic condition is possible and necessary to use a computer to illustrate and demonstrate the new material. Using the computer as a visualization tool allows you to submit a form shaped studied process or phenomenon. Computer demonstrations help to establish the link between theoretical knowledge and its concrete images in the mind of the student.
4. Fourth didactic conditions of formation of key information technology competencies is to ensure the unity of the theoretical and practical side of learning. The teacher using the computer in the learning process is necessary not only to choose the right content of educational material in accordance with the specifics of the discipline being taught, but also take into account the possible techniques and methods related to the implementation of information technology. Here the choice should be made taking into account the possibilities of training and application software used in the educational process.
5. Fifth didactic condition is the creation of problematic situations in the classroom in conjunction with the tasks that arise in professional economist activities. Problem solving training develops creative thinking of students, cognitive abilities, independence and intelligence. Problem learning not only allows you to learn the results of scientific knowledge, but also the very knowledge of technology and methods of creative activity.
6. Sixth condition is the presence of didactic knowledge fix the system in the implementation of practical tasks on the computer. Student knowledge should be constantly updated and fixed, without this it is impossible to achieve a given level of training. Computer information technologies provide effective reinforcement of knowledge in the process of self-study.
7. Seventh didactic condition is the creation of a computer-based system of continuous monitoring of the level of development of information technology competencies of

students, registration and evaluation of progress and results of their activities. Monitoring of educational activity of students should be ongoing – only then it will be effective. Continuous control, on the one hand, creates additional motivation for learning, on the other- gives the teacher information on the need for operating and maintenance of the corrective action. However, no new information technologies of its implementation requires the teacher more time-consuming, so it is rarely implemented to the extent necessary.

8. Eighth didactic condition is the practical orientation of the content of the tasks performed by students using a computer. In the process of training teachers need to develop specially prepared learning activities that would be as close as possible to the real economic conditions. For example, in the study of the theme "automation of business management procedures," it is desirable to use such software systems that are most common and in demand in the real life. This program is a system, for example, "1C: Enterprise."
9. Ninth didactic condition is the development and implementation of the system increasingly complex learning tasks for the processing of economic information on the computer. System of tasks allows the student to gradually get acquainted with new features and PC software for automation of financial and economic activity.
10. Tenth didactic condition is awareness of students - economists, professional and personal importance of mastering the basic knowledge, methods and techniques of working with computer technology. Job economist today cannot be effective without the use of tools of computer technology. The student should know the principles of the computer and its main peripherals to be able to choose the right software for the task.
11. Eleventh didactic condition is the use of active learning methods for the formation of information technology skills. Active methods of training contribute to the effective development of professional knowledge and skills of future economists. One variety of active learning methods is a computer game business, which by its nature can be as close as possible to the actual conditions of production. If the basis of the computer business game is an imitation of the production situation, this method becomes a useful tool of knowledge.
12. Twelfth didactic condition is the constant use by students in the learning process by means of computer telecommunications. The content of educational tasks necessary to put such questions to which answers must be sought in the local and global computer networks. Computer networks are a technical prerequisite for the development of group forms of learning that have a lot of positives. For example, the World Wide Web, provides an opportunity to students to communicate with individuals or groups of individuals with the same interests in different parts of the world, to share them with scientific information, to acquire new knowledge. Local area network (within the group, department or the entire institution) allows you to organize the process of verifying and troubleshooting tasks to students in band mates. Working in a global or local networks contributes to the development of communicative abilities of students.
13. Thirteenth didactic condition is the focus of teaching - educational process on the formation of the elements of general and professional culture with the help of computer technology. All the more visible the process of entering into the process of computerization of the broadcast content of modern culture. Computer networks become its new environment, contribute to the practical achievement of cultural values. In addition, the graduate of the Institute must have a certain level of culture of receipt, evaluation and information processing.

The following psycho-pedagogical conditions of formation of key information technology competencies by means of new information technologies have been identified:

1. First psychological and pedagogical conditions, we believe the organization of motivational activities of students on the use of computer technology in the educational activity. Educational information is assimilated well, if a student prepares for her perception. Therefore, the teacher should implement some effects system that would prepare students for the perception of educational material.
2. Second psychological and pedagogical conditions to the accounting information flow velocity in the process of learning new teaching material students. This is due to the fact that there are two reception limit speed and the subsequent processing of information a man - the maximum and minimum. If the value of the reception rate are outside certain limits, it has an adverse effect on the normal course of the exchange of information - reduced productivity of educational activity. The teacher together with the student must be selected individually paced learning the material. To do this, you need to prepare several options of didactic materials for each practical class.
3. Third psycho-pedagogical conditions of formation of a positive attitude of students to future operations as a source of their professional growth and well-being. Education student profession, which he carried away, provides a more effective result. Teachers need to consistently inculcate students with enthusiasm for information technology to educational activity was accompanied by positive emotions (Zou, 2006). The development of such an attitude contribute to, for example, creative teaching and research assignments practical orientation.
4. Fourth psycho-pedagogical conditions of a judicious use of multiple revenue channels of educational information, its rational distribution between them. Receptors human senses have a certain "throughput." It is important to apply academic information to students not only in the form of images (graphs, drawings, photographs), but also, for example, in the sound. This requirement is largely responsible multimedia technology.
5. Fifth psycho-pedagogical conditions of formation of a knowledge test procedure own activities and student self-assessment of its results in the solution of specific economic problems with the use of new information technologies. Under the self-assessment will be understood that quality of thinking, which is characterized by emotional intensity estimates of himself as a person and student awareness of their own abilities of their own activities affect the effectiveness of training and development of his personality. The ability to objectively assess the results will contribute to the emotional well-being of the student and allow him to properly distribute

the forces in solving the economic problems of varying complexity.

6. Sixth psycho-pedagogical conditions of formation of is the need of the student logical thinking. Use of information technology in carrying out educational tasks in the disciplines of the economic cycle contributes to this objective. It is also necessary to select and formulate learning activities to their solution would be required to make logical conclusions, according to the logic described in the economic process and the logic of the computer information system. In the mind of the student will be synthesized information and logical structure.

The following organizational and pedagogical conditions of formation of key information technology competencies by means of new information technologies have been identified:

1. First organizational and pedagogical conditions of a comprehensive planning of educational activity which follows from the laws of teaching. It is known that the learning process will be effective in the case when the organization thought out, planned, interrelated and interdependent whole complex of educational programs and educational objectives of the formation of the future expert in economics. This is especially important when solving problems with a computer, as at the initial stage of training students in varying degrees' own computers. Some students perform learning tasks much faster than others, but it can occur not only because of the higher level of intelligence, but, for example, by better computer skills. As a result, there can be a situation where some students are not loaded, and the other part at a given time cannot cope with the task. Occupation in this case will not reach their goals. Integrated planning learning activities will promote self-sufficiency, student activity and, accordingly, their transition to a new, higher level of development.
2. Second organizational and pedagogical conditions is to provide students with opportunities to use computer technology to individual and independent work. Independent work on a computer that provides an opportunity for students to re-execute the job causing difficulty to carry out various studies, the search for new scientific information, to meet individual interests.
3. Third organizational and pedagogical conditions is the optimal distribution of educational information between its source: The teacher and the computer system. It is necessary to distribute the functional responsibilities between the computer program, teachers and students. You cannot pass all the management of educational process computer. The training program should only help the teacher and the student to optimize this process.
4. Fourth organizational and pedagogical conditions of a definition of science-based standards time-consuming to perform learning tasks students. In the process of determining the content of learning tasks, it is necessary to establish a balance between the level of their complexity and the time that is given to their decision (Horton and Weidenaar, 1975). This is particularly important when using a computer, as It needs to take into account the time spent on processing of information of a computer program (or set of programs), used in carrying out assignments.
5. Fifth organizational and pedagogical conditions of a constant expansion of information technology knowledge base of students. Successful mastery of information technologies requires constant updating of existing knowledge of the student.
6. Sixth organizational and pedagogical conditions of an individual is the ability to pass the training course. Training activities will be more effective if the teacher provides individual approach to work with the student. Education of students with the use of new information technologies allow to organize such an approach. This suggests an opportunity for each student to choose their own pace of learning the material. For strong students need to provide additional individual tasks of high complexity.
7. Seventh organizational-pedagogical conditions is the presence of a computer class, equipped with modern computers and software as a general-purpose and specialized professional, having access to the Internet. In the absence of modern computers and software cannot ensure the successful implementation of the operations of the students who actually apply to financial and economic activity that, in turn, impede the production of professional skills for the use of the computer.
8. Eighth organizational and pedagogical conditions of the organization is a long and continuous practice of students on mastering professional skills studied with the use of information technology. The student must accumulate a personal experience with computers continuously throughout the study period. It is necessary to distribute the courses using computers so that they succeeded one another from semester to semester.
9. Ninth organizational and pedagogical conditions of the organization is a mutual learning of students during practical sessions in the computer lab, as well as in the process of self-study. According to our observations, mutual learning of students has a positive effect on the efficiency of the educational process. In the process of training their fellow student learning not only transmits information but also to actualize their knowledge.
10. Tenth Organizational-pedagogical conditions of students is the ability to access to various remote information resources (databases and databanks on the Internet, library collections, conferences, e-mail, etc.). For example, through the Internet, students can use the library collections of various universities of the world. Participation in online conferences in real time allows the student to discuss the issues of interest to him with high-level professionals. Email can promote the development of students' ability to express their thoughts clearly and available.

The above conditions are necessary to improve the level of information technology training of future specialists. Their implementation will create the necessary information technology economist competence.

## 5. CONCLUSION

A study of the theoretical foundations of the formation of the key competencies of information technology of the future economist - graduate of polytechnic institute was established as follows:

1. Formation of the key competencies of information technology specialist with economic education - Polytechnic Institute graduate is possible with the objectives and conceptual ideas of scientific studies, which revealed the following:
   - Key information technology competencies are an integral part of the professional competence of the future expert with economic education, without formation of he is not ready for professional work.
   - Key information and technological competence are the personal value of the future economist with secondary vocational education.
2. Introduction in pedagogical practice competency approach will improve the efficiency of the educational process and to solve particular pedagogical problems on the formation of the key information and technological competences such as:
   - The problem of the need for reform of the educational process polytechnic institute and the transition to the new information technologies in education, where the main product information is becoming.
   - The introduction of the problem in teaching practice polytechnic institute of formation of key information and technological competence of the future experts of economic specialty.
   - Changes in the content of the issue of higher education in the direction of its fundamental nature.
   - The problem of the definition of the pedagogical conditions for self-realization in the course of training, and then in the professional work on the economic field.
3. The basic principles of the competence-based approach in the preparation of specialists in the polytechnic institute. These principles reflect not only the world, but also the national, regional and specific (industry), especially the development of vocational education at the present stage. Among the basic principles of implementation of competence-based approach in the higher education system are the following: The principles of humanization and humanization, the principle of variation, the principle of democracy, the principle of fundamental nature, the principle of competence oriented education, the principle of professional competence, the intensification of the principle, the principle of integration of education, the principle of environmental conditionality principle of tolerance.
4. Pedagogical conditions of formation of key information - technological competences in the process of professional training at the polytechnic institute can be divided into three groups: Didactic, psycho-pedagogical, organizational - pedagogical.
5. Synthesis of subjectively new knowledge is one of the basic mechanisms of formation of key information - technological competences. To carry out the process of interdisciplinary synthesis subjectively new scientific knowledge, teachers should create the necessary conditions for this.

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