Peculiarities of Preparation of a Vocational Teacher for Use of Application Software Taking into Account the Requirements of the Federal State Education Standard

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ABSTRACT

The significance of the issue under study is due to the fact that nowadays there is a necessity of rethinking of conception of training future vocational teachers to use application software taking into account a competency-based approach. The article is aimed at studying the contradictions underscored while analyzing the conditions of the process of preparation of future vocational teachers for using application software within the educational process and also the ways of their solving realized with the help of the competency-based approach. The competency-based approach allows forming a system of requirements for the practical part of the research based on technology of project education. In the given research work the authors' viewing of principles of formation of conditions of preparation of the vocational teachers for using the application software within the education process is presented. The analysis of groups of conditions is made with regard to the discipline "Information Technologies in Education." With the use of traditional vision ("to know, to be able, to have") and vision from the point of view of Dublin descriptors. The contents of the article could be of interest for teachers who are engaged into training the Bachelors of Vocational Education (branch-wise) and also retraining in the sphere of use of the application software in the education process.

Keywords: Dublin descriptor, competency-based approach, teaching the Bachelors of vocational education

INTRODUCTION

Nowadays the basement of any process running in the sphere of reforms of the education system is Bologna process, and one of elements included into our education system is a competency-based approach to estimation of the results of education. The basic framework connected to its realization is described in regulatory documents, such as Federal Law dd. 29.12.2012 Nr. 273-FZ (edition dd. 02.03.2016) "About education in the Russian Federation" [1], "Law about higher vocational education", federal state education standard of higher education for Bachelor's program training level on field of study 44.03.04 "Vocational training (branch-wise) and professional standard for a vocational teacher". According to these documents the ground for measuring the results of activity of studying an academic program is a set of competencies represented by a set of integrative characteristics. In their turn the competencies themselves are represented in normative documents referring directly to tasks of an educational institution possessing a vocational pedagogic orientation, on base of which the given work was done, namely in "Federal state education standard of higher education for Bachelor's program training level on field of study 44.03.04 "Vocational training (branch-wise)" [2] and "Professional standard for a vocational teachers" [3]. The lists

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of competencies represented in these documents are highly extensive. But the exposure into the topical area makes us meet with a range of problems raised in a set of sources:

- In methodological guidelines concerning implementing of new standards [4] the problems of divergence of standard requirements and real requirements of employers are raised;
- Such authors as E. M. Dorozhkin, E. F. Zeer & V. Y. Shevchenko [5], who study the problems of development of a branch of vocational pedagogic education, raise in their works a problem of non-readiness of the pedagogic society to intervention of pedagogic innovations that appears in strengthening the role of information communicative and interactive technologies, underscore the necessity to support the system of ongoing education on the methodic level, say that new approaches to formation of nomenclature are needed.

So, future graduators of a vocational pedagogic institution will have to solve a group of professional tasks of a new style, connected to methodic and management behavior: to be ready to work with educational web portals as tutors of educational programs, to be ready to develop a methodic content for a discipline and solve the tasks of automation of activity in their own branch, to participate in educational internet project. So we consider, these tasks are a separate group which requires a system approach to the realization of such training.

MATERIALS AND METHODS

Methodological Framework

In the process of research the following methods were used: theoretical (analysis, synthesis, simulation, mental experiment); diagnostic (analysis of the results of the activity, statistical approach, an empiric projective methods, surveys, questionnaires; experimental (method of observation); methods of mathematical statistics and graphical recording.

Research and Trial Basics of the Study

Research and trial basics of the study are Russian State Vocational Pedagogical University (RSVPU) and also the branch of RSVPU in Kemerovo.

In this work a part of the research is represented, which aimed to make a scientific rationale, development and approbation of organizational pedagogic conditions of training the future vocational teachers of the field of study 44.03.04 "Vocational training (branch-wise)" of FSAEI HV (Federal State Autonomous Educational Institution of a Higher Education) of "Russian State Vocational Pedagogical University" (RSVPU) using the application software in the educational process. The base of study was specialties for which the industrial work is not connected directly to information technologies, particularly the profiles "State and municipal management", "Entrepreneurial business", "Tourism and hotel service".

Stages of Research

On the first, theoretical stage (2010-2012), the methodological and theoretical basics of the study were defined; scientific pedagogical approaches to solving the studied problem were set. As a result, such initial parameters of the study were disclosed as an object and a subject of the study, the primary hypothesis was developed, the conceptual and categorical framework was defined, the pedagogic and methodic literature on the researched topic was studied and analyzed, and the plan and the program of the experiment were developed. Also the predevelopment analysis was made defining the stage of the experiment.

On the second, experimental stage (2013-2014), the specifications of the conceptual and categorical framework were made, the hypothesis of the study was specified, a model of technology of training future teachers of special disciplines to use the application software in the educational process. The effectiveness of the offered model and the corresponding learning and teaching support material was checked. The conditions of resulting quality of the developed model were defined and given scientific credence, the scholarly apparatus was specified and the separate theses of the thesis work were corrected.

On the third, resulting and generalizing stage (2016-2017), the analysis of the results of the trial preconceptual study was made, the conclusions were formulated, and the materials of the thesis work were represented.

RESULTS

The Heuristic Basis of the Study is Defined

The problem is defined and the hypothesis of the study is developed

Having analyzed all the presented factors of development of the educational system nowadays we defined the main problem of the study as a necessity of scientific rationale of organizational pedagogic conditions of training future vocational teachers to use the application software in the educational process.

The process of training future vocational teachers to use the application programs in the educational process will be successful if the analysis of a future vocational teacher's activity is made taking into account the normative documents in the sphere of training future vocational teachers, which must be reflected in the system of conditions of the training and its result. The basis of training must consist of a system pragmatic and a competency-based approaches; ion these conditions. Under these conditions the use of them influences on the specification of the competency descriptors which describe the elements of training future vocational teachers to use ICT. It is possible to create a project which would include all the components of the study and to develop all the constituents for it, which would allow to create conditions of training described by the system of descriptors.

As the methodology of formation the communicative component for the sphere of IT is not adequately investigated, we offer a pre-project training based on integrative approach providing a basis for the process of interiorization of knowledge in the sphere of IT. The concluding picture was presented by a project activity based on processes of exteriorization of knowledge, which system of estimation gives a possibility to estimate not only standard but also Dublin descriptors.

New approaches realized in the study were defined

In order to realize the conditions of preparation for educational activity with the use of PC it's necessary to realize the corresponding conditions of preparation. It's important that these conditions have to be coordinated with the standards, on the one hand, and with the requirements of the principal education program (PEP), on the other hand.

The system of descriptors may be invariant, connected to a module and describe the results of this module study. Within the limits of the made research we defined that the indicators of absorption of the conceptual framework in the sphere of informational technologies is higher, if all the disciplines connected to informational technologies are aggregated into one module, whose aim is an integration of the content directed to achieving a single result.

For the productive realization of the competency-based approach it's necessary that the necessary base was formed on the research and methodological level, but it have to be realized taking into account the fact, that it must contribute to increasing of the vocational pedagogic motivation.

As it was stated in the dictionary edited by G. M. Romantsev et al. [6], vocational pedagogic motivation is a relatively stable set of needs and interests, involving provisions, emotions and ideals urging a person to obtain skills of pedagogic activity.

The important stage of the work with motivation is use of facilitating methods within the boundaries of use of active forms off education, namely a business game, which is organized on the elements of self-study, reciprocal instructing. Such approach allows activating cognitive activity, to define problem elements of thesaurus and to regulate it, make accents on the necessity of self-education.

Very often, if you want to understand the importance of a systematic, integrative study the PC, to define common directions and orientations of development of the educational system, dictated by the transition to the digital economics. Thus, while looking through the document "Provision about digital economics" which declares the importance of training of the stuff able to high adaptation in the digital space and possessing special competencies, we chose one of the tasks defined in the chapter "Work flow chart. II. Personnel and education" which comes to development and approbation the modules of the competencies providing effective cooperation of the society, business, labor market and education under the conditions of the digital economics [4, 5].

As alongside with the development of online educational technologies a part of a pedagogic society gradually becomes familiar with the new role that is a role of developers of the educational content especially in the branch-wise orientation. Some authors say about the role of computerization and its influence on the educational content: "As a result of coordination with newest means and objects of the educational process pedagogic methods (pedagogic technology) have a well-known technical increase. Trenching upon the pedagogic area cybernetic technology requires fulfilling a range of conditions that can lead to the restructuring of the educational content, encourages obtaining features of technologized system [7].

One of the components of computer literacy is user skills. Traditionally they are understood as ability to work on PC, but our many years' experience shows that users' knowledge is not enough if the conceptual framework of the topical area is not formed. Often the users exploit in their communication demonstrative words; gestures for information transfer, more often they do independently the operations that evoke another user's difficulties. Lacking of the conceptual framework even from one side complicates significantly. It's important to note, that it evokes difficulties while studying new software that is a serious inhibiting factor in the modern tempo of appearing of new informational technologies (NIT). That is why we mark one of the conditions of qualitative preparation of future vocational teachers to use the application software in the educational process as the necessity to study the conceptual framework.

Thus, having formed a common task of social pedagogic and scientific theoretical character, concerning the conditions of preparation of future vocational teachers for use of the application software in the educational process, we'd like to come to the analysis of possibilities of its solving.

As nowadays the results of educational programs are measured in the degree of appearing of the competences formed during the process of education, it's necessary to connect the solution of the task on forming the readiness to use IT in one's professional and branch activity.

On that basis we can define a *contradiction presented on the social pedagogic level*: between the demand of the educational system for teachers possessing ICT skills and able to adopt easily to quickly changing NIT, on the one hand, and insufficient level of the development of competences proposing the possession of ICT skills that future vocational teachers have, on the other hand.

The analysis of the content of an expectation for measuring the level of competences formation

The solution of the task concerning crating of new conditions of preparation of future vocational teachers while forming informational competency has to be made according to a plan. In this case we can rest only upon the c competences reserved to the disciplines in the competency matrix reserved to the branch PEP. So, we offer the following solution of this question: to select a group of disciplines and to analyze the possibility of integration of the content on level of basic definitions, that makes the process of interiorization of knowledge actual so that, later, in the total discipline it would be possible to use processes of exteriorization of knowledge, and also to conduct preparation for bifurcation in the sphere of cognitive activity of a student offering them to do a small breakthrough in the sphere of IT study. For that purpose, there must be created conditions on the ground of a scientifically proved approach.

We understand, that the students have to get acquainted with the technology of work and to get the experience of development electronic learning resources (ELR), to have an experience of coordination with informational educational portals (IEP), so0 we have to establish a possibility of obtaining such experience while forming the content of the disciplines in order to form the readiness to use these resources. These components are important for an employer, but we should understand, in what volume to present this block of information, to define the scientific tasks concerning defining the approaches of formation readiness to use this knowledge, methodical tasks concerning developing research and scientific providing of the disciplines.

Primarily, the analysis should be done taking into account the competency-based approach. Its use proposes that the educational activity has to implicate quality control not on the level of knowledge obtained by a student but on the level of competences, generalized ways of actions. BUT the complication is that not always the formation of competences can be checked explicitly during the educational process and not always the process of competences formation is explicit. That is why a tool of description (from the Latin "descriptor" – describing) was added to the analysis.

With the use of an integrative approach applied by the author to the analysis of the requirements to development of the professional competency we analyzed the total requirements to the studying of the disciplines connected with informational communicational technologies from point of view of different descriptors.

While analyzing the literature we have decided to analyze different methods of description of the competences in order to choose the method that allows describing the planned results of the education in the group of disciplines forming an informational competence to the fullest extent possible.

There are several views of the formation of the descriptors system for measuring the results of studying PEP and the results of studying the disciplines.

So, for example, T. B. Volobueva [8] shared in her work a very interesting view of the work with descriptors disclosing the measuring instruments of the professional competence in different aspects: adopting the European Qualifications Framework; analyzing the descriptors from point of view of the key competences: functional, social, general cultural, health-saving, civil, informational; general professional ones: cognitive, activity, social and

Table 1. Competency of a graduator of a vocational pedagogic institution in the sphere of informational communicational technologies according to the European Qualifications Framework

Knowledge	Skills	Competence
Theoretical or factual knowledge	Cognitive or practical skills	Responsibility and self-sufficiency
To have advanced knowledge in the sphere of work or study including critical understanding of a theory and the root principle	To have advanced skills demonstrating mastership and innovativeness necessary for solving complicated and unpredictable problems in a special sphere of work or study.	To have an ability to manage complicated technical professional activity or projects taking over the responsibility for making decisions in unpredictable contexts of work or study. To have an ability to take over the responsibility for management vocational development of separate people or groups of people.
Knowledge of a conceptual framework of information technologies	A skill to solve the tasks of professional or branch activity	To have an ability to organize interdisciplinary coordinations with students and colleagues referring to the sphere of IT, to manage educational projects with the use of ELR, to be ready to coordinate with developers of ELR and Information educational environment (IEE).

personal; disclosing the components of professional skills. But this method of analyzing the discipline seems to us too extensive, so we have turned to other methods of description.

One of the documents stating the results of learning is European Qualifications Framework (EQF) [9]. The requirement declared in this document say about the fact that bachelors as students finishing the 1st stage, have to correspond to a range of descriptors pointing out the results of studying named in a system of qualifications on the 6th level of the descriptors table stated in the document (see **Table 1**). According to these descriptors we have tried to particularize the results of studying for the disciplines connected to learning informational technologies.

But in order to define the structure of preparation in the discipline the more concrete requirements to measuring the results are necessary.

That is why, the demands of practices in the sphere of using IT in the educational process, on one hand, and also logics of the development of the theory of vocational pedagogic education, in which the prerequisites for realization of the integrative and the competency-based approaches for seeking new solutions in the sphere of building the educational process itself have been formed, on the other hand, require comprehensive reinterpretation of the results of learning information technologies.

As the main vector of development of the educational system is nowadays system activity and competency-based approaches, the analysis of future vocational teachers' activity connected with use of personal computers in the educational process was made. According to the requirements of an occupational standard for the bachelors of the training orientation 44.03.04 "Vocational training (branch-wise)" we have chosen the following competences realized in the process of preparation on the discipline "Information technologies in education" listed in **Table 2**.

Table 2. Competences realized for the training orientation 44.03.04 on the discipline "Information technologies in education" within the limits of the European Qualifications Framework

Professional competences	Descriptors
OPC-5 ability to work self-dependently on computer (elementary skills)	**To know**: principles of work with software in the sphere of ELR development
	To be able: to use program products for ELR development
	To have: basic skills of self-dependent development of ELR elements, work with application program packages (APP),
PC-1 ability to complete vocational pedagogic functions for providing effective organization and management of pedagogic process of training workers, office employees and middle ranking specialists	**To know**: common principles and approaches to use of ICT with aim to increase effectiveness of organization and to manage the pedagogic process
	To be able: to use ICT for organization and management of pedagogic process in the following orientations: scientific, methodic, within the limits of organization self-dependent work of students, for online education
	To have: skills of use ICT for organization and management of the pedagogic process in the following orientations: scientific, methodic, within the limits of organization self-dependent work of students, for online education
PC-3 ability to organize and to fulfill teaching vocational (TVA) and teaching and educational (TEA) activities according to the requirement of professional and federal state education standards in EO SVE (educational organization of secondary vocational education)	**To know**: methods of use ICT for organization and fulfilling TVA and TEA
	To be able: to use means of ICT for organization and fulfilling TVA and TEA
	To have : skills of use means of ICT for organization and fulfilling TVA and TEA

A traditional form of decreeing does not answer the question how to connect the requirements of the labor market to the results of studying the disciplines because does not propose an output to a concrete activity.

It's important to note that a system of requirements for a teacher must be wider than it is viewed against the background of the descriptors "to know – to be able – to have skills". Let's turn to researches made in this sphere. One of vectors, which we took as a basis of defining the content of a competence, is a necessity for a teacher to cooperate not only in a team "human – machine" but also realize a type of communication "human – human", where the object of discussion can be a PC.

Also the given model does not take into account the demands of the society concerning realization of models of networking cooperation, which realization problems for the educational system are presented nowadays with the scientific community. For example, a task of forming the educational clusters and a necessity of seeking the research and scientific approaches to the organization of the networking cooperation is described in works by B. N. Guzanov, M. A. Fedulova & K. A. Fedulova [10]. The authors underscore that without the programs of innovation elaboration, without innovation development such projects are doomed to failure. Consequently, there appears a question concerning formation of the environment, a platform for realization this idea, that means that there is a demand for pedagogic staff, able to blend seamlessly into this structure and be ready to realize the main ideas of the program on the networking cooperation, including the ability to prepare a content for realization of educational paths.

A communicative function with regard to ICT also should be developed, because personal computers carved their niche firmly out in industrial and state sectors. Earlier, before a PC became a main means of automation of office and partly production activity, the problems of cooperation "human – machine" were solved only on the level of engineering specialties. Now any activity, that is of an economist, a public employee, an enterpriser, is created on the ground of using the means of automation, that leads to a broaden demand for specialists possessing IT skills, that consequently must be realized in the system of training vocational teachers in a form of a communicative component of the corresponding orientation.

It is interesting, that the communication function is not detached among the leading ones in the sphere of training programmers too, because it is not prescribed explicitly by the professional standard. Though it is not underscored explicitly, the authors [11] note that the graduators, who have been trained according to the professional standard "Programmer" are not ready to work in a team, not ready to cooperate on the level of management of processes of developing the program products. Consequently, this is a problem of a system level: neither programmers – future developers of ELR, - nor teachers are ready to the communication.

It is necessary that the descriptors of the competences can allow us to describe the training results taking into account the specificity of modern requirements. In order to prove our point of view let's turn to a research work by B.F. Lomov [12], who detaches 3 functional subsystems of a teacher's personality cognitive, regulatory and communicative. Using his classification and a thesis concerning the fact that it's impossible to develop a teacher's personality without his/her preparation to interplays in all three directions, without our control above the

Table 3. Content of Dublin descriptors

Number of a descriptor	Content of a descriptor
1	Understanding in the studied area including elements of the most advanced knowledge in the studied area and ability to apply this knowledge and understanding on the vocational level.
2	Ability to develop arguments and to solve problems in the studied area.
3	Ability to collect and interpret information for developing statements taking into account social, ethnic and scientific reasons.
4	Ability to report information, ideas, problems and solutions either to specialists or to non-specialists
5	Ability to demonstrate skills of self-education

development these components [12], let's try to turn to such system of descriptors, which allow to reflect the given structure of a person.

It's also very important that the descriptors must contain the main idea of modern education, i.e. direction to a formation of potential self-development that is declared in a thesis about development of a system of ongoing education and formation readiness of a human being to a constant vocational perfection. "A sense of the ongoing education involves creating in conditions of general and basic vocational education a system of knowledge, skills and personal qualities, that allow it to continue self-dependently educating and perfecting itself, to orient freely in social and professional problems, to adopt successfully to changing conditions and to obtain self-dependently necessary knowledge and skills" [13].

So we consider the most suitable thing for disclosing this problem is analyzing the competences from point of view of Dublin descriptors. Let's detach a group of basic elements of Dublin descriptors or, according to provisions of Bologna process, qualifications meaning finishing of the first cycle of the higher education marked as a group of positions presented in **Table 3.**

The content of Dublin descriptors as exceedingly detailed components (and in the case this feature allows to raise quality of analyzing the research and methodical component) allows to set logic al connections in the content of the training material, connections within the components of competences, to integrate the components of the education process on the interdisciplinary multilevel (see **Table 4**).

Consequently, our task is a complex approach to solving the tasks of defining the contents of competency descriptors taking into account the raising penetration of the information technologies (hereinafter referred to as IT) into all living spheres, especially into pedagogy.

Table 4. Dublin descriptors used for analysis of expectations within the boundaries of a competence model for bachelors trained on field of study 44.03.04 "Vocational training (branch-wise)" according to totals of the discipline "Information technologies in education"

Number of a descriptor	Content of expectations from a graduator
OPC-5 "Ability to work self-dependently on a computer (elementary skills)"	
1	Ability to demonstrate knowledge and understanding of principles of work with PC and APP: - knowledge and understanding of a conceptual framework of IT; -knowledge of main methods of work with PC hardware; -understanding the principles of work with different kinds of software applied in main user's practice.
2	Ability to apply knowledge and understanding the basics for solving the special tasks: -preparation of texts, tables, work with databases; -seeking special materials, exploitation of electronic digital resources.
3	Ability to collect and interpret information for developing statements: -concerning formation of the education process with the use of ELR; -concerning possible self-education in the sphere of studying APP.
4	Ability to report information, ideas, problems and solutions connected with exploitation of PC and working with APP: -in a pedagogic society; -together with students; -to specialists in the application area during probation period; -to specialists in the sphere of developing ELR; -to programmers maintaining PC.
5	Ability to demonstrate skills of self-education while solving the tasks: -of maintaining PC: antivirus protection, disks diagnostics etc.; -software installations.
PC-1 "Ability to fulfill vocational pedagogic functions for providing effectiveness of work of an organization and managing the pedagogic process of training workers, office employees and middle ranking specialists"	
1	Ability to demonstrate knowledge and understanding of main means, ways and methods of application of computer equipment for: - organization and managing the pedagogic process, namely network IT, ELR, IEE; - demonstration of main ways of solving the task of branch orientation with the help of specialized APP.
2	Ability to use knowledge and understanding of basic fundamentals for solving specialized tasks: -in the sphere of branch orientation: ability to work with APP -in the pedagogic activity: ability to work with APP for supporting the education process, to have IT skills.
3	Ability to collect and interpret information for developing statements: -concerning building education process with the use of ELR; -concerning possible self-education in the sphere of studying APP.
4	Ability to report information, ides, problems and solutions connected to exploitation of PC, work with APP either to specialists in the sphere of IT or non-specialists, -with specialists in the sphere of APP during probation periods -with specialists in the sphere of development ELR -with programmers maintaining PC
5	Ability to demonstrate skills of self-education while solving the tasks: -for seeking methods of solving vocational and branch tasks with the help of new APP
PC-3 "Ability to organize and fulfill teaching vocational (TVA) and teaching educational (TEA) activities according to requirements of professional and federal state education standards in educational organization of secondary vocational education (EO SVE)"	
1	Ability to demonstrate knowledge and understanding the main means, ways and methods of application of computer equipment for: -organization of webinars, movie tutorials; -organization of control.
2	Application of knowledge and understanding of basic fundamentals for solving specialized tasks: -in the sphere of branch orientation: ability to work with application software in the sphere of organization branch cooperation (corporate information systems, databases, packages for organization business planning etc.); -in pedagogic activity: ability to work with ELR, application software in the sphere of organization of educational process, IEE etc.
3	Ability to collect and interpret information for developing statements: -about the most effective ways of using IT while fulfilling TVA and TEA -about the most optimal ways of cooperation in the conditions of online education (taking into account the work concerning preparation of guidance papers and selection of the environment for creating communication)
4	Ability to report information, ideas, problems and solutions connected to exploitation of PC and working with APP either by specialists in the sphere of IT or by non-specialists: -while conducting lectures; -while organizing work with a group as a curator or a project coordinator; -while organizing conferences, Academic Olympics, competitions.
5	Ability to demonstrate skills of self-education while solving the tasks of TVA and TEA: -seeking new information; -participating in video conferences, educational courses, webinars.

Results of the Research

Acknowledging stage

At the first, acknowledging stage of the experiment the statistics was collected according to groups studying the material with the help of traditional methodology. The materials were collected by means of method of observation and also by means of analysis of statistical data according to the point-rating system. Totally on the acknowledging stage the indicators of 85 students were analyzed.

Traditionally, the students created projects using ready patterns, trying to create a project basing on a sample; often they do not involve their content but used the ready material. The total project contained a pattern of materials given by a textbook, instruction on HTML-positioning, an example of an ergonomic textbook, a pattern of a computer testing (test tasks) and application for its realization, instruction on working with presentational materials. The project allowed students to get acquainted with technologies of creating ELR.

According to the results of the work, up to the moment of a progress review it was stated that a percent of works of the students realized in a whole volume 12%, the rest students, i.e. about 87% realized the study guide not in the whole volume.

In the process of observation it was also stated that the students fulfilled the project perceiving the necessity to coordinate the results of the projecting with the ergonomic requirements in different ways, took into account the requirements of pedagogic design.

As a result, the requirements of ergonomic were knowingly violated by 25% of the examinees, 65% left the design stated in the guideline, 10% worked with the ELR design. .

10% of the examinees thought about pedagogical design, the rest considered the interdisciplinary connections to be an unnecessary element, not bounding work on developing ELR with pedagogy.

So, according to the totals of the acknowledging stage we can make a conclusion about insufficient involving of students into the educational process, about absence of readiness to develop ELR and to work with pedagogic design.

Forming stage

At the forming stage we developed a structural functional model which reflects the peculiarities of integrating into the educational process the conditions of preparation future vocational teachers to the use of the application software in the educational process.

According to these expectations we needed to bring the working program of the discipline "Information technologies in education" into compliance with the main components of descriptors. For providing a full preparation it was also necessary to form the basic knowledge and skills within the boundaries of the disciplines "Informatics", "Information technologies in economics". If it's necessary to analyze fulfilling of these functions by a graduator, we should, consequently, put into the educational process the mechanisms of their realization.

So, we may see a contradiction between the necessity for a teacher to be integrated into a new system of cooperation "teacher – student", where a PC has a role of a mediator, and the insufficient accents on possessing the communicative component and skills of development the educational content by means of computer facilities (CF).

In this case we can form a group of directions orienting the practical component, following which we can move along the educational path in the sphere of studying information technologies and organize the project activity according to a system of provisions of Dublin descriptors stated below according to a discipline (see **Table 5**).

Table 5. Approaches, methods and forms of realization of descriptors formation for the discipline "Information technologies in education"

Descriptor	Approaches, methods and forms of realization of a descriptor formation
1	We will consider the main approach in knowledge formation to be an integrative approach, according to which the **knowledge** basis used in building the cross-cutting studying the thesaurus will be formed and which will be the ground for the system formation of the conceptual framework in the sphere of IT. The realization is made within the limits of the disciplines "Informatics", "Information technologies in economics", "Information technologies in education".
2	In order to form readiness to solve problem situations connected with the necessity of using PC in the educational activity, we will use a set of elements of the methodical educational system and of a system education model: a system and activity-based approach, being its ground, a project technology of education. Organization of work of students with a project tending to create a part of a research and methodical accompaniment of a discipline includes not only acquaintance with technologies of developing ELR but also understanding the pedagogic design, selection of rational solutions while using a PC.
3	The project technology of education includes obtaining the experience on collecting, arrangement and processing of the information, acquaintance with main ELR, containing the necessary materials of the branch appropriation. It is important to note that the students get acquainted with the system of data selection, critically analyze the materials, obtain the experience of self-dependent pedagogic and didactic projecting.
4	The common communicational vector directed to the development of the **skill** of discussing the ideas and problems connected with IT. It's an important skill, and its possession is initially viewed as one of the main components, and in this case the active forms of lessons conduction are used (facilitating techniques), then the gained skills are proved in a form of elements of an individual project. The problem solution is impossible without comprehensive understanding of the present bundle of knowledge, reconsideration of the attitude towards business communications, the main subject of which is set to be a PC and informational products, developed with the help of actual application software or a web-service or resource. It's also getting clear, that for a full studying the principles of building communications in the sphere of IT we need to create a system, integral vision of principles of this task solution, that is why we recommend to use a hermeneutical approach to the analysis of principles of the conceptual framework formation and possibilities of its application [4].
5	A vector of self-education as a system of skills (level of **possession**) of information obtaining, which is realized in the project activity, and a student under the teacher's control tries to arrange the knowledge, to build a logic conception of the knowledge presenting within the limits of an individual project. And the project work itself includes seeking the problem places in the conceptual field;

The development of the professional reflection is possible with the organization of the system of cooperation between a teacher and a student during the project work. The indicator of the professional advancement and desire to be developed in this direction can be stated as fullness of realization of an individual project, readiness to perfect it, considered particularization, terminological elaboration, work with pedagogic design, and correspondence of a project to ergonomic requirements.

So, while implementing in practice all the orientations of work with information and communication skills, we have created learning and teaching complex of the discipline including working programs, lections and laboratory-based practicals, funds of estimating means (hereinafter referred to as FEM), means of test control and self-control. The project activity is organized in such a way, that it can reflect all the descriptors and they can be measured with the help of any ways of experiment conducting.

Control stage

The problem of a traditional approach to formation of research and methodical accompaniment within the limits of the conditions of preparing future vocational teachers is that the curriculum prescribes that initially for studying information technologies (IT) there are 3 disciplines: "Informatics", "Information technologies in economics", "Information technologies in education", but traditional the integration of the disciplines is not made so precisely that to affect even such basic element as the conceptual framework of the topical area.

At the control stage we made a comparison of the results of studying the discipline "Information technologies in education", which gave an opportunity to make sure about the presence of differences of training under the traditional approach from that made under the author's approach (see **Figure 1**). So, the traditional approach supposed a realization of a ready project.

The author's approach proposed creation of projects, the substantial part of which was formed taking into account the further output to the system of Dublin descriptors. It were individual educational paths, specialized methodical tools, explaining the principles of work with such projects, facilitating techniques, methodological support, organizing self-dependent work.
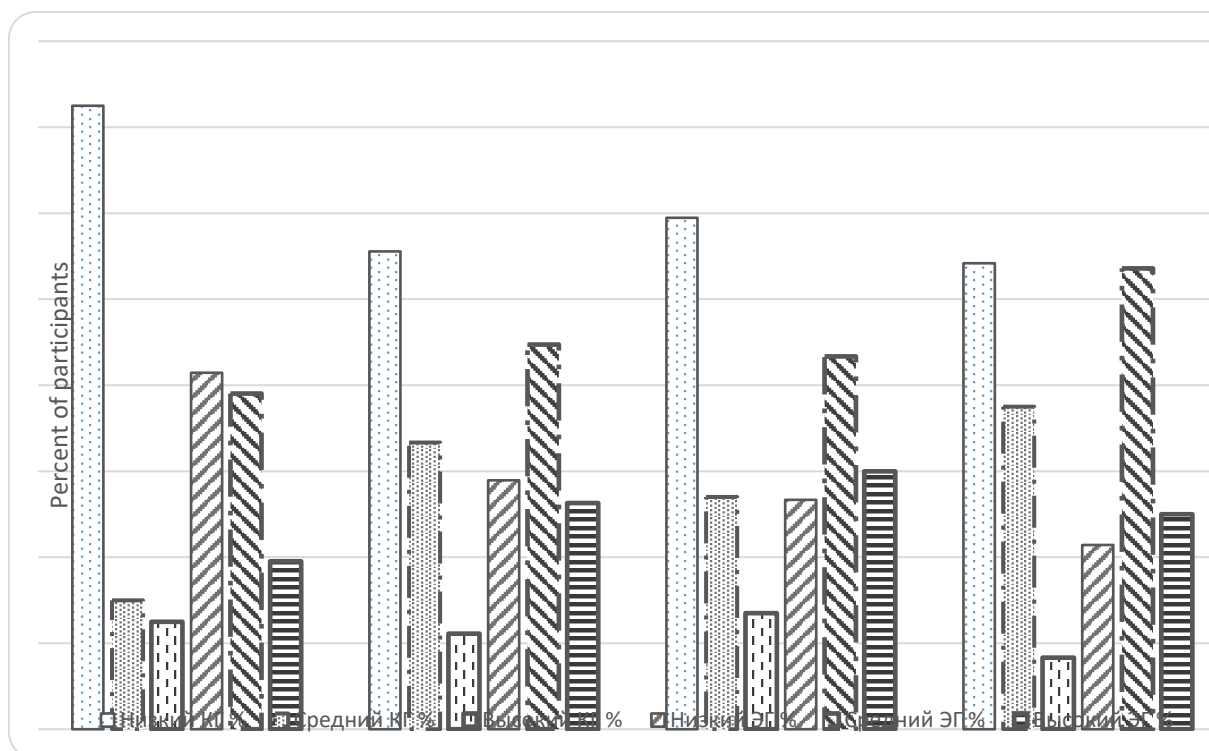
Figure 1. Fullness of a project realization

As we see, in **Figure 1** the generalized data of the experimental part, showing the stable growth of the results of projects fulfilling in experimental groups. The stable growth of results of high and middle levels shows in this case, that under the author's method more student fulfill the whole project working with different kinds of application software, which allow to solve pedagogic tasks.

It is important to note, that students try to realize all the elements of a project, not ending work after achieving minimal numbers of balls necessary for gaining a credit that is reflected in the rating system. The project itself becomes interesting for the students, its logic completeness; this is characterized by the results of observations, fixed in parallel.

In **Figure 2** we can see the results of statistics obtained by means of the method of observation and showing the number of projects fully or partly corresponding to ergonomic requirements and taking into account the principles of building the pedagogic design (the students define the location of every element of the project, understand the regularities of forming the elements of the project, can connect the components to kinds of activity, number of hours and order of studying.

In whole, testing of hypothesis concerning the supposition that the conditions of preparation of future vocational teachers for using the application software in the educational process, the ground of which is a multifaceted system approach, showed that the hypothesis cannot be rejected. The system of requirements to the conditions of preparation can be described in a form of Dublin descriptors that allows developing the content of the discipline on the research and methodological level.
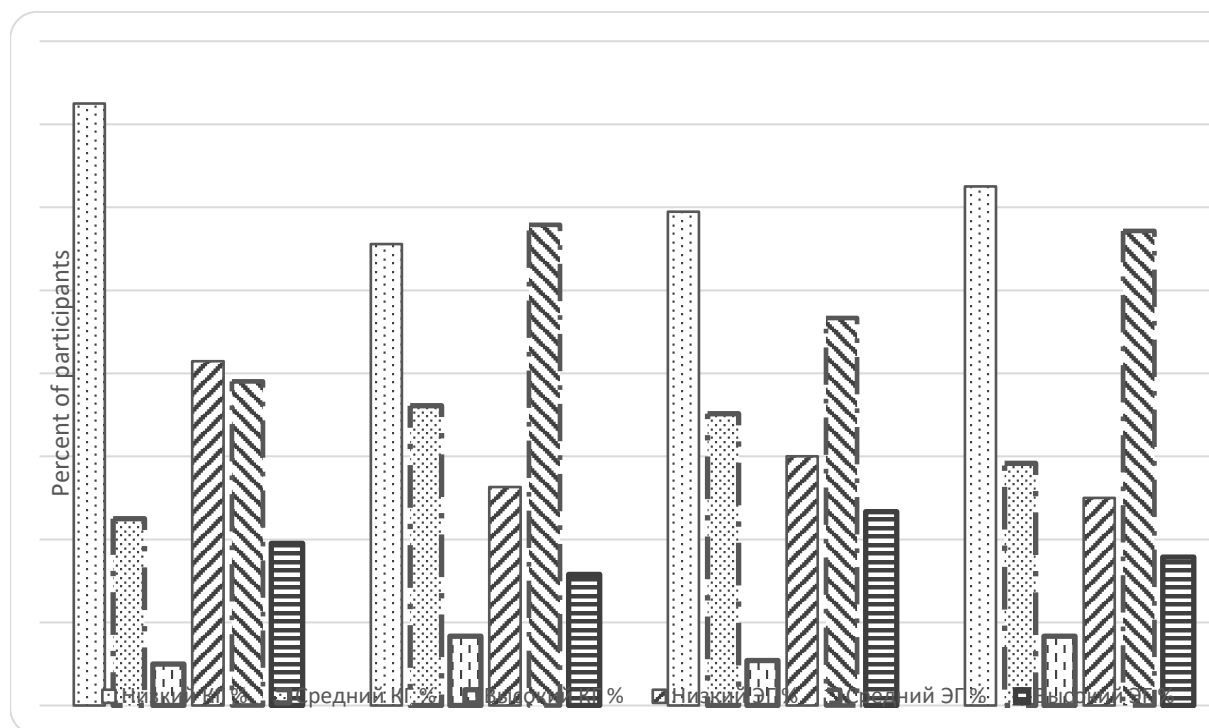
Figure 2. A project analyzed for correspondence to ergonomic requirements and presence of an elaborated pedagogic design

DISCUSSIONS

When we study the determination of the competency-based approach, we need to analyze the main definitions used in its description. The scientific-theoretical researches of these problems were made by such scientists as V. I. Baidenko [14], E. F. Zeer [15], L. M. Spenser & S. M. Spenser [16], A. V. Khutorskoi [17]. Let's view some variants of definitions allowing us to set the starting points for analysis of our material.

The competency-based approach, according to a definition given by E. F. Zeer [15], is "a top-priority orientation to the following goals, i.e. vectors of education: educability, self-regulation (self-determination), self-actualization, socialization and development of individuality. As the instrumental means of achieving these goals the radically new metaeducational constructions are set to be: competencies, competences and meta-qualities". In this case the meta-qualities are "abilities, qualities, features of a personality stipulating and defining the productiveness of a wide range of teaching cognitive, social and professional activity of a person" [15].

"Competences are generalized methods of actions providing productive fulfillment of a vocational activity. These human abilities to implement in practice his/her competency. The core of a competence is activity-based abilities, i.e. a set of methods of action" [15].

"Competencies are substantial generalizations of theoretical and empirical knowledge presented in a form of concepts, principles, sense-making provisions" [15].

In a pedagogic dictionary edited by V. I. Zagvyazinsky, A. F. Zakirova & T. A. Strokova [18] the following definitions are stated: "Competence is a range of powers, a sphere of activity, in which a person has the necessary knowledge and experience". "Competency is a level of preparation for activity in a definite sphere, a degree of obtaining knowledge, methods of activity, necessary for making true and effective decisions". "Competency-based approach in education is an orientation of the education to achieving a sufficiently high level of knowledge, experience, awareness for fulfilling activity and communication in different areas and spheres; a distinction is made between informational, social, communicational, pedagogic and other types of competencies; it can be a ground for rebuilding the educational process, overriding a one-sidedly topical orientation of education" [18].

In the philosophical dictionary edited by E. F. Gubskii, G. V. Korableva & V. A. Lutchenko [19] the concept "competency" is viewed as "a measure of correspondence of knowledge, skills and experience of persons of a definite social and vocational status to a real level of complexity of tasks and problems solved by them".

According to a definition of a concept "competence" given by L. M. Spenser & S. M. Spenser [16], it is "a basic quality of an individual having causative relation to effective and the best work fulfillment on the ground of a systems of criteria".

According to A. V. Khutorskoi [17] "Competence is a set of interrelated qualities of a person (knowledge, skills, abilities, methods of action), assigned referring to a definite range of things and processes and necessary for a qualitative productive activity with regard to them".

The analysis of definitions seizing the given topical area allowed us to form an understanding and to define the requirements to the results of learning with regard to studying a group of tasks concerning formation of scientific and methodical content of the disciplines, made us turn to the formation of a system of requirements concerning measuring the results of education with regard to the fulfillment of labor functions while working on PC.

One more perspective in viewing the requirements is an analysis of the problem status at the labor market. As the statistical data show, the pedagogic staff corresponds nowadays insufficiently to the requirements raised towards them at the modern stage (as to the developers of program methodical and teaching pedagogic support), and it is noted in works by Russian researchers, that is reflected, for example, in the results of investigation made against an order of UNESCO fund [20]. The foreign authors also point out the existence of a problem in the sphere of manifestation of teachers' readiness to use PC in educational and vocational activity, to study new branch and professionally significant technologies marking the influence of initially badly developed basic informational and communicational competences of teachers [21, 22].

Also according to the results of investigations, there is a demand for pedagogic staff, who are ready to work in a system of retraining tutors and teachers (especially, the tutors of the senior age category, the most experienced), solving the problems connected to the adaptation of the teaching employees to an intensive tempo of changes in the sphere of NIT [23].

According to the "Law about education" "Vocational education is a kind of education directed to obtaining by students in the process of studying the main vocational education programs knowledge, skills, abilities and formation of competences of a definite level and volume, that allow to conduct vocational activity in a definite sphere and (or) to fulfill work of a concrete profession or specialty" [24].

There are many publications and textbooks on topic of IT teaching methodology, let's select the following authors M. P. Lapchik, I. G. Semakhin & E. K. Henner [25], E. S. Polat & M. Y. Bukharkina [26], I. V. Robert [27], L. I. Doliner [28], K. Lin, A. N. Sokolova & V. K. Vlasova [29], A. V. Konysheva & E. N. Ibragimova [30], A. A. Khrulyova & R. G. Sakhieva [31], F. Chen et al. [32], E. Y. Levina et al. [33]. But nowadays the specificity of scientific and methodical search is concentrated on listing the used technologies and underscoring the importance of the processes of integration of pedagogy and IT. We'd like to see more application solutions in the sphere of integration, models of integration not only on the level of management of education process but also on the level of creating system solutions concerning creation of integral projects in the sphere, for example, pedagogic design with the use of IT.

Very often in the literature they mark the absence of such kind of a teacher's activity (regarding a teacher as a subject of the education process) as possession of technology of development and exploitation of ELR, free possession of the conceptual framework of IT. For example, in the study guide prepared by a team of authors G. D. Bukharova, O. N. Arefiev & L. D. Starikova [34] in the kind of a tutor's activity (regarding a tutor as a subject of the education process) the possession of IT as a means of realization of online education is not marked, though the distinctive for online education presence of such means of education as texts, audio and video materials, computer programs. But the way in which these products will see the light (whether the teacher performs the role of an instructor while forming the education content or not) and the way in which the tutor should cooperate with the developers of ELR and also communicate with the students by means of IEE, are nor explained [35].

The authors of textbook and study guides disclose the content of the discipline "Information technologies in education" on the level of a list of information and communication technologies and technologies of their use, and nothing more. The dead language and dead texts don't allow looking at using IT from the position of creativeness, possibilities of realization of brave author's ideas, developing of interesting thoughts and are fully separated from pedagogy. There are no points of intersection of theoretical and practical components, which could serve to strengthening of the process of pedagogic projection.

The authors studying the aspects of motivation to use IT in the education process by teachers bring to front the problems connected to realization of the main ideas of using IT in education, i.e. creation person-centered education paths, individual education, that leads to changing of methodological approaches to building the process of teaching itself [30]. Consequently, these problems have to be solved on the system level increasing the level and quality of training the in this direction.

Analysis of these materials allows us to select and distinguish understanding of points of intersection of the concepts "competence" and "competency" applying to studying of theoretical and practical aspects of using application software in branch and vocational activity of future vocational teachers. In whole, it is necessary to view such aspect as information competency taking into account information technologies.

Also, while analyzing literature on IT teaching methodology in education we can distinguish the absence of an approach different from knowledge one, on the one hand, and the necessity to form a new type of mentality allowing to adopt self-dependently to innovations in the sphere of IT, on the other hand.

That is why the difference of our development work from development works by other authors is that it allows to solve on the research and methodological level a contradiction between the necessity of practical solution of the problem of creation conditions for realization of preparation for using ICT in education process taking into account the modern requirements of FSES on the level of learning and teaching support, on the one hand, and absence of development works taking into account andragogic, psychologic, communicative component, on the other hand. The solution centers around the level of Dublin descriptors, that is supported by project technologies and also centers around hermeneutic and integrative approaches.

CONCLUSION

The fulfilled research allowed us to make the following conclusions.

1. The system of estimation of results of training the use of application software in the education process of future vocational teachers is described the most comprehensively with the help of Dublin descriptors. This method of description gives a possibility to cover all the spheres of using PC in branch and vocational activity that provides creation of an integral system of estimation of the level of formation of competence elements.

2. The analysis of the descriptors clearly shows that the development of research and methodological support of the discipline "Information technologies in education" should be done taking into account integrative and competency-based approaches, and the technology of project education must be the ground of the discipline structure.

3. The project technology gives an opportunity to obtain stable indices of volume growth of the studied material, if there is a high share of problem presence in the projects; an individual education path is realized.

4. The results of the experiment-based preconceptual study show that the hypothesis cannot be rejected; the volumes and quality of work were increased significantly in comparison with the traditional approach to the study of the principles of work with the application software in the education process.

RECOMMENDATIONS

The given material is of value for tutors at high schools that prepare future vocational teachers and also upgrades the skills of the pedagogic staff in the sphere of use of application software in the education process.

ACCEPTED ABBREVIATIONS

CE – computer equipment

IT – information technologies

ELR – electronic learning resources

FEM – forms of estimating means

IEE – information educational environment

TVA – teaching vocational activity

TEA – teaching and educational activity

APP – application program packages

PEP – principal education program

EO SVE – educational organization of secondary vocational education

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