System of Educational Process Informatization at Vocational Schools of Building Type

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Abstract. The article scientifically grounds the system of informatization of the educational process at vocational schools of a building type that takes into account the structure of professional informative competence of skilled workers-builders, and the tendencies of building information model. The author proves that the usage of computer oriented tools and informative resources while builders' professional training contributes greatly to the efficiency of educational activity, interactive pedagogical co-operation, professional orientation, and improvement of educational forms and methods.
Keywords: building type, ICTs-saturated educational environment, informatization of vocational education and training, learning management system.
Key Terms. Competence, Didactics, Information Communication Technology, Teaching Methodology, Teaching Process.

System informatyzacji edukacyjny-wychowawczego procesu w zavodowych szkołach budowlanego profilu
Streszczenie. Naukowo- uzasadniono system informatyzacji edukacyjny-wychowawczego procesu w zavodowych szkołach budowlanego profilu, która uwzględnia strukturę fachowej informatycznej kompetencji wykwalifikowanych pracowników-budowniczych, tendencji informacyjnego modelu budownictwa. Udowodniono, że stosowanie komputerowy orientowanych środków i informacyjnych zasobów w fachowym ksztalceniu budowniczych sprzyja efektywności edukacyjnej działalności, interaktywności pedagogicznego współdziałania, zavodowemu ukierunkowaniu, udoskonaleniu form i metod nauczania.
Kluczowe słowa: budowlany typ, IKT-nasycone oświatowe środowisko, informatyzacja zavodowej edukacji, nauczania i ksztalcenia, system zarządzania nauczaniem.
Kluczowe Terminy. kompetencja, dydaktyka, informacyjny-komunikacyjne technologie, metodologia nauczanie, edukacyjny proces.

1 Introduction

At the beginning of the 20th century informative and communication technologies (ICTs) covered all the spheres of a man's activity. In particular, building industry requires highly skilled workers able to master, in a very short time, innovative technologies directed at production informatization. Generalizing practice of vocational education and training (VET) informatization in Ukraine and analyzing the modern state of this process in scientific literature showed that educational institutions were mainly aimed at the decision of current problems of informatization – equipping with computers and introducing ICTs into the educational process. At the same time an urgent necessity is to determine theoretical and methodical bases of informatization process at

vocational schools, prospects and strategies of the educational system development in the informative society, formation of integrated informative and educational space. Obviously, the extensive way of vocational education informatization exhausted itself: the satiation of educational institutions with computer techniques does not lead to the growth of quality of specialists' preparation; the introduction of new ICTs into the educational process is restrained by the unpreparedness of pedagogical staff at vocational institutions; the developing potential of ICTs remains unrealized; and, as a result, – informative preparation of workforce does not meet the requirements of production.

2 Analysis of the Latest Researches and Publications

The problems of education informatization are in the spotlight of pedagogical science, that is testified by a number of conceptual and world outlook researches (H. Bednarczyk, A. Bork, C. Chapelle, S. Davis, E. Gaiek, M. Grauer, G. Kiedrowicz, G. McCalla, N. Hativa, W. Horton, S. Papert, T. Plomp, D. Robertson, B. Sendov, W. Strykowski, S. Tella, M. Wallace, M. Warschauer, T. Yawkey, etc.), as well as Ukrainian and Russian research workers (V. Bykov. B. Gershunskiy, O. Dovhillo, A. Ershov, M. Zhaldak, Yu. Mashbyts', N. Morze, I. Robert, M. Smul'son, O. Spivakovs'kiy, O. Uvarov, etc.). The detailed scientific works are devoted to studying ICTs in the educational process of vocational education (R. Gurevych, A. Gurzhiy, K. Meteshkin, P. Stefanenko, M. Sherman, V. Sholokhovych, B. Shunevych, Yu. Zhuk) and their introduction to higher school (I. Bulakh, V. Klochko, T. Koval', G. Kozlakova, A. Kolomiets', T. Poiasok, S. Sysoeva, M. Chvanova). In the context of professional training informatization Eu. Polat, scientifical and methodical researches (N. Balovsiak, A. Verlan', Yu. Doroshenko, M. Kademiya, L. Konoshevskiy, G. Krasnova, P. Obraztsov, V. Osadchiy, G. Selevko, O. Soldatov, O. Solovov, V. Strel'nikov, V. Sumskiy, etc) are very ponderable. Recently research workers and practical men pay much attention to application of ICTs in vocational and technical education. Possibility of work with multimedia data (graphic, video and sound) provided creation of on-line tutorials and trainers of new generation that adequately recreated the real devices and objects[1]. Today the systems of virtual reality become accessible – computer technologies, in which different components of multimedia are united in an only complex that involves not only visual and auditory analyzers but also such organs of feeling, as a touch, sense of smell, vestibular vehicle and others. Chosen and correctly connected media components and streams education materials are mutually reinforced and help to transfer and accept the information that assists the development of subjects of

[1] Кедрович Г. Теория и практика использования компьютерных технологий в общеобразовательных и профессиональных учебных заведениях Польши / Кедрович Гжегож ; пер. с пол. Г. А. Цисовской. — К. : Вища шк., 2001. — 355 с., p. 29.

studies[2]. Joint work of all sense-organs integrates the reflection of separate isolated images included into the general system of perception. The computer program works as a system of external signals that influencing on the organs of feelings grow into intelligent perception image.

At the same time theoretical developments and conceptual methodical approaches towards the process of education informatization have considerable divergences. Pedagogical science has not worked out perfect mechanisms, which would allow to determine the level of informatization at an educational institution, to fix the quality of informative software, to take adequate decisions on the directions of the development under the conditions of society informatization. It should be noted that informatization of vocational and technical education takes place mainly elementally, without taking into account the objective needs and achieved level of introduction of the newest technologies. The theoretical bases and features of organizational and methodical maintenance of future workers' training by means of ICTs have not been studied enough. Therefore the purpose of our article is to define theoretical and methodical principles of educational process informatization at vocational schools of a building type as a pedagogical system that provides upgrading the quality of skilled workers' training for a building industry.

3 Outline of the Main Research

The process of informatization is a result of ICTs development and transformations of technological method of production into a postindustrial one. The investigation of theoretical and methodological principles of education informatization proves that informatization stipulates creating the integrated informative and educational environment, which will provide availability and efficiency of the use, integration and standardization of informative and educational resources for all the levels and types of education. Informatization of education is a purposeful process of providing the system of education with methodology, technology and practice of creation and the optimal use of scientific and pedagogical, educational and methodical, programmatic and technological elaborations oriented to the realization of psychological and pedagogical possibilities of ICTs[3].

Informative revolution unfortunately has changed the essence of many professional environments, entering the element of alienation, mass character, and absence of strong identification with a profession[4]. Therefore humanistic values that are formed in the process of informative preparation and application of IKT should appear in the methods of cognition,

[2] Strykowski W. Komputery — audio — wideo — TV SAT w kulturze i oświacie / W. Strykowski, A. Zając. — Tarnów : Towaryska Oficyna Wydawnicza WOK, 1994. — 172 s.

[3] Роберт И. В. Информатизация образования как трансфер-интегративная область научного знания [Электронный ресурс] / И. В. Роберт // Проблемы современного образования. — 2010. — № 2. — С. 13—29. http://www.pmedu.ru/downloads/full-text/2010_2.pdf., p. 14.

[4] Kapuściński R. Lapidarium IV / R. Kapuściński. — Warszawa : Czytelnik, 2000. — 133 s., c. 88–89.

professional and informative culture; it has to take place even when some students and teachers do not understand their importance and insist on a necessity of especially professional and pragmatic training.

The potential of ICTs application while teaching and learning is determined by speed and reliability of information processing, enhancement of its presentation, design of different processes and phenomena, activation, individualization and differentiation of learning, formation of conditions for organizing independent educational activity, communication facilitation, and creative approach development. Informatization allows to modernize aims, contents, methods, means and organizational forms of teaching and learning; to facilitate the development of students' (pupils') individual abilities and their personal qualities; to promote forming their cognitive abilities and aspiration for self-perfection; to provide the integrity of studying the phenomena of reality, indissoluble intercommunication between natural and technical sciences, the humanities and art; permanent dynamic upgrade of the contents, forms and methods teaching and learning[5].

Education informatization aims at wide and effective introduction and application of ICTs while performing educational, scientific and manegement functions, inherent to educational industry[6]. From these positions we will analyze ***the tasks*** of informatization of an educational establishment in the system of VET, in particular — to teach and master basic principles of informatics; to develop students' algorithmic style and culture of thinking; to capture general means of informatization, to form abilities and skills of working on the PC, to master methods of working with ICTs; to study and master methods and facilities of using modern ICTs in accordance with the needs of future professional activity; to actualize professional knowledge, abilities, and skills taking into account the possibilities of ICTs; to form abilities and skills of planning ICTs resources that are necessary for carrying out professional tasks; to develop communicative abilities and skills of collective work; to acquaint with modern methods of research and project activities in professional area. ***Functions*** of informatization at vocational schools are the following: instrumental, informing, compensatory, motivational, individualizing, adaptive, integrative, control and diagnostic, designing, prognostic, and administrative ones. The tasks and functions of informatization are interconnected and directed at forming ICTs competence as an obligatory component of a specialist's professional training.

The basic notions of informative component of professional activity is computer literacy, ICTs competence and information culture. A specialist's ICTs competence is a personality's integrative professional quality, which represents a person's capacity for determination of

[5] Співаковський О. В. Теоретико-методичні основи навчання вищої математики майбутніх вчителів математики з використанням інформаційних технологій : дис. ... доктора пед. наук : 13.00.02 / Співаковський Олександр Володимирович. — К., 2004. — 360 с., p. 26.

[6] Биков В. Ю. Моделі організаційних систем відкритої освіти : [монографія] / Валерій Юхимович Биков. — К. : Атака, 2008. — 684 с., p. 141.

informative needs, information retrieval and effective work with it, as well as, with computers and telecommunication technologies in professional activity and everyday life[7]. ICTs competence «foresee an ability of a man to orient in the informative environment, to use information data from modern informative and communication technologies in accordance with the needs of labour-market to perform professional duties effectively». For students of vocational schools ICTs competence means formed abilities and skills to use ICTs for studying[8]. A personality's information culture is «an integrity of informative world outlook, value orientations system, knowledge, abilities and skills which provide purposeful and effective independent activity aimed at satisfying own and professional needs in informative products»[9].

Continuous growth of information volumes and intellectualization of professional sphere require from vocational schools of a building type a new high-quality level of teaching, providing of intellectual and psychological readiness of graduates to work under new conditions. The objects of professional activity of builders today are connected with information and communication processes and systems, and ICTs become the means of builders' work. The information competence is necessary for them while working with production papers, operating the newest technique, etc. Studying the computer programs of 3D design and CAD aims at, as a rule, the on-line tutorials of architectural and building faculties of higher educational institutions. It allows the future engineers-builders to learn how to work with information (including traced) with the purpose of the architectural planning, preparation of documents, construction of buildings, development of engineering networks and systems, and also management of building process. Modern building industry needs integral planning of a building object, when a change of some of its parameters leads to an automatic change of the other one, up to the drafts, specifications and schedule of works. Such approach is called BIM (Building Information Modeling) that is a concept of the integral planning of a building object with the help of ICTs, when a change of some of its parameters leads to an automatic change of the other one up to the drafts, specifications and schedule of works. Models and objects of operating BIM (unlike CAD) are not simply graphic objects, it is the information which allows to create drafts and reports automatically, to analyze a project, to do necessary calculations, to design a progress chart, exploitation of objects and others. Thus designers can effectively and jointly use information which eliminates errors at its transmission and

[7] Сисоєва С. О. Інформаційна компетентність фахівців : технологія формування : навч.-метод. посібник студ. та викл. вищих навч. закладів / Сисоєва Світлана Олександрівна, Баловсяк Надія Василівна. — Чернівці : Технодрук, 2006. — 208 с., p. 181.

[8] Морзе Н. В. Впровадження інформаційно-комунікаційних технологій у навчально-виховний процес закладів ПТО : [метод. посібник] / Н. В. Морзе. — К. : Арт Економі, 2011. — 168 с., p. 16.

[9] Коломієць А. М. Інформаційна культура вчителя початкових класів : монографія / Алла Миколаївна Коломієць. — Вінниця : ВДПУ, 2007. — 379 с., p. 131.

transformation[10]. Introducing BIM in a building industry determines the tasks of specialists' informative training and the ways of informatization of vocational education of a building type. In our opinion, graduates from profile vocational schools must be told about the possibilities of informative design.

Skilled workers-builders must know about basic possibilities and methods of using a computer in the industry of building, the basis of a computer building design, and the possibility of using ICTs in building works management. They also must know about the features and be able to choose special computer programs; know and be able to use technologies of the automated planning of buildings, and know the methods of using a computer in organizing construction-works of the type. Components of information competence of workers-builders are the following: world outlook, user, algorithmic, and professionally directed ones[11]. Criteria of its formation are motivational; cognitive; activity; operation; and creative ones[12].

The conducted research of vocational schools of a building type allowed to define four interdependent ***ways of ICTs application***:

• *Informatization of organizational and administrative activity at an educational institution:* automation system of managing an institution and network of vocational schools; organization of circulation of documents and financial reporting; creation of the students' and teachers' base data; planning of educational process taking into account the specifics of training for building professions; development of informative and methodical equipment of educational establishment of a building type; organization of internal banks of data and systems of scientific and technical information of architectonical and building directions; creation and permanent update of web site; complex pedagogical testing and psycho-diagnostics of students; monitoring of quality of learning and employment of graduates.

• *Informatization of educational process:* introduction «Information Technologies» subject into the process of workers-builders' training; informatization of traditional forms of teaching and learning of different subjects; inclusion themes related to the formation of abilities and skills in the area of ICTs into the process of workers-builders' training; usage of assessment software, automation of educational activity correction; computer design of different phenomena and processes, including building ones; intellectual means and educational environments.

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[10] Kymmell W. Building Information Modeling : Planning and Managing Construction Projects with 4D CAD and Simulations / Willem Kymmell. — New York : McGraw-Hill, 2008. — 297 p.

[11] Гуревич Р. С. Інформаційна культура — важлива складова загальної культури особистості // Сучасні інформаційні технології та інноваційні методики навчання в підготовці фахівців : методологія, теорія, досвід, проблеми : зб. наук. пр. ; у 2-х част. [редкол. : Зязюн І. А. (голова) та ін.]. — К. ; Вінниця : ДОВ Вінниця, 2004. — Вип. 6, ч. 1. — С. 42—47., p. 42.

[12] Сисоєва С. О. Інформаційна компетентність фахівців : технологія формування : навч.-метод. посібник студ. та викл. вищих навч. закладів / Сисоєва Світлана Олександрівна, Баловсяк Надія Василівна. — Чернівці : Технодрук, 2006. — 208 с., p. 170–171.

• *Informatization of educational-production process:* visualization and design of building technological processes and production situations; development of professional abilities and skills with the help of imitation programs, trainers and simulators of a building equipment; operation of laboratory equipment, as well as real units and sets with the help of PC; computerized control of professional and practical abilities and skills; fulfillment of project construction-works by the specialized software.

• *Informatization of out-of-class activity:* students' and teachers' self-education and self-training with the help of ICTs aimed to acquainting them with the achievements of a building industry; aesthetic development by means of ICTs; application of developing computer games; use of ICTs in future builders' club work; organization of students' intellectual leisure time; etc.

Informatization of educational process at vocational schools is interpreted as the integral phenomenon, system of interconnected organizational, educational and methodical, technological, educational-production and administrative transformations, directed at satisfying informative, calculable, educational-designing and communicative needs of future workers-builders, and also at forming new culture of pedagogical activity. The informatization system includes students' informative training for professional activity under the conditions of informatization of a building production and use of ICTs in future workers' training.

Today education informatization is considered as a process of creating a developed information educational environment. In pedagogical and psychological publications there are different variants of this category: «an information communication environment», « an information educational environment», according to V. Bykov – «a computer oriented educational environment»[13]. Often researchers do not distinguish between an «educational environment» concept, which refers, mainly, to educational establishment, and a considerably wider concept of «an information educational space» or «Infosphere». The purpose of forming of such an environment is to provide certain educational needs and didactic aims which influence on the informative resource of an educational institution, its staff and structural features. Investigating informatization of vocational and technical education, we use «an ICT-saturated educational environment» term, as we consider that it stresses the meaningfulness of using informative and communication technologies means while studying subjects of different cycles, first of all, of professional and theoretical one, at vocational schools.

As the analysis shows, informatization of education, does not limit to the replacement of pedagogical technologies by analogical ones which are carried out with the use of ICTs. Changing a range of forms and methods of educational work used at vocational schools in support of an ICT-

[13] Биков В. Ю. Моделі організаційних систем відкритої освіти : [монографія] / Валерій Юхимович Биков. — К. : Атака, 2008. — 684 с., p. 141.

saturated educational environment is one of the important features of the process of education informatization[14]. An ICT-saturated educational environment is a complex of hardware, software, data bases which realize informative processes and proper didactic materials, methods, educational communication, as well as, connection and effective functioning of organizational structures of educational establishments. Such an environment is aimed at exposuring, revealing and developing a person's abilities and potential possibilities; forming the conditions for self-education; providing assessment software into the educational process; compensating possible negative results of students' working with ICTs. An ICT-saturated educational environment at an educational establishment can be a part of a regional informative and educational space of VET.

For informatization of specialists' training at vocational schools, it is necessary to define, provide and realize certain ***pedagogical conditions*** which allow to manage the educational process effectively, to organize the educational process in accordance with the tasks, applying selected forms, methods, and techniques of using ICTs. The conditions of educational process informatization at vocational schools of a building type are the following:

• *Readiness of pedagogical workers for introducing ICTs and complex informatization of educational process:* formed informative culture of teachers and experience of informative activity; an awareness of the necessity of introducing ICTs into an educational process; an ability to prevent possible risks and failings, inherent to ICTs; knowledge of didactics principles, pedagogical theories and approaches; an update of didactic, informative and special professional knowledge by means of ICTs.

• *Continuous systematic informative training of future workers:* a construction of the contents and structure of an educational process in accordance with the components of ICTs competence; a formation of future builders' informative abilities and communicative skills; students' free access of to the PC and information sources; a formation of students' motivation in relation to using ICTs and intensive informative activity; an effective management of cognitive activity using ICTs; a stimulation of future builders' creative activity.

• *Creation and permanent perfection of methodical and technical base of education informatization:* an update of technopolis, networks organization with connection to regional and global telecommunications; an update of modern software, including specialized one; an installation of computer trainers and simulators of a building equipment; a creation of an electronic library and informative databases of a building type; informative terminals installation; a search for software, adaptation to the requirements of educational process, elaboration of own programs of computer-supported collaborative learning.

[14] Уваров А. Ю. Кластерная модель преобразований школы в условиях информатизации образования : автореф. дис. на соискание науч. степени доктора пед. наук : 13.00.02 «Теория и методика обучения и воспитания» / А. Ю. Уваров. — Москва, 2009. — 41 с.

• *Integral scientifically grounded use of the complex of ICTs application directions within the educational process:* the coordinated introduction of ICTs into different cycles; a computer-integrated study of ICTs in the process of training; a combination of traditional and innovative methods and technologies of education; a development of methods of organizing the educational process on the basis of ICTs; a design of processes of a building production, and also diploma papers writing with the help of ICTs.

• *Effective management of professional training informatization:* an appointment of a leader and people responsible for the directions of ICTs application; an ellaboration of the conception and program of informatization of an establishment; an installation of specialized software for educational process control; an assessment of ICTs usage efficiency; a monitoring of information component of workers-builders' professional competence; a collaboration with the network of establishments of a building type, as well as, with foreign partners in relation to introducing ICTs into professional training.

The process of informatization must be based on the complex of didactic principles, personality and activity approaches, programmable, module and problem education. In addition, a crucial factor is an experience of working with computer hardware and pedagogical workers' qualification. The use of ICTs in an educational process, beyond doubt, needs developing vocational schools' infrastructure: to put computer hardware, facilities of network support, information terminals, educational and methodical techniques, and ICTs technical support into operation, and also to develop a strategy of equipping educational establishments with necessary teachware. ICTs must be used in all the cycles of training. The administration of vocational schools must elaborate a long-term program of informatization aimed at putting automation system of educational process management into operation. It enables to improve management effectiveness, productivity of workers-builders' training due to providing a strong feed-back into the educational system. It also develops possibilities operatively to bring in the necessary corrections into the contents, forms and methods of vocational education, and allows to optimize the decision of complex problems of the methodical and technical provision of informatization while builders' professional training.

In continuously changing conditions teachers have to design and make the reality of new educational programs that take into account the last scientific achievements, are systematically self-perfected, constantly actualize the knowledge, renew methods, organizational forms and facilities of the work, and prepare students to the vital functions, the essence and problems of which we are yet unable to define exactly[15].

[15] Кедрович Г. Теория и практика использования компьютерных технологий в общеобразовательных и профессиональных учебных заведениях Польши / Кедрович Гжегож ; пер. с пол. Г. А. Цисовской. — К. : Вища шк., 2001. — 355 с., p. 53.

As a basis of planning and organizing all the measures necessary for informatization process realization, we developed a Conception of informatization of specialists' training at vocational schools of a building type, which aims at a complex decision of problems connected with normative and legal, educational and methodical, organizational and financial provision of informatization at vocational schools[16]. The realization of the suggested conception takes place through the Educational and Methodical Centers of VET by means of planning and observance of «Flow sheet of informatization» of every education institutions.

We also plan and approbate scientific and methodical provision of informatization of vocational education of a building type, which includes a complex of organizational and methodical aspects[17]: the professionally directed teaching and learning of informatics at vocational schools; the development of general professional and professionally oriented informative abilities; the combination of traditional and innovative forms and methods of organizing educational process on the basis of ICTs; the problem- and project-oriented methods of workers-builders' training with ICTs application; the workers-builders' professional training by means of the Internet; the development and introduction of teachware for building professions; the computer oriented diagnostics of professional training quality; the methods of preparation of teachers and masters of production studies to use ICTs at vocational schools of a building type.

Another problem to solve is to realize step-by-step and continuous informative training of workers-builders, to use ICTs in general, general-professional, professional-theoretical subjects and production studies, fixing it in the State standards of VET of concrete professions. We consider expedient to create and introduce innovative educational-production and pedagogical technologies on the basis of ICTs in accordance with the needs of labour-market and features of different regions, to provide establishments of VET with the newest professionally applied teachware.

The development and introduction of learning management system – LMS (in Ukrainian terminology – pedagogical programmatic facilities or e-leaning resources) promotes the increasing of the efficiency of professional training at vocational schools of a building type considerably. The advantages of LMS are the following: the use of graphic arts, video and audio accompaniment, the support of feed-back, the permanent test control, the searchability and navigation, compactness, and circulating simplicity. They must be functionally comfortable, evident, and interactive; they also must correspond to methodical rules, employers' demands, and foresee a possibility of bringing in additions and changes. LMS creation is facilitated by the specialized software (CourseBuilder and OnViz, Dazzler and Dazzler Deluxe, eLeaning of Suite, HyperStudio, LERSUS, Moodle, Quest and Designers Edge, Seminar, ToolBook II Assistant and ToolBook II Instructor) and programs for

[16] Литвин А. В. Інформатизація професійно-технічних навчальних закладів будівельного профілю : монографія / Андрій Вікторович Литвин. — Львів : Компанія «Манускрипт», 2011. — 498 с., p. 247–268.
[17] *Ibid.*, p. 288–292.

editing media (AutoRun Pro Enterprise, Authorware, Dreamweaver, NeoBook Professional, et.al.). For effective informatization of vocational schools of a building type we offer to form electronic educational methodical complexes, which include various learning management systems and give the students and teachers necessary informative materials and educational functions. The contents of the complex components is varied depending on the necessities of a subject and a type of training of workers-builders.

The training of teachers and masters of production studies of vocational schools to use ICTs aims at developing informative culture of pedagogical workers, i.e. a system, multidimensional concept which includes a style of thinking and a system of values of an informative society; and provides the performance of professional activity in the informative educational environment and is the sign of professionalism, as well.

4 Conclusions

The substantial increase of graduates' professional qualification level and ICTs competence as a result of complex informatization of professional training process at vocational schools is experimentally proved. The approbation and results of the research let us formulate the following conclusions:

1. Extrapolated on the sphere of education, informative processes (cognitive, communication, and social ones) are its system factor, an important constituent of a new, personality oriented paradigm of education. A scientific ground, planning and introduction of pedagogical technologies and informative resources which would provide the purposeful use of ICTs in future specialists' training, are on great demand.

2. The modern state of the informative provision of vocational and technical education does not meet, to full extend, the expectations of users of educational services and the requirements of social partners. It demands the scientific reorientation of aims of informative training in VET, the grounded update of its contents, the clear determination of the structure and organization of education by means of ICTs, and the complex of measures to improve informatization of all the process of skilled builders' professional training at vocational schools.

3. Taking into account the structure of skilled workers-builders' professional informatics competence, the informatization at vocational schools of a building type is expedient to examine according to four directions: in the organizational and administrative activity; in the educational process; in the educational-production process; and in out-of-class activity. In particular these are educational multimedia systems; business intelligence databases; computer design of production situations and professional actions; programs of knowledge and abilities control and self-control;

use of ICTs to write diploma papers; computer educational-trainings complexes as well. The task of every vocational school is a complex development of all these directions.

4 The pedagogical conditions of informatization of the educational process at vocational schools of a building type are a complex of social-pedagogical and didactic factors, i.e.: pedagogical workers' readiness to introduce ICTs and complex informatization of educational process; continuous systematic informative training of future workers; creation and permanent perfection of methodical and technical base of informatization; integral scientifically grounded use of a complex of ways of ICTs application within the limits of educational process; effective management of professional training informatization.

5. Informatization of vocational schools of a building type aims at the creation, maintenance and development of ICT-saturated educational environment on the basis of the computer oriented and telecommunication resources. This environment is favorable to the development of the processes of informative and educational co-operations between pedagogical workers, students and ICTs facilities, and the formation of students' cognitive activity, as well.

6. The conception of informatization of training specialists at vocational schools of a building type will realize the ideology of a balanced, steady development of separate educational establishments and the VET system on the whole. The conception aims at the system use of the newest technologies, taking into account the real possibilities of the resource provision of vocational education informatization, the development of electronic educational and methodical complexes, the update and approbation of the contents of specialists' informative training and methods of ICTs application while training workers-builders.

7. Scientific and methodical provision of informatization of workers-builders' training consists of two basic parts: methods of informative training and methods of teachware application at vocational schools. Informatization is directed at students' effective stimulation and motivation, increase of structured of educational contents, provision of complex visualization of professional phenomena, design of difficult professional objects, and increase of efficiency of the training stage of professional preparation.

Further elaborations must be devoted to the improvement of vocational education in Ukraine on the basis of ICTs, including the creation and introduction of computer-based trainings systems, planning of distance and mixed-type of vocational training, development of means of their electronic support and accompaniment. Special attention must be paid to teaching professionally oriented subjects with the use of ICTs, researches on students' age and psychological features while introducing ICTs, realization conditions and efficiency criteria of informatization on the different levels of education and for various subjects. In this connection the problems of pedagogical workers' readiness to use ICTs in different aspects of educational activity, methods of intelligent

tutoring system and methods of educational and cognitive activity management in the system of VET must be investigated.

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