



Motivation Research and Development of Educational and Cognitive Activity of Technical University Students

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Abstract: *The article is devoted to the problem of the motivation development of educational and cognitive activity of technical high school students. The article presents the results of the research on the motivation development of educational and cognitive activity of students of the direction 21.03.01 "Petroleum Engineering" of the Surgut Institute of oil and gas (a branch of the Industrial University of Tyumen in Surgut). As a result of the research, a method of stimulating the development of motivation of educational and cognitive activity of students was proposed, based on the combined use of interactive teaching methods with various pedagogical techniques. The article also discusses the characteristics of the students' motives of their educational activities, as they directly affect the quality of professional training, the formation of the professional personality.*

Keywords: *motivation, educational and cognitive activity, practice-oriented tasks, interactive teaching methods.*

I. INTRODUCTION

Global changes affecting all spheres of human activity at the current stage of development of society put forward higher requirements for the quality of educational training in higher education. In this regard, the state program of innovative development of the Russian Federation emphasizes the need to develop the creative economy and improve its competitiveness in the world market [1]. Stimulation of the motivation development of educational and cognitive activity of students of technical specialties is a perspective direction of implementation of the state program of innovative development for the next years.

One of the foundations of the design and implementation of the educational process in a modern technical University is the competence approach. Modern highly qualified specialists are characterized by the possession of a system of knowledge and skills that allow analyzing complex problems in the field of professional activity, to solve non-standard situational practice-oriented tasks, making the choice of the most rational solutions from a number of possible. Systems of academic, professional and socio-personal competences

are formed and developed by the educational standards of a new generation of higher education in the process of training of such specialists. The above mentioned competences cannot be successfully formed in the absence of proper motivation of educational and cognitive activity.

The contradictions between the needs of society in the training of highly qualified specialists and the lack of development of pedagogical conditions for their professional development are becoming increasingly obvious.

In this regard, the aim of the work is to study and develop the motivation of educational and cognitive activity of students of technical University.

II. PROPOSED METHODOLOGY

A study on the basis of T. I. Ilyina's methodology "Questionnaire for the research of the motivation of studying at the University" was conducted among the third-year students in two groups in the Surgut Institute of oil and gas (a branch of the Tyumen Industrial University in Surgut).

This questionnaire is based on the use of three evaluation scales:

"Acquiring knowledge", "Mastering the profession" and "Obtaining a Diploma". "Acquiring knowledge" means the will to get it. "Mastering the profession" means the striving for the development of professional competences. "Obtaining a Diploma" implies the desire to become the owner of a diploma of higher education with minimal efforts in the learning process [2].

When answering 50 questions of the test, students were required to either agree with the statement by putting a "+" sign opposite the corresponding statement, or refute it with a "-" sign.

After the survey, the total number of points on each scale was summed up. According to T. I. Ilyina, if a student has a predominant number of points on the scales "Acquiring knowledge" and "Mastering the profession", this indicates an adequate choice of profession and satisfaction with it, as well as the presence of an internal orientation of motivation of educational and cognitive activity.

Methods of mathematical statistics were used to describe the results of the survey [3].

Such characteristic indicators as estimation of mathematical expectation and estimation of standard deviation of the results on each of the scales were considered. The calculation results are shown in Table 1.

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Table 1: Evaluation of mathematical expectation and of root-mean-square deviation of points on the scales of the T. I. Ilyina's questionnaire

Scale	Group 1		Group 2	
	Evaluation of mathematical expectation	Evaluation of root-mean-square deviation	Evaluation of mathematical expectation	Evaluation of root-mean-square deviation
"Acquiring knowledge"	5,58	1,45	4,31	1,42
"Mastering the profession"	9,20	1,06	7,70	0,66
"Obtaining a Diploma"	7,28	1,54	7,18	1,35

According to the results of the survey, students of the two groups scored the majority of points on the scale of "Mastering the profession", followed by the scale of "Obtaining a Diploma". The scale of "Acquiring knowledge", which determines the educational motivation, was in last place.

Analysis of the results of the study by T. I. Ilyina indicates inadequate choice of students of the future sphere of professional activity, and, therefore, dissatisfaction with the chosen profession. Also, the results of the survey state the prevalence of students' external motives of learning.

The results of T. I. Ilyina' test revealed the presence of a serious problem in the educational process. The students' prevailing motive of "Mastering the profession" is not supported by the desire to acquire knowledge. It can be assumed that such results are due to the small connection between the development of the theoretical foundations of academic disciplines and the acquisition of professional competences needed in the future activities of the future specialist.

It should be noted that the learning process in this higher education institution has not yet become practice-oriented, and theoretical knowledge remains detached from production. In order to meet the demands of the society and to be competitive, a prospective specialist should be already involved into a course of professional issues in the process of learning in a higher education.

Obviously, there is a contradiction in the motivational sphere of students who participated in the study. The prevalence of scores on the scale of "Mastering the profession" indicates that the future area of professional activity for students has great interest and attractiveness. However, a small correlation between theoretical knowledge and practical skills necessary for successful professional implementation, does not create prerequisites for the development of cognitive activity of students, and as a result – the motive of "Acquiring knowledge" was in last place.

Undoubtedly, knowledge is useful only when it can be applied in the future. Otherwise, students are not interested in their study, which was confirmed by the results of the survey. The relevance of the problem is due to the weak formation of students' cognitive motivation due to lagging behind in

school, difficulties with the development of the program, the lack of vision of the impact of the acquired knowledge and skills on future life prospects. Without the formed motivation of learning it is difficult for University teachers to achieve noticeable results in training.

Motives can largely determine actions. They explain the purpose that the students set for them, predetermine their behavior. The motive of educational activity can be defined as the orientation of the students to achieve their own development goals, including acquiring knowledge and skills dictated by their interests, internal needs, as well as the external environment [4].

The motivation of learning is a complex of factors that determine the motivational tendency of the students, which, depending on their educational intentions and external reasons, can activate or inhibit their educational activity.

There is a classification of motives on different bases. One of them is based on two tendencies: to achieve success and to avoid failure. Students motivated to achieve success set positive goals, actively seek funds, while experiencing positive emotions, mobilizing resources [5].

Students who are motivated to avoid failure behave differently: they are not sure of themselves and are afraid of criticism. They associate only negative emotions with the work where failure is possible. Such motivation is associated with low self-esteem, disbelief in their forces, in the possibility of success.

Students with the desire for success tend to explain their victories and failures by the volume of their efforts, their diligence, which indicates an internal controlling factor. The same students who tend to avoid failure, as a rule, explain the failure by the lack of ability, bad luck, ease of the task, etc. They begin to develop the so-called learned helplessness: trying to do something further, to make efforts seem quite useless to them. Hence the main task of the teacher is to develop the desire for success, to encourage even the smallest achievement, not to focus on the failures.

Very important is the question of the standards of motivation (types), which should be correlated with the level of development of motivation in a particular student. Psychologist A. K. Markova identifies five types, stages of student's involvement in educational activities. [6].

These are the following types of motivation:

1. Negative attitude to learning.

This type is characterized by poverty and narrowness of motives; cognitive motives are exhausted by interest in the result. There is no ability to set learning goals and overcome difficulties, perform tasks according to detailed instructions. There is no orientation on the search for deployed ways of actions. Educational activity is not formed.

2. Indifferent (neutral) attitude to learning.

This type of motivation is characterized by the presence of unstable experiences of novelty and interest; there begin to take place first preferences of some subjects to others. The broad social motives of obligation are dominant. Such students are characterized by primary understanding of the goals set by the teacher. Typical training activities are simple training exercises based on a sample and instructions. Simple types of self-control are possible.



3. Positive amorphous attitude to learning.

Combination of broad cognitive motives (interest in the result of learning and evaluation) and wide social motives is characteristic for motivation of study. Students with motivation of this type experience emotions of surprise, novelty of educational material in the course of educational activities. They are receptive to new knowledge. Their educational activities are characterized by the fact that they understand and fulfill the goals set by the teacher. They perform training exercises on the model and instructions, they exercise self-control.

4. Positive attitude to learning (cognitive, conscious).

Students with this type of motivation for learning redefine and define the tasks that the teacher sets, and set their learning goals on this basis. Educational activities for them are not only the reproduction of the sample, which is given by the teacher, but also the implementation of educational activities on their own initiative. They distinguish ways and results of educational activities, are able to find a variety of ways to achieve results. They are able to plan and evaluate their training activities before its implementation; self-control and self-assessment of training activities are well-developed in them.

5. Positive (personal, responsible, effective) attitude to learning.

Subordination of motives, their hierarchies are characteristic for students with this type of motivation of educational activity. The motives are balanced and are in harmony with each other. They are able to set perspectives and non-standard goals of educational activity, to realize them and to overcome obstacles while achieving them. Learning activities are flexible and mobile. The search for non-standard ways to solve educational problems is typical for them. Such students foresee the social consequences of their learning; their educational activity turns into self-educational one [7].

The teacher's task is to find effective methods of the formation of students' educational motivation. The general way of formation of educational motivation consists in promoting transformation of broad motives of students into the mature motivational sphere with steady structure and domination of separate motives. The following aspects contribute to the formation of motivation:

- General atmosphere of positive attitude to learning and to professional knowledge;
- Involvement of students in joint educational activities in the team of the study group (through paired, group, team forms of work);
- Building a teacher-student relationship not by type of invasion, but by advice, creating situations of success, using various methods of stimulation (from praise, giving additional tasks for evaluation, to the token system, etc.);
- Entertaining, unusual presentation of new material;
- Imaginative, bright-sounding speech, strengthening of positive emotions in the process of teaching;
- Use of cognitive games, discussions, creation of problem situations and their joint and independent resolution;
- Building the study of the material on the basis of life situations, the experience of teachers and students;
- Development of independence and self-control of students in educational activities, planning, setting goals and

implementing them in activities, finding non-standard ways to solve educational problems [8].

The main impacts of teachers should focus on the following:

- Actualization of previously established motives of teaching and socialization, (i.e. not to destroy, but to strengthen and support);
- To create conditions for the manifestation of new qualities of existing motives (stability, awareness, effectiveness) and the emergence of new motives;
- Correction of defective motivational attitudes.

The beginning of the lesson should orient students to the willingness to be engaged in educational activities. For this purpose it is necessary to actualize the previous achievements, to cause motives of relative dissatisfaction and motives of orientation on the forthcoming activity [9]. The main part of the lesson should be aimed at confirming and strengthening of motivation. This can be achieved by alternating different types of educational activities (easy and difficult, reproductive and searching, individual and frontal types of work), the use of active search by students themselves, and the inclusion of students in the evaluation and self-assessment processes [10].

At the final stage of the lesson, it is necessary to provide an exit with a positive experience and a positive attitude to the learning. This can be achieved through a detailed differentiated assessment of the student's activity by the teacher. It is necessary to show successes, achievements and to mark weaknesses [11].

III. RESULTS

Summing up the results of the study, it is necessary to focus on some pedagogical techniques that contribute to the development of cognitive motivation of students.

1. Techniques associated with the stimulating effect of the content of educational material are as follows: showing the novelty of the content; updating the already acquired knowledge, its deepening; disclosure of practical, scientific and other significance of knowledge and methods of action; professional orientation of the content, interdisciplinary, intra-subject and inter-cycle communication; entertainment of the study material; demonstration of the achievements of modern science, etc.

2. Problem-based methods and interactive ones have a significant impact on the development of learning motivation. The following techniques help to implement the possibilities of learning methods in the development of learning motivation: clarification of goals of activity, setting of information and problematic issues, the creation of problem situations, organization of work with sources, application of knowledge on a production basis, the use of entertaining and playing forms of lessons, etc. [12-13].

3. Methods associated with the use of visual, didactic and technical means of teaching are: presentation of information using technical means of teaching and computers, providing students with operational feedback (for example, using the internal network, the University website, the teacher's website); preparation of tasks with visual information; management of independent work of students, etc.

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4. Techniques based on the interaction of the teacher and students are as follows: evaluation treatment of the teacher (indirect assessment, comment, denial, agreement, approval); encouragement (praise, cheering up); creating a situation of success; assistance; support of students' endeavors; reception of apperception (connection with the life experience of students, their interests, inclinations), etc.

5. Methods taking into account intra-relations are: organization of collective work on planning and implementation of joint activities; collective discussion of the results of work; tasks for mutual control and mutual assistance of students; combination of different forms of joint work; public evaluation of students' actions, reliance on public opinion, etc. [14.]

The following aspects slow down the formation of educational motivation:

- Emotional poverty of educational material;
- Excessive repetition of the same techniques of the same order;
- Monotonous tasks;
- Lack of evaluation;
- Unfriendly attitude of the teacher to the students (sarcasm, mockery, reproach, threat, notation);
- Methods of coercion (punishment, unreasonable demand, pickiness).

IV. RESULT ANALYSIS

As a solution of the identified problem, it is proposed to include the solution of situational practice-oriented tasks directly related to the professional activities of future specialists in the educational process. Taking into consideration the fact that students have the strongest need for mastering professional competences, they will significantly increase their motivation in the development of theoretical material.

Then they will be able to see the correlation between theoretical and practical competences and realize that without mastering the theoretical foundations of the studying disciplines, they will not be able to become successful, competitive specialists. The demand for theoretical knowledge among students can be high only if students can really use them. The sphere of application of this knowledge is the future professional activity of students [15-16].

The teacher needs to create links between different disciplines of the educational process and show them to students on the example of modeling of situational practice-oriented tasks in the educational process. Students' understanding of such interdisciplinary connections will enhance their cognitive and research activity in the study of a number of disciplines. In order to enhance and develop the research potential of students, it is recommended to use methods of finding new non-standard solutions. To solve situational practice-oriented problems, it is advisable to include interactive teaching methods in the teaching methodology.

The proposed method is based on the combined use of interactive teaching methods: individual work (1 student), in pairs (2 students), in micro groups (4 students), as well as in teams (a student group or a half of the group). These include collective decision-making methods: a brainstorming and its

various modifications, a case study, a Delphi method, a method of diaries, a method of voting "for" and "against", a method of discussion, a method of the court, a method of nominal group technique, business and didactic games. It is recommended to actively include technologies of inverted and problem learning, as well as the project work in the educational process [17].

Such combination of interactive teaching methods activates scientific and technical creativity of students, develops their creative abilities. When included in the process of solving situational practice-oriented tasks, the student actualizes the application of his/her knowledge, identifies poorly studied theoretical foundations and takes responsibility for the decision. During the lessons, the teacher helps to create a "situation of success" for students. Reflection allows students to focus on the formulation of original solutions and trajectories of individual growth. Each subsequent lesson is conducted with the use of another interactive method of teaching, which creates the effect of novelty for students and helps to increase their motivation for educational and cognitive activity.

Thus, the proposed method can be used to stimulate the motivation of educational and cognitive activity of students of technical University.

V. CONCLUSION

As a result of the study, it can be concluded that the multidimensional nature of the problem does not allow considering the results as exhaustive.

Further research should be carried out in the following direction: development of psychological and pedagogical programs aimed at optimizing the motivation of educational and cognitive activity of professional development of students; development of a program of psychological and pedagogical support for the teaching staff, revealing approaches and recommendations to create conditions for the activation and optimization of motivation of educational and cognitive activity of professional development of students; implementation of multilevel system of the optimization of educational and cognitive activity motivation (secondary school, University, postgraduate education), educational cluster system, etc.

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