

## IMPROVEMENT OF METHODOLOGICAL BASIS OF INFORMATION COMMUNICATION PREPARATION BASED ON A COMPUTER DESIGNING TOOLS

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### ABSTRACT

This article is about the methodological foundations for improving the information and communication training of vocational education teachers based on computer-aided design tools in the modern information space. The basis for improving the information and communication training of vocational education teachers is determined through the following types of training: contextual education, interactive training, problem-based training, preparation for design, information-design tasks.

**Keywords:** Training, computer design, improvement, vocational education, information and communication training, contextual education, interactive training, problem-based learning, design preparation, information-design tasks.

### INTRODUCTION, LITERATURE REVIEW, METHODOLOGY

Development of information and communication training of future teachers of vocational education based on computer designing tools will allow them to develop preparation to utilize innovative teaching methods. Innovative methods include contextual methods of teaching: interactive methods, problematic lectures, method of concrete situations, design method, program training, seminar-discussions and special courses. Therefore, first of all, we will briefly talk about contextual education.

Contextual education is vocational education; the main idea is to acquire new knowledge only in the context of future vocational activity. It is necessary to emphasize the need to take into account subject and interdisciplinary consistent links, because without them, contextual education does not make sense.

According to A.A. Verbitsky, sign-context (or only contextual) education is a form of active training. It is intended for use in high school and is aimed at vocational training of students. This is carried out systematic use of vocational context and is based on the gradual improvement of the learning process with elements of vocational activity.

The content of contextual education can reflect two different meanings-logic, namely it can reflect the educational science and future vocational activity, in other words, a future expert model of contextual education will be presented and describing its essential vocational qualities, functions, problems and objectives. The logic of future labor content determines the temporal scale of educational activities, as well as the plan for its spatial expansion, roles, knowledge is not only subjective and determining the need for system use interdisciplinary [1].

In contextual education, as any other type of education, the content of scientific knowledge is presented as educational information. But behind him, through problematic situations, projects, developed models and assignments, the formation of the future specialist from the beginning to the end of the entire training is manifested.

Based on the above comments, in *contextual education*, the subject and social content of vocational work is dynamically designed, and as a result of this, the conditions for the transition from the educational activity of the student (future vocational education teacher) to the professional activity of the specialist are provided.

*Interactive training.* The utilize of interactive forms of teaching is one of the innovative directions of improving the training of students in modern higher education institutions. Interactive training is the interaction of people involved in the learning process: the interaction between student and teacher, among students. Interactive teaching is considered as a learning strategy in higher education institutions, its purpose is to model and design intellectual independence of the student in the context of the development of social competence. In the current situation the focus on improving and optimizing teacher activities, the real level of inactive student knowledge is ignored and the learning process itself is ineffective without interactive learning. In interactive teaching, the student chooses the direction of individual learning and makes the learning process effective.

*Problem-based learning* is a teaching technology based on the use of active learning methods; problem-presented content of teacher-organized teaching with method of active interaction of the subject. In the process, it becomes familiar with the objective contradictions in scientific knowledge and methods of solution, and it becomes a participant in the process [2].

Usually, traditional methods of teaching present a certain amount of knowledge, subsequently reproductive tasks are given to reinforce the theoretical material. The logic of using a problem-based learning method is that at the initial stage it presents a problem or conflict to a student, because the student does not have sufficient knowledge to do so, but the purpose of the problem is to make it difficult for the student to comprehend. In this case, knowledge be acquired independently or with the help of a teacher.

The application of problematic methods in improving the information and communication preparation of teachers of future vocational education through computer designing tool allows the development of information and communication thinking and finds its expression in the formation of necessary creative abilities:

- willingness to independently determine the need for designing a process or object;
- the ability to suggest a model of design, based on a goal hypothesis;
- ability to choose environments for designing process based on their processing, analyzing and finding data;
- ability to verify the compatibility of the created model with the educational content, draw conclusions based on the calculations carried out;
- ability to see the integrity of the problem in all aspects and stages of its solution.

In the process of improving the information and communication preparation of future vocational education teachers on the basis of computer designing tools, it is expedient to use information and design issues.

*Project teaching* is an educational, creative or game-quality activity aimed at achieving the overall result of the students, the overall goal, methods chosen by mutual agreement, carried out jointly on the basis of performance styles. An essential indispensable condition of the

design activity is the final product of the activity, preliminary understanding of the stages of project development and implementation, including the analysis of performance results [2].

In the process of preparing the project, future vocational education teachers will use different forms of information work: 1) Searching information in different sources; 2) selecting content for answering questions or preparing messages; 3) understanding the essence of the information read; 4) use of information to solve issues; 5) creative processing of information; 6) critical analysis and evaluation; 7) transfer of information to others; 8) creation of own texts and other information sources. Therefore, the study of designing requires that future vocational education teachers to work with information and communication technologies which need to be attentive to the modern requirements for information and communication training for future vocational.

## **RESULTS, DISCUSSION**

The place of computerization of production and pedagogical activity is occupied by the activity of acquiring knowledge through multimedia viewing, observation, it is becoming a useful source of viewing with its obvious impressive features. Thus, the most effective means of informatization in such a direction are modeled environments. They help visualize the problematic model in which the construction, combination or technological processes are formed (AutoCAD, Autodesk Inventor, MathCAD, SolidWorks, etc.).

Implementation the technologies of design education, it will be necessary precisely such integrated information complexes, that is, education based on the design activity. They create a single educational environment whose resources consist not only of computer but also of all means of human information activities. At the same time, the question arises whether design should be used as an effective way of acquiring knowledge, rather than as a part of increasing the effectiveness of a narrow section of learning activities in a particular subject area.

From this perspective, the role of design education is much broader than that of "constructivist approach". In this case, on the one hand, its developmental education, on the other hand, should be applied in the concept of social order to «new literacy» (education standards of the new generation). O.T. Turakulov, J.A. Hamidov, D.O. Himmataliev, H.Sh. Kadirov and others further develop this approach in the concept of "information and educational environment", the essence of which is the computerization of the entire educational activity of students.

It is necessary to systematize the experience of using design activities based on the content of the "Information and Communication Technologies" education, to formulate the structure of design tasks on the level of complexity, and to develop an approximate scenario. The analysis of such experience serves to complement the content of the task structure, enabling the integration of intellectual and practical organizers of education into a single process of knowledge.

The creation of computer models of technological processes consists of hundreds of steps, which include the development of a special strategy, as well as skills of working with unique tools, modifiers, software. Practice shows that traditional principles of teaching the application of computer models do not allow students to move to the design and development stage of technological processes. In the existing educational literature, specific software is considered, for example, in the field of computer modeling of technological processes: for example, a mathematical model, tools, exercises for the design of the simplest objects, the calculation of the necessary equipment. Nowadays, teachers of vocational education are required to work independently on themselves, to use information and communication technologies in the

educational process, to participate in forums and conversations dedicated to the methods of computer designing tool of technological processes, to learn through trial and error in virtual communication with industry professionals, and to communicate with industry vocational.

The information and design tasks system, which is part of the operational management component of computer designing tools, will be developed case-method, which will involve the student in solving the real problems in the learning process, develop skills in them, and incorporate vocational elements into the activity. On the other side, each task serves to introduce a separate sub-project, resulting in all tasks completed, with the final computer model (machine-building construction or technological process project) implemented. It will also be known that there is not enough knowledge available in finding a solution to the proposed tasks, as a result of which there will be a problematic situation with the choice of technology for the development of computer models.

The structure of the information-design task system is presented in Figure 1.

<b>Level 1 – information and design tasks aimed at activating the cognitive activity</b>			
Knowing	Understanding	Skill	Control
<b>Level 2 – information and design tasks aimed at implementing intellectual and transformative activities</b>			
Information and intellectual skills		Heuristic skills	
<b>Level 3 – information and design tasks aimed at implementing their creative activities</b>			
Self-development		Independent education	
Information and communication competences			

**Figure 1. The structure of the information and design task system**

The logic of the system of information-design tasks system implies gradual complication of learning activities of students, and the distribution of tasks by the same type of activity, as well as taking into account the requirements of logic and information discipline.

The first stage involves tasks performed by the algorithm, which is necessary for studying and understanding the basic information units of the content block (reproductive level, the level of development of descriptive intellectual and cognitive abilities).

Second-class tasks are partly exploratory tasks that involve the formation of intellectual and organizational skills through self-development in the process of modifying the developed models (it is associated with actions to justify, deny, prove, present conceptual knowledge, which relies not only on remembering, but also on the ability to think, reason, argue, analyze events). Tasks at the secondary level develop the skills of explaining and identifying the reason of certain facts, which is a link between individual events understanding communications and relationships, demonstrates the ability to critically assess the situation.

The performance of the third-level assignments is based on information already known from the beginning, which includes designing activities related to the expression of assumptions about the possible variants of events, events that are present and will occur in the future. The level of development of the design activity is assessed as the degree of appropriation of the tool for the logical construction of the model, the study of which makes it possible to formulate new knowledge based on the existing knowledge.

The implementation of information and design tasks within the educational process is aimed at bringing students into real vocational activity, developing skills of vocational activity, and incorporating elements of vocational creativity into their activities.

It is impossible to improve information and communication training for future vocational education teachers without the organizational change of educational activities. Independent work of students plays an important role in the educational process.

The independent work of students is a way of identifying an active and purposeful way of acquiring new knowledge and skills that the teacher is not directly involved.

According to O.A. Kossinov, organizational measures to ensure the effectiveness of independent work of students should be based on the following:

- Independent work must be accurate in the direction of its subject;
- Independent work must be effective and should be continuously monitored and its results evaluated.

The system of information and design tasks included in the educational and methodological support of future vocational education teachers to computer designing tools allows them to properly organize their independent functioning as a function of knowledge of their work. At the same time, students become subjects of education, that is, they independently improve their professional knowledge and skills and continuously develop their vocational qualities.

The process of preparing future vocational education teachers for independent use of information and communication technologies in their vocational and pedagogical activities and computer designing activities should be organized in such a way that they can integrate pedagogical technologies and information and communication into the positive aspects of the traditional training system.

Various organizational forms of education are traditionally available. These are lectures, practical exercises and their various types: seminars, laboratory works, practical work, scientific research work of future vocational education teachers, independent work under the supervision of teachers and so on.

Taking into account these, in our view, the forms and methods of organizing independent work aimed at improving the information and communication training of future vocational educators on the basis of computer designing tools should be chosen according to the types of use information and communication technologies. Classification of forms and methods of organization of independent work aimed at improving the information and communication training of future vocational education teachers on the basis of computer designing tools is presented in Table 1.

**Table 1: Classification of forms and methods of organization of independent work purposed at improving of information and communication training of future vocational education teachers based on computer designing tools**

<b>Types of activities</b>	<b>Forms</b>	<b>Methods</b>
Educational-cognitive activities on the use of computer designing tools	Lectures identify that (problematic, explanatory-illustrative), pre-planned lectures, practical seminars, laboratory training in computer classes, work on individual methodological topics, acquaintance with the system of tasks of information and design tasks with varying degrees of complexity, study of additional topics on the curriculum, solving complex problems, identifying various elements of construction (machine, available machine tools, vehicle, tractor and sizes of agricultural machinery parts).	Explanation-illustrative, reproductive, problematic statement, partial exploration; educational – business games, creative performances (information), analysis of situations
Research activities on the utilize of computer designing tools	Exchange of ideas on technical and general vocational subjects on the basis of innovative technologies, organization of various didactic games. Problematic lectures, problematic seminar and practicum, work on the topic of research, educational and communication projects, independent work of future vocational education teachers, conference.	Partial research, researchers; creative performances, educational-research game, design method, micro-research.
Practical work on the utilize of computer designing tools	Scientific-practical conference, practical training in educational institutions, performance of system of information and design tasks with varying degrees of complexity, laboratory work on the design, teaching of special laboratory equipment, disassembly and reassembly, developing methodologies for their use in the teaching process, and so on..	Analysis of situation, design methods, study of problems of vocational education, self-assessment.

The work on the creation and implementation of improved system for future vocational education teachers in the use of information and communication technologies and computer designing tools activities requires a systematic approach and collaborative work of education participants.

Analysis of the state of the practice of improving students' information and communication preparation training on the basis of computer designing tools shows that future vocational education teachers only acquire discrete knowledge and skills in the learning process. Many of them have insufficient experience in the acquisition of knowledge, information and educational, experimental research, use of information and communication technologies in the educational process, computer design, organization and implementation of creative activities, have not

mastered the skills of independent processing of various types of information, use of virtual and multimedia educational materials.

The results obtained on the basis of pedagogical research indicate that 5111000 – Vocational education of technical higher educational institutions (5310600 – Road transport systems and their exploitation) students in the field of education (teachers of future vocational education) on the basis of computer designing tools of information and communication preparation in order to determine organizational and pedagogical and didactics conditions complex. When we say such conditions, we understand important external and internal situations that affect the course of the pedagogical process.

Taking into account the improvement and broad implementation of modern information and communication technologies, the effectiveness of the teacher of vocational education not only depends on the level of basic psychological-pedagogical and technical knowledge and skills, but also depends on the level of information and communication training.

## CONCLUSIONS

In conclusion, information and communication training of vocational education teachers plays an important role in formation of vocational knowledge, skills and competencies among students of modern educational institutions. He must have extensive and solid knowledge in his field of specialization and be able to apply them actively and creatively with the use of information and communication technologies in their vocational and pedagogical activities. This requires high information and communication preparation, extensive technical knowledge, in-depth knowledge of modern production achievements and advanced directions of economic development.

## REFERENCES

1. Verbiskiy A.A. Kompetentnostniy podxod i teoriya kontekstnogo obucheniya. - M.: IS PKPS, 2004. – 84 s.
2. Vishnyakova S.Ya. Vocational'noe obrazovanie. Slovar'. – M.: Nov', 1999. -526 s.
3. Qo'ysinov O.A. Talabalarda mustaqil ta'lim olish ko'nikma va malakalarini shakllantirish. Kasb-hunar ta'limi. – T.: 2008. -№2, 22-23 b.
4. Khakimov J.O. Documenting procedures for implementing the process of project teachers to computer projects. International Journal of Advanced Science and Technology (Scopus). Vol. 28, No. 20, (2019), pp. 881-889.
5. Xodjaboev A.R. Kasbiy ta'limda zamonaviy innovasiyalarning mazmuni va mohiyati. O'zbekiston milliy axborot agentligi (O'ZA) – UZA.uz saytining ilm-fan bo'limi (elektron jurnal). – T.: 2019.
6. Xodjaboev A.R., Hamidov J.A. Kasb ta'limida elektron o'quv-metodik majmualarni loyihalash va qo'llash muammosi. Kasb-hunar ta'limi. – T.: 2019. -№5, 27-32 b.
7. Xakimov J.O. Bo'lajak o'qituvchilarni komp'yuterli loyihalashga tayyorlash jarayoni modelini joriy etishning didaktik shart-sharoitlari. Mug'allim ham yzluksiz bilimlendirio'. – Nukus, 2019. -№4, 38-45 b.
8. Xakimov J.O. Texnika mutaxassisliklari talabalarini kasbiy faoliyatlarida axborot-kommunikasion texnologiyalaridan foydalanishga tayyorlashning pedagogik shartlari. Xalq ta'limi. – T.: 2019. -№5, 111-114 b.

## СПИСОК ЛИТЕРАТУРЫ

1. Вербицкий А.А. Компетентностный подход и теория контекстного обучения. - М.: ИЦ ПКПС, 2004. – 84 с.
2. Вишнякова С.Я. Профессиональное образование. Словарь. – М.: Новь, 1999. - 526 с.
3. Қўйсиров О.А. Талабаларда мустақил таълим олиш кўникма ва малакаларини шакллантириш. Касб-хунар таълими. – Т.: 2008. -№2, 22-23 б.
4. Khakimov J.O. Documenting procedures for implementing the process of project teachers to computer projects. International Journal of Advanced Science and Technology (Scopus). Vol. 28, No. 20, (2019), pp. 881-889.
5. Ходжабаев А.Р. Касбий таълимда замонавий инновацияларнинг мазмуни ва моҳияти. Ўзбекистон миллий ахборот агентлиги (ЎЗА) – UZA.uz сайтининг илм-фан бўлими (электрон журнал). – Т.: 2019.
6. Ходжабоев А.Р., Ҳамидов Ж.А. Касб таълимида электрон ўқув-методик мажмуаларни лойиҳалаш ва қўллаш муаммоси. Касб-хунар таълими. – Т.: 2019. -№5, 27-32 б.
7. Ҳакимов Ж.О. Бўлажак ўқитувчиларни компьютерли лойиҳалашга тайёрлаш жараёни моделини жорий этишнинг дидактик шарт-шароитлари. Муғаллим ҳам үзлуксиз билимлендириў. – Нукус, 2019. -№4, 38-45 б.
8. Ҳакимов Ж.О. Техника мутахассисликлари талабаларини касбий фаолиятларида ахборот-коммуникацион технологияларидан фойдаланишга тайёрлашнинг педагогик шартлари. Халқ таълими. – Т.: 2019. -№5, 111-114 б.