

**AMURCON 2021**  
**AmurCon 2021: International Scientific Conference****OCCUPATIONAL MOBILITY PROMOTION OF VOCATIONAL  
SECONDARY INSTITUTION STUDENTS**

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**Abstract**

The article is devoted to the problem of the development of occupational mobility of technical college students through the project approach in organizing the educational environment in the context of the current professional education. The article aims to present the experience of developing competencies of future professionals that are in demand in the digital economy, able to work in rapidly changing conditions of institutional relations, to switch to new technologies, able to build not an ordinary line career in one profession, but change qualification and a field of work. The paper reports on theoretical analysis of the notion 'vocational mobility' as the most significant quality of a specialist on the modern labour market, grounds of the structure and content of that category and gives the author's definition of the denoted concept. The authors focus on the identification of interrelation of technical college educational environment and vocational mobility of students, the effectiveness of project approach application in the arrangement of technical college educational environment. The article presents the findings of experimental research into vocational mobility development which provides the data about the level of development of vocational mobility of technical college students and the influence of the educational environment on this process. The project approach described in the article and the considered stages of project activities, applied in the vocational mobility development of technical college students, allow the educational environment to be organized in any vocational education institution taking into account rapidly changing socio-economic conditions and personal characteristics of students.

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*Keywords:* Educational environment, educational environment design, vocational mobility

## 1. Introduction

The development and introduction of efficient technologies, founding high-tech industries, and product recovery with new consumer properties contribute to rapid changes in working relations and conditions for professionals and employees at the companies. According to the Global Education Futures and WorldSkills Russia workplace image survey, the main trends in the 21st century include (Luksha et al., 2017):

- -Technological, including the digitalization of all spheres of human life, automation and robotics, transforming the role of human labour in all sectors of the economy;
- -social, including demographic changes and the making of network society;
- -techno-social based on globalization (economic, technological and cultural) and ecologization;
- -a meta-trend, the acceleration of all life and production processes, which is setting the pace for a renewal of the world around us.

Influenced by digitalization, the labour market is rapidly transforming, filling with new production relations, which requires workers to improve their skills continuously and acquire new competencies (Abuzyarova et al., 2019; Solovov & Menshikova, 2021; Soboleva et al., 2020).

The ongoing changes in the labour market require a principal transformation in vocational education and training, including for the vocational education system itself. Competently trained teaching staff (Rogaleva & Tretyakova, 2017) can train flexible professionals who are not only highly qualified, but also able to succeed regardless of the particular characteristics of work, ready for change and retraining, and ready to change professional activities. Today, pursuing a profession is less relevant. The labour market needs specialists who can perform professional tasks under constantly changing conditions, including the economic crisis. Employers are interested in employees with flexible skills, who can solve tasks that require creativity, are ready to cooperate with other people and artificial intelligence systems and can quickly switch to new technologies. These workers are the ones who can build a career in one profession rather than the regular line career path and who can change qualifications and job areas. Nowadays, the main task of a professional educational institution is to train a multivariate specialist of a multi-professional who is able to determine the lack of professionally significant information independently and quickly, find, structure it, and master the latest technologies. This approach does not deny the importance of the initial, basic profession, but rather contributes to overrange it through the enlarged knowledge, competencies and technologies from other professional activities (Zinchenko et al., 2020).

## 2. Problem Statement

From an applied point of view, the development of vocational mobility of students in the educational environment of a technical college is preceded by the development of the content of the intended process. It should be aimed at combining educational tasks, methods of their solution, predicting the results to which all subjects of learning should seek and developing an objective assessment of these results.

A project-based approach is a universal tool for solving this task. This is confirmed by scientific research on the theory of organization management, where project management is considered 'as a technology of program-target management, based on the program and a system of projects'.

As a result of the study of scientific literature and educational practice, we have identified the following contradictions:

- between the growing requirements of the state and society to the professional mobility of specialists, defined by the national programs and projects of the Russian Federation, and the insufficient level of its development among the graduates of vocational educational institutions;
- between the objective necessity of purposeful development of vocational mobility of students of professional educational institution and insufficient development of theoretical provisions for its development in the modern educational environment of a technical college;
- between the need to implement innovative models of learning and the lack of applied results of using the project approach in organizing learning environments in educational practice.

According to the emphasized contradictions, the research problem is supposed to be in the lack of a systematic approach to develop students' vocational mobility in the arrangement of the learning environment of a technical college.

### **3. Research Questions**

The subject of the study is the process of developing the vocational mobility of a learner through the project approach in the educational environment of the technical college.

### **4. Purpose of the Study**

The objective is to give reasons, develop and test a project-based approach to fostering students' vocational mobility while organizing the technical college educational environment.

### **5. Research Methods**

The methodological foundations were the project approach aimed at transforming the system of traditional education and the systematic organization of innovative educational environment focused on the development of vocational mobility, providing specialist adaptation to the accelerated change of technology on an indefinite date of the future. When working out, the theoretical and experimental methods of research were applied, which allowed obtaining data on the level of the development of vocational mobility of technical college students. At the stage of empirical data collection, a questionnaire survey of students and social partners was conducted. The results were processed using the Documentation of Statistical Method to process data according to the Student t-test.

## **6. Findings**

### **6.1. The content of the concept of ‘vocational mobility’ of secondary vocational education students in the context of the modern paradigm of pedagogical knowledge**

In recent years, the interest of researchers in the concept of ‘vocational mobility’ as a peculiar social, pedagogical and psychological phenomenon, which provides a personal labour professional success and an employee’s competitiveness, has increased (Efremkina, 2018).

The theoretical study of scientific publications shows that there is no single definition of the concept of ‘vocational mobility, which makes it possible to distinguish the traits of vocational mobility and develop the structure of this phenomenon. Currently, authors denote the concept of ‘vocational mobility’ in two aspects: as a quality/characteristic/property of an individual and dynamics/movement in space.

Summarizing the diversity of researchers’ opinions and views, requirements of the state and social partners to the quality of graduates’ training, this study has clarified the concept of vocational mobility of a student, which ‘means a set of personal and professional qualities presented as being ready and able to a future specialist to move in the professional and qualification structure, i.e. to change the branch of professional activity, profession, major or specialization depending on the current economic and job demands on rapidly changing labour market’ (Karelina, 2019).

This category has the following components: cognitive, integrative-activity and organizational-activity. However, in the structure of professional mobility, the digital skills that a modern graduate of a professional educational organization should master to be successful not only in professional activities in the new economic and technological conditions but also to live comfortably, to communicate effectively and develop oneself in the digital environment are determined.

### **6.2. Structure and content of the educational environment of a professional educational institution in the context of modern education**

Having studied the results of Russian and foreign scientific research related to the characteristic of the category ‘educational environment’, its features and structure, design and modeling problems, it can be argued that there are several approaches to the definition of this notion with different meanings and context.

Taking into account Yasvin’s (2001) definition, an educational environment is a system of influence and conditions of personality development according to a given pattern, as well as opportunities for its development contained in the social and spatial-subject environment’. So the government requirements for professional education results are determined in the Federal State Educational Standards of Secondary Vocational Education in the form of professional and general competencies. Competitive graduates should have them as a given pattern as well as employers’ training requirements and the region’s need for professionally flexible professionals.

The system of effects and conditions, as well as opportunities for personal development means a set of organizational and pedagogical conditions contributing to the development of professional mobility.

And social and spatial-subject environments are meant not only components of the educational environment of a professional educational institution, but also the educational environment of the city, region, and state. According to Efimov and Efimova (2015), an innovative educational environment can function and develop successfully only if certain conditions are met.

Taking into account the goals and priorities of education, government requirements for the results of vocational education, employer requirements for the level of specialist training and the needs of the region for specialists with professional mobility, as well as motivational readiness of the subjects of learning, the organizational and pedagogical conditions for the development of professional mobility of technical college students have been explored and theoretically proved:

- To fill the spatial and subject-specific component of the technical college educational environment and to organize different forms of learning;
- Instructional support and construction of students' individual learning trajectories in the technical college environment;
- Purposeful cooperation between the concerned parties of learning.

Therefore, the nature of the process of organizing the educational environment of technical college is a qualitative transformation of each individual structural component within it (i.e. the implementation of organizational and pedagogical conditions) and interaction between components, which determine the integrity of the educational environment of technical college and are necessary for the development of professionally flexible graduates.

In this study, we share the opinion of Vasilieva (2009) that educational environment is not only a phenomenon of pedagogical reality and pedagogical concept but also the object of design. There is a need for such a project because of the necessity to solve a cognitive or managerial problem.

### **6.3. A project-based approach in organizing the educational environment to foster professional mobility among technical college students**

The problem of the project approach in the management of the educational institution is studied in the papers of Seeer (Seeer, 2018; Seeer et al., 2016), Ilyina and Bazhilina (2017), Kiseleva (2021), Prikot (2019), Sedykh (2019), Smurova et al. (2018).

Within the research, the project 'Development of professional mobility of technical college students' was developed and carried out. It was tested at the Irkutsk Region State Autonomous Professional Institution Irkutsk Aircraft Building and Materials Engineering College.

The project activities were carried out stage by stage: from problem finding out to presentation of the completed product. Based on the revealed problems and objectives, the goal of the project 'Development of professional mobility of technical college students' was set: the involvement of 80% of students in activities aimed at the development of professional mobility for the period 2019-2021. Achievement of the goal made it possible to determine the completeness of the development of professional mobility of students of the professional educational institution and its readiness for effective professional activity.

At the stage of planning the project, a register of concerned parties was defined, project participants were selected, a communication model was developed, requirements for the project product, methods of project implementation were selected, deadlines for implementation were set, etc.

The project participants and concerned parties include:

- The founders of the vocational education and training organization, the authorities that determine the purposes and priorities of education;
- Social partners, as customers and consumers at the labour market;
- Educators, whose personal interest, competence, understanding of educational goals, and knowledge of professional training methodology determine whether this educational environment is an effective tool for the development of students' professional mobility;
- Learners who are able to build their individual learning trajectory and plan their career paths (Mishchenko & Tenyunina, 2018).
- Parents and lawful representatives of learners who are interested in the quality organization of learning and participate in it, which mostly determines the success in learning activities and career-building of a future graduate.

For a unified presentation of the project results, accepted by all project participants, a product image is developed, namely, the structure and content of the components of professional mobility as a result of learning, their markers and levels of development are determined. For each component, low, medium and high levels of development are defined, described in previously published works (Karelina, 2019). The distinguished components are formed in learning activities and are quite correctly measured. The procedures of diagnostics of the level of the components of professional mobility development have been carried out, as well as information collection and analysis:

- About the capabilities of a professional educational organization at a particular time stage. The educational environment of the technical college is analyzed according to three characteristics: opportunities for expanding the educational environment, rapid adaptation to the demands of the labour market and constant updating of technologies;
- On the learning and development outcomes of the 2nd-4th year students. Diagnostics of the cognitive component of professional mobility is carried out using software and didactic testing on general professional disciplines, the results of the intermediate state and final certification, the number of students participating in the subject and general technical competitions and contests.

The entry and final level of development of the integrative-activity component of professional mobility are assessed through observation and based on the results of interdisciplinary tasks and interdisciplinary projects performance by the students.

To diagnose the level of development of the organizational-activity-related component, the following methods were chosen: a questionnaire to determine the individual style of cognitive activity by the method of N.A. Kopeina, test Diagnosis of self-organization special features by A.D. Ishkov, test surveys Flexibility Assessment by vital indicators and Measurement of achievement motivation, test to diagnose communication and organizational abilities of B.A. Fedorishin (as cited in Rogov, 1999).

- on the level of students' satisfaction with learning. The results of the survey show that students are generally satisfied with learning and the choice of future major. However, they believe that learning a trade does not guarantee employment, the change of trade is not frightening but rather becomes the norm.
- on the level of satisfaction of social partners with the quality of students' training. According to the results of the survey, employers do not complain about the level of students' special training but expect more responsibility, adaptability, time management skills, self-criticism, ability to work in a team and high motivation for retraining from them.

Based on the collected information of research, the main trends of the project schedule Development of vocational mobility of technical college students have been defined, the activities and result characteristics have been developed:

1. Curricula and syllabi are changed. During the study, the interdisciplinary course 01.03 Special methods of aviation material processing for teaching IVE 15.02.08 Technology of mechanical engineering students is determined and developed.

2. The facilities and resources of the college have been updated. The technical college is a grant recipient for renovating work departments and service facilities.

3. The programs of supplementary vocational education are accomplished.

4. The content, management and control of educational activities by teaching tools (technical, computer and software) are enhanced.

5. Various forms of organizing learning are involved. Learning is promoted by introducing different forms, applied technologies and teaching methods.

6. Students' research work is included in learning. Students carry out interdisciplinary research and applied projects, including those ordered by social partners.

7. Students' work experience internship procedure has been improved. The system of dual education 'as a form and method of training students for trading' (Belikov et al., 2020) is performed; an independent assessment of the qualification of SPE graduates is introduced.

8. The working process of cycle commissions has been improved. The unified approaches in explaining the content of the processes and phenomena focused are defined, the most rational methods of teaching are chosen, and teachers are actively included in the interaction between each other.

9. The vocational education program has been performed. Projects have been implemented in ecological, vocationally-oriented and business areas.

Project work is a high-risk activity. This means it may happen that makes one act differently from the preexistent plan at any time, at any stage, in any work. The quality and success of the project depend on the choice of strategy to deal with such events.

The fourth stage is project implementation when the progress of the project is monitored to identify deviations in time and take management actions, to determine checkpoints (milestones), to evaluate each stage of work in terms of timing and achieved results with all project participants at sessions of the subject-cycle commissions.

The final stage is project turn in (meeting a project schedule). At this stage the effectiveness of the development of professional mobility in the educational environment of technical college students of a

professional educational institution is determined, control and assessment of markers are carried out, possible difficulties, errors in the arrangement of the educational environment are identified, ways to correct them are determined, decisions on correction of the educational environment and directions of further development are taken, the results are shown, which allowed the team to reflect on the work done, allowed to transfer the obtained experience into skills.

#### **6.4. Results of experimental work on fostering students' professional mobility through the implementation of a project-based approach in the organization of the technical college educational environment**

During the experimental work of the thesis research, the students from Irkutsk Aircraft Building and Materials Engineering College of the Irkutsk region and social partners were tested, interviewed and surveyed to determine the current state of professional mobility of students in professional educational institutions and to identify employers' preferences concerning personal and professional qualities of graduates.

The results of the survey show that students are generally satisfied with learning and the choice of future major. Nevertheless, they believe that obtaining a trade does not guarantee employment due to the economic crisis in the country, and the change of qualification does not scare students, but rather becomes the norm.

According to the results of the survey, employers do not complain about the level of professional training of students, but expect from them more responsibility, adaptability, being more disciplined, self-criticism, ability to teamwork and high motivation for retraining.

Taking into account this generalized information, an experimental group of 45 students (EG) was selected for the ascertaining stage of the experiment. EG and control group consisted of 25 people (CG) among the full-time students of technical college major 15.02.08 Technology of Mechanical Engineering.

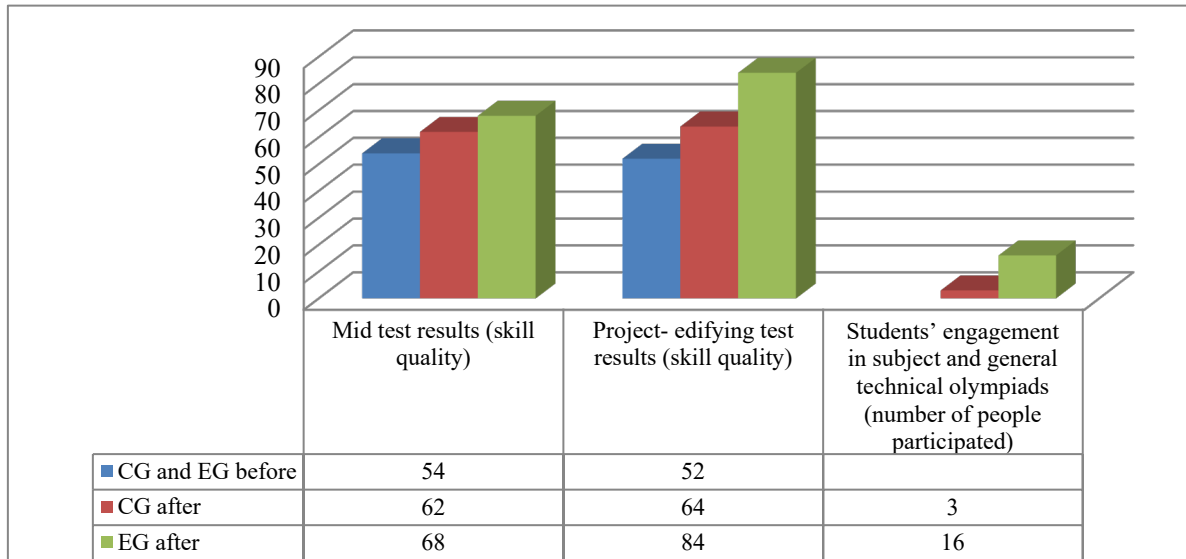
The summative assessment shows that the main components of the professional mobility of technical college students are not generated enough. The results of the project and edifying testing reveal that the development of the cognitive component is 54%, and the integrative-activity is 28% (according to the results of solving integrated problems). The activity-organizational component is identified through testing when the following results are obtained: the level of independence of students is 26%, discipline - 28%, motivation - 9%, adaptability - 16%, communicativeness and leadership potential - 28%, which stands for a low level of development of the component in general. The results of the experimental stage are a sticking point in the further process of personal and professional development of technical college students.

At the teaching stage of the experiment, the development of professional mobility of EG students is carried out within the project called Development of professional mobility of technical college students.

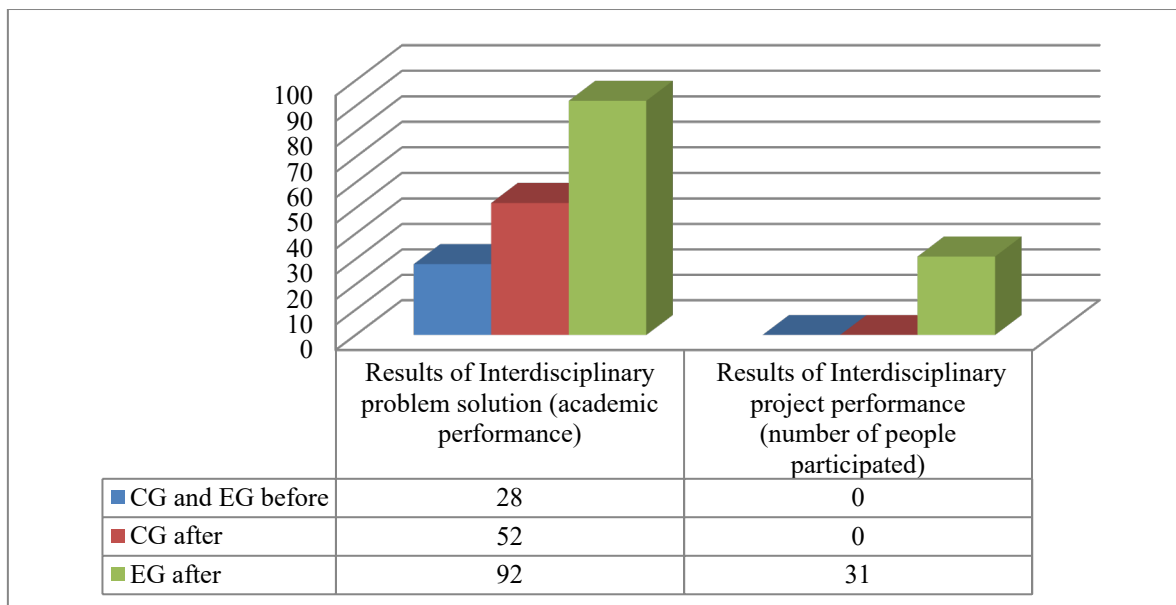
As a result of organizing the educational environment according to the experimental syllabus, positive results of the changed level of development of the components of vocational mobility have been obtained (Fig. 1, 2).



The level of the development of the cognitive component of vocational mobility is determined by the results of mid certification in general professional disciplines for second and third year-students. Project and edifying testing are conducted for second, third and fourth-year students.



**Figure 1.** Diagnostic results of the cognitive component of vocational mobility in CG and EG before and after the experiment



**Figure 2.** Diagnostic results of the integrative-activity component level of vocational mobility in CG and EG before and after the experiment

The results of control tests of the organizational-activity-related component show that the increasing markers (independence, organization and self-organization ability, communication and organizational abilities, adaptability and purposefulness) of students in the EG is more than in the control group, which is shown in Table 1.

**Table 1.** Results of organizational-activity component of vocational mobility in CG and EG before and after the experiment

<b>Components of the Organizational and Activity Component of vocational mobility</b>	<b>Level of development</b>	<b>CG and EG before, people</b>	<b>CG after, people</b>	<b>EG after, people</b>
Self-organization	Low			
	Mid	34	27	12
	High			
		40	46	46
Self-organization	Low			
	Mid	51	57	58
	High			
		21	53	31
Motivation	Low			
	Mid	64	62	55
	High			
Adaptability	Low			
	Mid	16	10	8
	High			
Communication	Low	51	42	40
	Mid	34	48	52
	High	28	22	16
Leadership skills	Low	38	38	34
	Mid	34	40	50
	High	58	51	36
Leadership skills	Low	15	18	30
	Mid			
	High	27	30	34

A comparative assessment was made using methods of mathematical statistics, namely, a paired Student t-test to measure the effectiveness of organizational and pedagogical environment.

Statistical data processing shows that the organizational-pedagogical conditions of the development of vocational mobility when performing the project named *Development of vocational mobility of technical college students*, provide the growth of knowledge quality, but are not fundamental, as the change of the feature is statistically significant in both the control and the experimental group. However, the level of the cognitive component is higher in the experimental group, as the number of students with profound knowledge of general professional disciplines is higher, which is evident from the average value of the value before and after the experiment.

It depends on the fact that while learning, all students study theoretical material on the same disciplines in the same amount, but the students from the experimental group have an opportunity to

master the obtained skills in the course of project independent tasks and solving interdisciplinary tasks, which significantly increases the level rates of the cognitive component of vocational mobility.

The statistical processing results of integrative-activity component data are statistically significant in the EG and not significant in the KG, which confirms that it is not the problem is of the lack of students' knowledge on general and vocational disciplines, but non-systemic character and failure in applying the skills in practice.

Of the six studied rates of the organizational-activity component during the experiment, the most significant growth is observed in the values 'self-organization', 'independence' and 'motivation'. The positive dynamics of the rest of the qualities is slightly less than the dynamics of the above-mentioned values.

Based on the data presented, we can conclude that the organizational and pedagogical conditions and effective use of the possibilities of the educational environment of technical college, created within the project called *Development of vocational mobility of technical college students*, provided the development of components of vocational mobility of students of EG group at medium and high levels, respectively, the alternative hypothesis was confirmed.

## 7. Conclusion

The results of the study allow denoting the concept of vocational mobility of students of secondary vocational education, which implies a set of personal and professional qualities expressed in the readiness and ability of a future specialist to move in the professional and qualification structure, i.e. to change the branch of professional activity, profession, speciality or major depending on current economic and working requirements of rapidly changing labour market'. The relationship between the vocational mobility of a student and the educational environment of the technical college is revealed, the effectiveness of the project approach in the organization of the educational environment and the implementation of organizational and pedagogical conditions for the development of vocational mobility of students in the educational environment of technical college is proved.

The proposed article and the conducted research do not claim to consider the problem completely and solve it thoroughly. Prospects for further research are seen in improving the content and methodology of its use, in expanding this experience in institutions implementing supplementary training programs (training and skills enhancement programs and retraining programs).

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