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METHODS OF USING ENGINEERING GRAPHICS SOFTWARE IN THE PROCESS OF ORGANIZING INDEPENDENT EDUCATION OF STUDENTS

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ABSTRACT

The article is designed to develop methods of using engineering graphics software in the organization of the Independent Education of students of professional educational institutions. The article, based on empirical research, is aimed at the Independent Education of the students of professional educational institutions from the e-learning resources in the process of organization, in particular, the individual performance of tasks in the example of the Compass 3Dprogram and the development of their professional competence in the integrated educational environment through it. In this regard, training sessions for students in Termez city vocational school on the use of these engineering graphic programs were organized, and in the process, the students were divided into experimental and control groups. The indicators of their mastering were analysed using mathematical statistical methods.

KEYWORDS: *Engineering Graphics Software, Empirical Research, Competence, Integration, Mathematical Statistics.*

INTRODUCTION

Currently, the process of vocational education, based on innovative engineering programs, is a very important factor in the life of mankind. The use of e-learning in the learning process improves the quality of education and makes it better (Olga V. Yanuschik, Elena G. Pakhomova and Khongorzul Batbold, 2015) **[1].** The use of e-learning in the learning process provides educational effectiveness. Therefore, in various conflicting situations in the socioe-economic spheres of human life, professional compensation plays a key role in making the most decisive decisions. The main task of this educational process is the training of specialists with professional knowledge, skills, and the ability to apply modern information technologies in the educational and production process (Kuysinov O.A., 2021) **[2].**

It is no secret to anyone that in most of the countries of the world, there are various obstacles to the development of the professional education process; therefore, due to the high level of professional education in our country today, the issue of creating an educational environment in which educational institutions develop the integration of students engineering graphics programs and information technology with (Olim Mengliboy o‘g‘li Alimnazarov, Yigitali Jummayevich Shamayev, 2022) **[3].** This integrated learning environment shows that the practical applications

studied by the students are associated with their future scientific activity in the field of technology and construction and their prospects in society, as well as the necessity of training a competitive person in the process of obtaining quality education (Qo‘ysinov O.A., Alimnazarov O.M., 2022) **[4].** Therefore, today in our country, there is a rapid development of the educational environment due to the rise in the level of professional education, which will lay the foundation for independent study and success of their chosen professions.

The educational process, along with information, reflects the main task of innovative education in the formation of special compensations aimed at the ability to apply professional knowledge and skills in students and in the development of their skills in future professional activities (Kuysinov O.A., Abduraimov Sh.S., Mamamtov D.N., Zaripov Z.R. and Abduraimova G., 2022) **[5].** First, we should pay attention to the fact that we cannot introduce it into practice without a clear understanding of the new type of education, that is, the processes of effective use of the electronic environment to listeners and students. If this process is used purposefully, it can improve the quality of the training process (Luiz Miguel Renda dos Santos and Shintaro Okazaki, 2015) **[6].** The increasing social and economic importance of the educational process in the quality of strategic education is the creation of a digital educational environment in the development of the individual, society and the state (Parupalli Srinivas Rao, 2019) **[7].** Life is an unstoppable process towards technology and an electronic government that has all the different components. Electronic education helps elevate the nation and develop the country (Mazen Ismaeel Ghareb and Saman Ali Mohammed, 2015). **[8]**

The aim of the study is to contribute to the research activities on the development of motivation in students through the introduction of independent education into practice using engineering graphics programs in the process of professional education. An example of the use of Compass 3D software in solving the existing problem in the field of research is the development of strategic directions in the organization of independent education of students of professional educational institutions, as well as increasing the effectiveness of the educational process using engineering graphics programs and pedagogical information technologies. The objectives of the study are to analyse the existing problems in the independent learning process by organizing training sessions using Compass 3D software to ensure the effectiveness of the research work and to compare the results.

The scientific novelty of the study is that it is determined by the empirical research framework in which the study is oriented towards practice.

An important aspect of the study is the increasing social and economic importance of the educational process in the quality of strategic education, together with the establishment of a digital learning environment in the development of the individual, society and the state.

Experimental research work was carried out with the aim of testing the data and practical process observation results as a result of the study of theoretical and practical sources relevant to the problem of the study in an experimental setting. Additionally, in the course of the empirical research work, the following were done:

• The pedagogical opportunities for the development of work compensation with engineering programs of students of Termez city vocational school were investigated;

• The practical significance of the theoretical results obtained in the course of the conducted empirical research work was studied and compared;

• For the research work, a specially organized learning process was observed, analysed, identified and eliminated shortcomings, and students' performance with an engineering graphics program was developed as a base competency.

In achieving the objectives pursued by the research process, the following main objectives were identified and implemented:

1) to determine the content of the conducted research work and prepare the research program in accordance with it and develop an alternative solution for their experimental experience: training sessions in the Control and Experience groups on the organization of the independent educational process were organized on the example of using the Compass 3Dprogram in Termez city vocational school;
2) Using the Compass 3Dprogram in Termez city vocational school, the methodical provision of development of students' competency in working with educational information was created to further enrich theoretical knowledge and practical skills in teachers;
3) The tasks of developing a method of effective use in the educational process independent of the Compass 3Dprogram have been defined;
4) On the basis of the methodological provision developed by our city vocational school, the development of students' performance compensation with engineering graphics programs was determined through mathematical statistical methods, and the content of the research work as well as the final conclusions were developed, confirming that the ideas put forward were effective and substantiated.

To introduce this research work into practice, training sessions were observed in Termez city vocational school with the aim of effectively using Compass 3D software in the process of independent learning. Question-answer, questionnaire, and interview were conducted with the respondent teachers. The students were protected by presentation of the independent learning assignments that they performed on a theoretical and practical basis.

Methodology

Research design and instruments

In the process of organizing independent education in professional educational institutions with the introduction of pedagogical and information technologies, we analysedthe effectiveness of students' acquisition of knowledge using theoretical and empirical research techniques. Empirical researchconsists of developing the necessary practical proposals and recommendations on the basis of generalization, analysing the empirical data obtained on the phenomena and processes of social life on a practical basis with new programs and methods.

Empirical (concrete) research techniques are studied as follows:

• The most common scientific method of scientific knowledge (conscious practical and theoretical activity);

• General scientific methods on the empirical level of scientific knowledge;

• General scientific methods on the theoretical level of scientific knowledge.

In the process of carrying out practical research, preliminary empirical data are collected using specific research techniques, which include the following:

Survey method – The convenience of this method is manifested in the fact that the observation and experimental techniques of the study can only be used by teachers in the educational process, while the survey method can also involve short-term trained assistants in conducting the research and with their help cover a large number of respondents.

Discussion – method through dialogueue-this will serve to strengthen the knowledge of students on the basis of the task given by question and answer;

Presentation – this is a method that allows students to determine the level of speech and professional knowledge;

Statistics – to achieve reliable accurate results using mathematical statistical techniques for the processing, proof of analyseddata.

The empirical research method is the means of obtaining information and data about an object and processing them in the primary way. Empirical data will then be included in the scope of the theoretical study.

The explanation of the information entering into the theoretical research circle leads to the development of their worldview, that is, the development of the law or principle, the technological invention.

Observation as a method of empirical research:

• obtaining primary information and information about properties, signs and structures that can be perceived (observed) by objects;

• create a clear picture of the object;

• performs resource delivery tasks for theoretical analysis.

One of the global tasks of innovative development in the world is the competence of creativity and the enthusiasm for creating new ideas as a result of the professionalism of students around the world, including creativity in humans, as well as the creative approach to professional activity, the ability to make rational decisions and the result of professional competence (Z.K.Ismailova, Sh.U.Nurullaeva, N.N.Karimova and T.Y.Abzairov, 2021) **[9].** The main task of integrated education is reflected in the formation of special compensations aimed at the ability to apply professional knowledge, skills in students and the development of their skills in future professional activities (Kuysinov O.A., 2018) **[10].**

The effective organization of the process of developing students' competency in working with graphic software is interrelated with the chosen concessions, conditions, and the components of targeted, conceptual, process-oriented and result – analysis are as follows:

Target components. Orientation towards the formation of work compensation with engineering graphics programs through the effective organization of students' educational activities. The targeted component focuses on the formation of engineering graphics program performance compensation through the effective organization of students' learning activities.

Conceptual components. The stages of development of the competency of students of Termez city vocational school for work with engineering graphics programs are considered – the stages of development of the competency – based on the principles of competency, personality – oriented, integrated, systematic-active approaches and adaptability, interrelationships with practice, naturalness, interpretation, and development of the competency of students for work with engineering graphics programs.

In the course of the study, the technology for the development of students' engineering graphics program performance competency was developed with the aim of introducing advanced ideas into practice, and the technology was carried out in motivational, cognitive, creative and process-oriented stages:

Motivational stage. Ability arises through creativity as a variety of human activities as one of the special productive human qualities in processes that are not regulated by nature and serves as a direction of enriching the creative potential and levels of the individual (Abduvalieva Dilsora Nodirjon Kizi, 2021) **[11].**

With the rapid growth of the use of information communication technology among students and teachers, professional education programs, such as other educational institutions, indicate the need to integrate and support the development of digital skills (Stefen Wild and Lydia Schulze Heuling, 2020) **[12].**

The use of practical applications in innovation and technical education in ensuring the readiness of students for engineering activities in this process indicates the relevance of the development of modern teaching technologies and methodologies (B.Dj.Ulugov and Sh.U.Kasimov, 2021) **[13].**

The objective of the motivational phase of developing performance competency in engineering graphics programs in students is to guide the development of the need for data analysis in the course of educational activities. In particular, depending on the direction of the specialty, the various disciplines taught for them can also be applied in informatics, engineering graphics, computer design and other sciences. To learn Compass 3D software, students will first be required to have the skills to create 3D models. However, even if there are no such skills, then with the help of this program, there will be no serious obstacles in the work of 3D design. Engineering graphics software has a standard graphical interface that is integrated with many Windows operating systems, which significantly reduces application learning time and is thus an easy-to-use engineering graphics software (Víctor Revilla-Cuesta, Marta Skaf, Juan M. Manso and Vanesa Ortega-López, 2020) **[14].**

To demonstrate the relevance of information acquisition as a learning material to practice on the basis of understanding the importance of information acquisition in teaching activities and vital activities of students, using Compass 3Dsoftware, we will demonstrate the following function:

About the project

Organization	Termez Engineering and Technology Institute
Author	Alimnazarov Olim
Current application	APM FEM Compass 3D

The APM FEM Analysis Unit is combined with Compass 3Dsoftware to perform static frequency, bending, and thermal analysis, in which the work is performed as follows:

1. Enable Compass 3Dsoftware
2. In the 3D model mode, we build a three-dimensional spatial model of the Bolt combination detail and its assembly unit from the "Сборка". Since the objects under consideration are considered to have a simple configuration, it is considered convenient to use Figure 1.

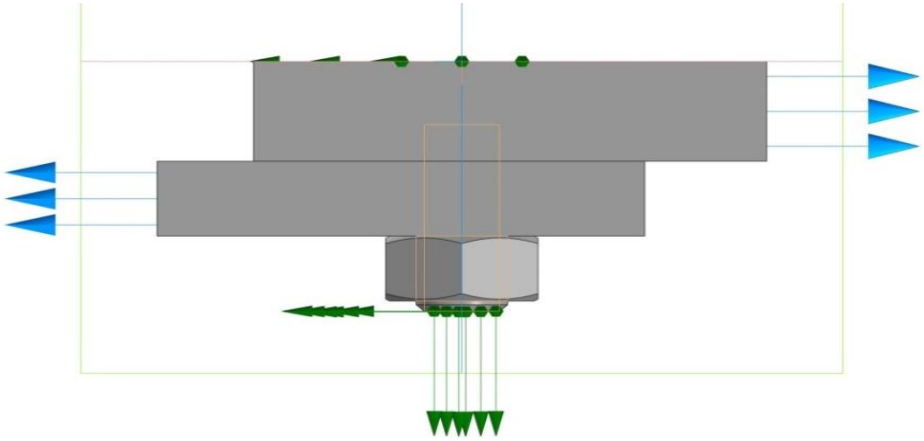

Figure 1. Bolt combination detail and three-dimensional model of its assembly unit

3. The next step is to select the material from the library of the "Управление" section of the Compass 3Dprogram. There is a wide range of different materials that the program offers, among which we select the material according to the design details of the assembly unit.

We select the materials of the design details folding unit steel. The characteristics of the materials selected for the assembly unit are given in Tables 1 and 2.

TABLE 1. BOLT COMBINATION DETAIL MATERIAL PARAMETERS

Material	**Type**
Constant voltage [MPa]	235
Normal voltage module [MPa]	200000
Coefficient	0,3
Density [kg/m^3]	7800
Linear temperature growth coefficient	0,000012
Consistency in compression [MPa]	410
Stretch endurance limit [MPa]	209
Resistance limit in torsion [MPa]	139

TABLE 2. MATERIAL LOADING INFORMATION

Name	**Loading parameters**
Distributed power [N/m]	Power vektori: X = 0; Y = 0; Z = - 300 Price: 300 N
Distributed power [N/m]	Power vektori: X = 0; Y =0; Z = 200 Price: 200 N

4. Comparison of parameters and results in the network of finite elements

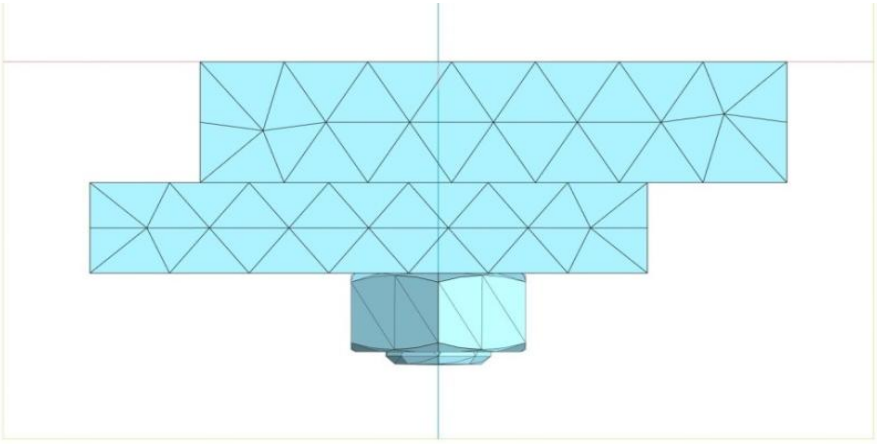

Figure 2. Limited set of elements

TABLE 3.COMPARISON OF PARAMETERS AND RESULTS

Name	**Results**
Type of elements	10 knotted tetraedra
Maximum side length of the element [mm]	5
Maximum thickening coefficient on the surface	1
Coefficient of volume distribution	1,5
Limited number of elements	1304
Number of nodes	2816

5. The static calculation results are shown in Table 4 and 5.

TABLE 4. INERTIAL CHARACTERISTICS OF THE MODEL

Name	**Results**
Model mass [kg]	0.089368
Model weight Center [m]	(0.007319; -0; -0.000184)
Inertial moments relative to the center of mass of the model [kg*m^2]	(0.000013; 0.000011; 0.000006)
Reaction moment relative to the center of mass [N*m]	(-0.00102; 1.752547; -0.000745)
General reaction of the supports [N]	(0; -0; 100.000008)
Absolute reaction price [N]	100.000008
Absolute torque value [N*m]	1.752548

TABLE 5. STATIC CALCULATION RESULTS

Name	**Type**	**Minimum value**	**Maximum value**
Equivalent on Mizesu kuchlanish	SVM [MPa]	0.039305	9.786724
General linear wiper	USUM [mm]	0	0.000321
Reserve coefficient		10	10

6. The results of the calculation of Priority Figures 3, 4, 5, 6, 7, and 8 are presented in Tables 6 and 7.

TABLE 6. RESULTS OF THE CALCULATION OF PRIORITY

N	Reserve coefficient in loss of priority
1	0,000305

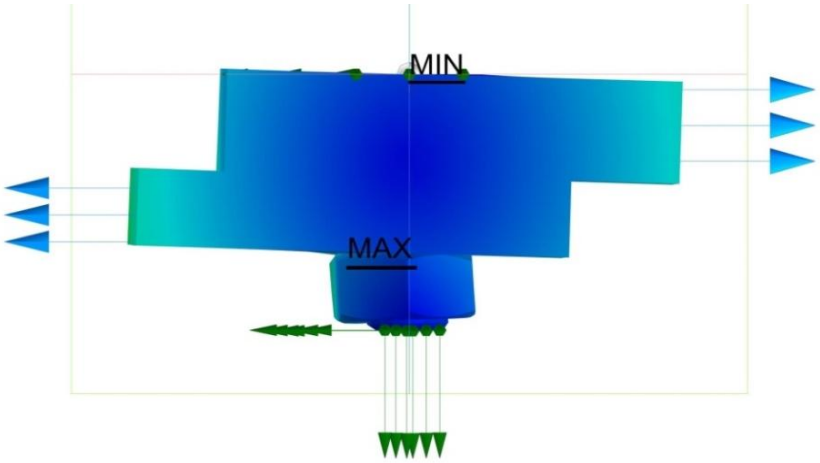

Figure 3. The form in the loss of the first priority

TABLE 7. RESULTS OF THE CALCULATION OF THE PRIVATE FREQUENCY

N	**Frequency [rad/sec]**	**Frequency [Hz]**
1	67982.736762	10819.788601
2	92859.66284	14779.074355
3	101061.74306	16084.475966
4	162543.459779	25869.595091
5	196327.912086	31246.557675

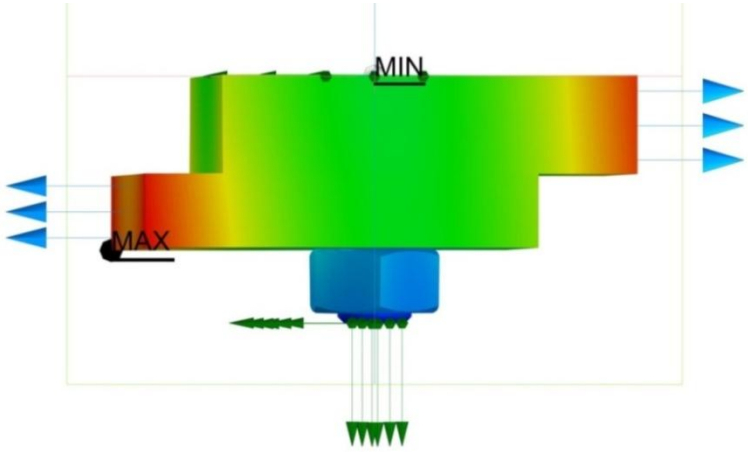

Figure 4. First private swing form

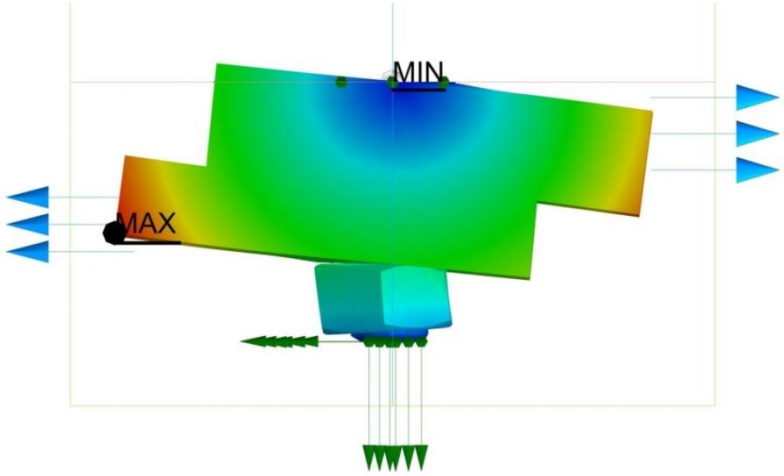

Figure 5. Second private swing form

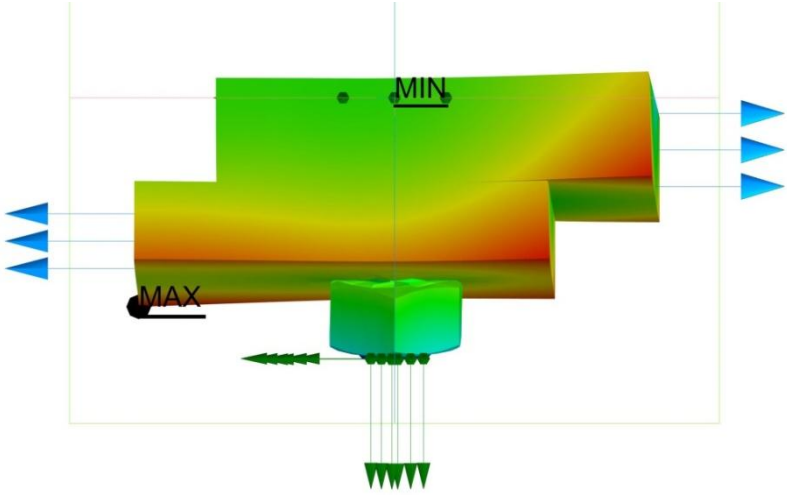

Figure 6. Third private swing form

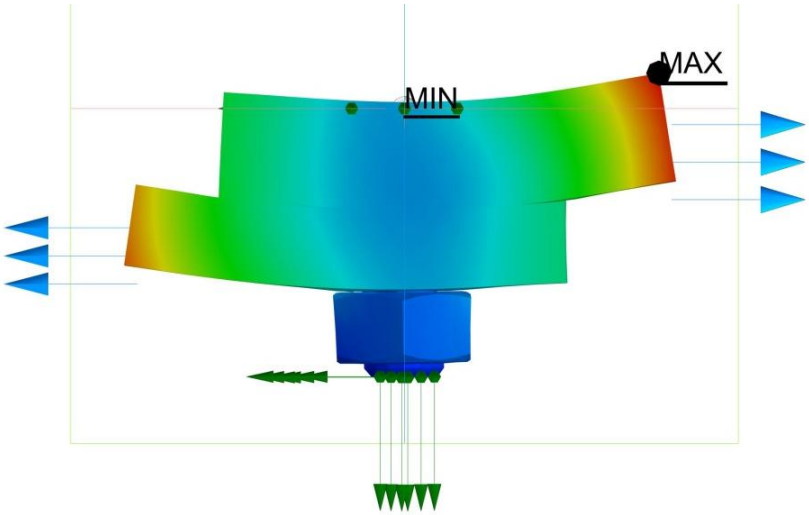

Figure 7. Fourth private swing form

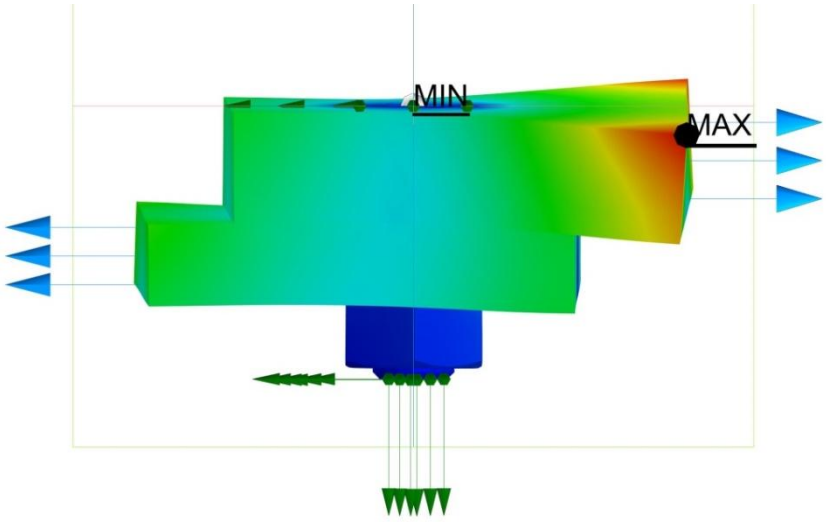

Figure 8. Fifth private swing form

Integration based on the student's knowledge and personal experience competence is considered professional and personal quality and is an expression of the creative side nature. The composition of the student's compensation includes cognitive, mineral, technological, communicative, reasoning and innovative. As part of the reader's competence, we can show individual, motivational, interactive, normative and evaluative elements (Иванова Любовь Викторовна, 2014) **[15].**

Cognitive stage. At this stage, it is important to ensure that students' performance with engineering graphics software is consistent with the level of continuous contemporary requirements of competence. It is necessary for students to be fully aware of the activities and activities associated with modernity in the process of integrated education.

Creative stage. The ability to apply the acquired information in the process of independent education, to solve problems, to assess situations and to put forward the necessary ideas requires creativity from educators. The factors that make students' creative approach to the process of working with engineering graphics software are as follows:

• individual characteristics of the individual: the ability to assess unusual (nonstandard) and uncertain situations, adapt and choose the optimal options; the ability to find an unusual or unusual solution to problems; the ability to have their own independent worldview;

• environment of creativity: a constant environment that creates conditions for a creative approach, and various factors that serve to create this environment; influences that create situations that create the effect of "adrenaline".

Process stage. The main objective of the independent educational process, based on the competency approach, is to prepare students for the conscious use of the information they have acquired in their life activities in accordance with the requirements of integrated education and to reflect on the results of the development of the student's work with engineering graphics programs.

Data analysis

This means that in the organization of independent education under the leadership of the teacher, the educational process will be as effective as the one established as a holistic system in each group and in the extracurricular activities. However, in carrying out these works, it is necessary to take into account the capabilities of each student (R.K.Choriev, R.Kh.Usarov, M.A.Sattorova, N.E.Abdiev and N.R.Pulatova, 2021) **[16].**

Vocational schools prepare their students for the formation of technical competences related to technical sciences, as well as multidisciplinary digital competences, and in the process for various difficulties (Michael Roll and Dirk Ifenthaler, 2021) **[17].** The scientific novelty of the results is that to increase the effectiveness of the independent educational process of students of professional educational institutions, we conducted experimental research at the Termez city Vocational School of the Surkhandarya region as an example. In the course of the study, 54 students were included in the experimental group of respondents and 54 in the control group. To increase the effectiveness of the independent educational process of students of professional educational institutions, an empirical study was organized. At the meeting of the Department of General Science of the Termez Institute of engineering and technology, the procedure for participation in the experimental – test work of the first-stage students of the Termez city vocational school was considered and discussed. The procedure for discussion, the results of the proposals and decisions given were noted at the meeting (Note No. 12 of March 2022). It was found that the trainers had various difficulties in interpreting, implementing and evaluating their skills. Trainers are often considered worthy of training different groups of students, even if they do not have in-depth knowledge of the competences (Bronwyn Ewing, 2017) **[18].**

Results

Preliminary analysis and latent profile analysis

To solve the existing problem on the basis of the studies, we organized a training session on the example of using the Compass 3D program for students of the Termez city vocational school. This is the development of strategic directions in the organization of independent education of students of professional educational institutions, through which the effectiveness of the educational process is enhanced by the use of pedagogical and information technologies.

The success of the research work is determined by determining the level of effectiveness of the previously proposed pedagogical ideas in their practical activities. In the above empirical research work, mathematical statistical methods were used to determine the effectiveness of the results obtained and to prove the ideas put forward as well as to process the results of the experiment. One of the methods of Mathematical Statistics Styudent statistics was used in carrying out the work carried out in our research work. For the purpose of comparing the assessment of the experimental and control groups, the mean value of the assessment evaluation in Group (1) is taken as follows:

$$\overline{X} = \sum_{i}^{N} \frac{X_i}{N} \quad (1)$$

The following mathematical statistical formulas were used in the analysis of experimental and test cases in four stages:

The first stage. (2) and (3) indicators for determining average values.

$$\overline{X}_\tau = \sum_i^N \frac{X_i m_i}{N} \quad (2)$$

$$\overline{X}_\sigma = \sum_i^N \frac{X_i m_i}{N} (3)$$

Here, X_i – is the indicator of assimilation (value of evaluation), and they accept 3 (satisfactory), 4 (good), and 5 (excellent) values. m_i – number of repetitions in the evaluation, N – the number of respondents who participated in the experiment.

(4) and (5) represent selective dispersion in experimental and test cases.

$$S_\tau^2 = \sum_i^N \frac{m_i (X_i - \overline{X}_\tau)^2}{N} (4)$$

$$S_\sigma^2 = \sum_i^N \frac{m_i (X_i - \overline{X}_\sigma)^2}{N} (5)$$

The second stage. (6) The mean value that evaluates the effectiveness of the learning process is the ratio of the mean arithmetic values of the experience and control group assessments, i.e., the coefficient of efficiency.

$$\eta = \frac{\overline{X}_\tau}{\overline{X}_\sigma} (6)$$

Here, $\overline{X}_\tau$ – is the average arithmetic value of the experimental group estimates, and $\overline{X}_\sigma$– is the average arithmetic value of the mastering evaluation in the control group.

The third stage. (7) and (8), the unknown middle values of the head bundles are confidence intervals for a_τ and a_σ:

$$a_\tau = \left[\overline{X}_\tau - \frac{t}{\sqrt{N_\tau}} \cdot S_\tau; \quad \overline{X}_\tau + \frac{t}{\sqrt{N_\tau}} \cdot S_\tau \right] \quad (7)$$

$$a_\sigma = \left[\overline{X}_\sigma - \frac{t}{\sqrt{N_\sigma}} \cdot S_\tau; \quad \overline{X}_\sigma + \frac{t}{\sqrt{N_\sigma}} \cdot S_\sigma \right] \quad (8)$$

Here: t –the probability of confidence in the normalized deviation is determined on the basis of β. For example, if we take β=0,95, then t=1,96.

The fourth stage. Hypothesis (9) on the equality of the mean values was taken as counterhypothesis (10).

H_o:$a_\tau = a_\sigma$(9)

H:$a_\tau \neq a_\sigma$(10)

We will examine the above hypothesis through Styudent statistics (11).

$$T=\frac{|\overline{X}_\tau-\overline{X}_\sigma|}{\sqrt{\frac{S_\tau^2}{N_\tau}+\frac{S_\sigma^2}{N_\sigma}}} \quad (11)$$

If we adjust the points to the Styudent statistics, then $T>T_{0,95}(k)$, then H is accepted, otherwise H_o is accepted. The tentative criterion here is the degree of freedom. To calculate it, the following (12) formula was used:

$$k=\frac{\left(\frac{S_\tau^2}{N_\tau}+\frac{S_\sigma^2}{N_\sigma}\right)^2}{\frac{\left(\frac{S_\tau^2}{N_\tau}\right)^2}{N_\tau-1}+\frac{\left(\frac{S_\sigma^2}{N_\sigma}\right)^2}{N_\sigma-1}} \quad (12)$$

Now, we will analyse the results obtained above based on the results obtained before the training session and the results obtained at the end of the training session. According to the results of the analysis of theoretical knowledge about the development of the competence of teachers working with engineering graphics programs, as well as the experience and control groups, the average value of the results showed the following results:

$$\overline{X}_\tau=\frac{[18\cdot5+17\cdot4+19\cdot3]}{54}=\frac{90+68+57}{54}=3,98$$

$$\overline{X}_\sigma=\frac{[12\cdot5+14\cdot4+28\cdot3]}{54}=\frac{60+56+84}{54}=3,7$$

Coefficient of effect:

$$\eta=\frac{3,98}{3,7}=1,08$$

Selective dispersion of teachers' results in experimental and control groups:

$$S_\tau^2=\frac{[18(5-3,98)^2+17(4-3,98)^2+19(3-3,98)^2]}{54}=0,69$$

$$S_\tau=\sqrt{0,69}=0,83$$

$$S_\sigma^2=\frac{[12(5-3,7)^2+14(4-3,7)^2+28(3-3,7)^2]}{54}=0,65$$

$$S_\sigma=\sqrt{0,65}=0,8$$

Confidence intervals of teachers in the experimental and control groups:

$$a_\tau=\overline{X}_\tau-\frac{t}{\sqrt{N_\tau}}\cdot S_\tau=3,98-\frac{1,96\cdot0,83}{\sqrt{54}}=3,76$$

$$a_\tau=\overline{X}_\tau+\frac{t}{\sqrt{N_\tau}}\cdot S_\tau=3,98+\frac{1,96\cdot0,83}{\sqrt{54}}=4,2$$

$$a_\sigma=\overline{X}_\sigma-\frac{t}{\sqrt{N_\sigma}}\cdot S_\sigma=3,7-\frac{1,96\cdot 0,8}{\sqrt{54}}=3,49$$

$$a_\sigma=\overline{X}_\sigma+\frac{t}{\sqrt{N_\sigma}}\cdot S_\sigma=3,7+\frac{1,96\cdot 0,8}{\sqrt{54}}=3,91$$

EMP empirical value and degree of freedom of Odent statistics:

$$T=\frac{|3,98-3,7|}{\sqrt{\frac{0,69}{54}+\frac{0,65}{54}}}=2,15$$

$$k=\frac{\left(\frac{0,69}{54}+\frac{0,65}{54}\right)^2}{\frac{\left(\frac{0,69}{54}\right)^2}{53}+\frac{\left(\frac{0,65}{54}\right)^2}{53}}=106$$

According to these results, $T_{crit}(0,05;106)=1,96$ equal. Hence, hypothesis *H* is accepted as $T_{crit}=1,96<T=2,15$ according to the results obtained in the experiment. Hypothesis *H* is accepted because the assimilation of the students of the experimental and control groups is equal to 1.14, $T_{crit}<T$. The results therefore showed a 14% higher rate in the experimental group than in the control group.

DISCUSSION

General discussion

In the new professional educational institutions, many changes were made due to the content, number and quality of education and the reform of educational programs and technologies. The implementation of these tasks will ensure a positive solution to the issues of development of the economy, reduction of poverty, and finding a worthy place in the life of young people, as a result of which the issues of increasing the welfare of our people will be solved. In this process, cooperation relations between professional educational institutions and higher education institutions have been systematically established, and the objectives and priorities of modern professional education system restoration and the new mission of the sphere have been defined.

It was checked that vocational education, which was conducted before the introduction of higher education, correlates graduates with cognitive abilities and personal characteristics. The results show that the results of the formative entrance test cannot accurately determine the students when they leave their first year of study, and accordingly, the link between cognitive abilities and personal characteristics does not matter at all. Consequently, both for the students and for the vocational education, it is important that the students are not properly informed about whether their skills and personal qualities correspond to the required skills and personal characteristics of the program (Chris Van Klaveren, Martijn Meeter and Irene Eegdeman, 2018). **[19]** To foster the institutional capacity to control learning within the framework of joint activities, experiments have shown the need to involve mentors and students in professional pedagogy, as well as jointly develop guidelines for supervision and control. The experience of the development of dialogueue between partners has revealed the need to establish a government-supported Cooperation Center on the policy of encouraging feedback and involvement in vocational education to the

participants in the partnership (Dinavence Arinaitwe, 2021) **[20].**

At present, the teachers of the Department of General Sciences of the Termez engineering and Technology Institute organized training sessions for the students studying at the Termez city vocational schoolto organize an independent educational process using engineering graphics programs. In the course of the training session, the indicators of achievement were analysed by the students using the methods of empirical research and mathematical statistics. For the example of the use of Compass 3D software for the experimental and control groups in the research processes, using the Styudent statistics of their mastering performance, the results were compared, and positive results were obtained in the independent learning process.

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