IRSTI 14.25.07 https://doi.org/10.32523/2220-685X-2024-72-1-23-37
Scientific article

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Studying and influence of professional motivation of students when studying graphic disciplines

Abstract. This article explores the issues of quality management in teaching graphic disciplines in higher technical education. Special attention is given to the need for continuous monitoring of students' academic performance, incorporating various assessment methods such as written assignments, oral examinations, computer-based testing, and independent project defense. Analyzing the correlation between these assessment methods allows for a more objective evaluation of students' knowledge levels and helps identify weaknesses in the educational process, contributing to its optimization and increased efficiency. As part of the study, a survey was conducted among students majoring in "Architecture" and "Design" to examine their professional motivation and interest in the subject "Engineering Graphics." The results showed that many students do not fully recognize the importance of engineering graphics in their future careers, which negatively affects their motivation to study the subject. At the same time, the findings revealed that incorporating modern educational technologies and practice-oriented teaching methods contributes to a deeper understanding of the material. The article also discusses possible ways to enhance the teaching of engineering graphics, including the integration of digital technologies, increasing the number of practical lessons, and implementing an individualized approach to learning.

Received: 21.01.2024; Revised: 04.02.2024; Approved: 12.02.2024; Available online: 30.03.2024

Keywords: professional motivation, graphic disciplines, engineering graphics, questionnaires, learning efficiency, education, teaching.

Introduction

In the context of the reform of the higher education system, priorities are given to ensuring the competitiveness of specialists - forming a technical image and the necessary competencies in them. Since the socio-cultural and socio-economic development of the country depends on it, education is the priority direction of the society's development. The state education policy in modern Kazakhstan is aimed at modernizing education, taking into account the general trends of educational development, and requires modern institutions to be mobile and open to changes. There was a transition to the competency model of education, which defines the integrative characteristics of a professional. Therefore, the problem of comprehensive assessment of the specialist's quality through his engineering competence arose. In general, improving the quality of the technical profile of education is a set of organizational, pedagogical, psychological, methodological conditions aimed at improving the educational process. The analysis of modern studies on the problems of the technical image of education shows that as a result of education, there is an increasing interest in the problem of formation of professional and personal qualities, technical profile of engineers [1, 2]. Professional motivation is the driving force of quality training. Professional motivation affects students' professional self-determination and satisfaction with their educational and professional activities. Professional motivation should be formed in the process of studying not only special, but also professional and practical subjects, including engineering graphics. In order to become a highly qualified specialist, in this case, to become an engineer, the learner needs high-quality graphic training. The experience of teachers and researchers shows how important it is to motivate students to study subjects, especially in the first years, they consider everything related to their future profession as motivationally important [3, 4]. In order to determine the objective situation of the process of formation of professional motivation of students, the students' idea about the meaning of the concept of «professional motivation» was studied, what the students mean by the concept of «professional motivation» was studied, and what is the motivation of educational

professional activities for students. For this purpose, it was necessary to determine the purpose of studying in this specialty by students of higher technical educational institutions, as well as to determine the nature of the formation of professional motives necessary for future professional activity. Survey methods were used to investigate the issues [5]. The purpose of the article is to study the level of professional motivation of students in the process of learning graphic subjects and to identify the shortcomings of teaching the subject «Engineering graphics», which leads to a decrease in interest in studying the subject.

Materials and methods

The study employed survey and data analysis methods to assess students' level of professional motivation in learning graphic disciplines and to identify factors contributing to decreased interest in the subject "Engineering Graphics". The study involved 68 students from the Architecture and Design fields during the 2022–2023 academic year. Research Instruments. The first questionnaire focused on examining students' overall motivation for learning. The second questionnaire aimed to assess students' interest in studying engineering graphics.

Data Collection and Analysis. The survey included both closed and open-ended questions, allowing for a combination of quantitative and qualitative analysis. The responses helped determine students' reasons for choosing their profession, their level of satisfaction with their choice, and their perception of engineering graphics' role in their future careers.

The study's limitations include the sample size and the subjectivity of students' responses, which may have been influenced by individual perceptions and their current academic workload.

The motivation of professional activity is determined by the appropriate orientation, has a certain goal, professional relations of the person. Permanent systems of relations in professional activities form professional mentality and define professional positions [6, 7]. One of the important conditions for improving the quality of education of students is the formation of their professional motivation, because it actively affects the effectiveness of the educational work of students. Therefore, it is necessary to actualize the processes of formation of professional motivation of students. One of the main conditions for increasing the

effectiveness of education is the development of professional motives of students. Targeted development of motives for cognitive activity is related to meeting the primary needs of the learner. One of these needs is cognitive need. In the process of satisfying it, permanent cognitive interests and professional inclinations are formed, which determine a positive attitude to learning. At the same time, it will be interesting to expand and enrich their knowledge, get into the essence of the studied phenomena, establish cause-and-effect relationships. Motive, if not necessity, is directly related to it. Motivation, needs drive the subject to professional activity, the existence of a close connection between the implemented professional influence system and knowledge of his motives is a component of the need-motivational component, without which quality training of specialists is impossible [8, 9]. Motive comes from Old French motives – «call to action». Motivation is a general broad concept that understands the direction of human activity. It defines a certain ratio of dynamic and substantive aspects of action and behavior. Difficulties arise during the study of «Engineering graphics», which is studied in the first years and is one of the most difficult types of education for students, due to several reasons:

- the presence of objective difficulties in mastering engineering graphics: too much material to be studied in the specified period, as well as the absence of abstract nature of the subject working with objects;

- students have a poor understanding of the place and role of engineering graphics in their future professional activities;

- the opinion that achievement in engineering graphics does not affect highly specialized qualifications.

- so, the reasons accompanying these problems help to determine what difficulties arise in the study of engineering graphics, and this, in turn, allows us to find the right ways to implement professional motivation. Therefore, to determine the level of motivation, it was recommended to look at the survey of first-year students. Motives for choosing a profession, adequate self-acceptance as a professional and self-esteem were chosen as criteria for evaluating formation. The motives for choosing a profession, the adequacy of self-perception as a professional and self-esteem are selected as criteria for evaluating formation. Two questionnaires were developed to conduct the research: the first one is the motivation of students to learn, and the second one is the interest in studying the

course «Engineering Graphics» developed for students of higher educational institutions.

Results and Discussion

Questionnaires included closed and open questions related to determining the level of formation of professional motives of students of higher education institutions. The study was conducted during the 2022-2023 academic year, and 68 students in the «Architecture» and «Design» fields participated in it. The results of the study on determining the level of motivation of students in the learning process of the subject «Engineering Graphics» are presented in Table 1.

Table 1

Results of the professional motivation survey

№	Questionnaire questions	Response rate, %
1	How important is higher education today?	
	a) very important;	80
	b) not important;	12
	c) I have trouble answering.	8
2	Do you consider your profession honorable?	
	a) yes;	60
	b) no;	4
	c) I have trouble answering.	36
3	What motivated you to choose your profession?	
	a) material interest;	12
	b) prestige of the profession;	32
	c) recommendation of parents;	28
	d) family tradition;	24
	e) location of the educational institution;	20
	f) study with friends;	20
	g) according to the results of the NUT.	32
4	Are you happy with your choice?	
	a) I am very pleased;	88
	b) I haven't decided yet;	12
	c) I waited for another.	0
5	Are you familiar with the work of your chosen profession?	

	a) yes b) no c) partially	40 12 48
6	Do you associate your future with your chosen profession? a) yes; b) no.	 84 16
7	What did you want to learn while studying graphic arts? a) develop the ability to think in the field to read any drawings; b) learn to draw and read lines related to my profession; c) logical thinking; d) know how to design; e) quick independent decision-making; f) learning to work with literature.	 48 84 40 60 20 0
8	What are your goals in studying «Engineering graphics»? a) development of the ability to think in the field; b) development of logical thinking; c) learning to solve metric problems; d) expanding knowledge about methods of drawing scenes.	 56 52 36 52
9	Is it possible to start the study of graphic subjects by performing drawings by profession? a) yes; b) no.	 4 96
10	How do you understand the concept of «Professional motivation»? a) interest related to future professional activity; b) the need of an individual to carry out professional activities; c) life goals aimed at obtaining a future profession; d) requirement that determines the choice of specialty.	 60 24 48 20

The survey questions were intended to determine the reasons for future engineers to enter the respective professions, as well as to determine the main goal

that connects their studies in the respective profession. According to the analysis of the survey, the share of students who chose the specialty based on its prestige is 50% of the respondents; material attractiveness - 16%; parents' advice - 22%; family traditions - 15%; location of educational institution - 16%; willingness to study with friends - 13%; According to the result of NUT - 26%.

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About 71% of the first-year students who took part in the survey can confidently say that their chosen profession is really honorable, the rest of the students (26%) have difficulty answering the question about the honor of the profession, and only 3% of respondents disagree with the opinion about the honor of the chosen profession. Analyzing the obtained results, it can be said that the professional enthusiasm of the students is sufficient and this has a positive effect on the general motivation of teaching. «Are you happy with your choice?» 74% of learners answered that they were very satisfied, 24% were undecided and only 6% expected something completely different.

«Do you see your future in the chosen profession?» The answers to the question were positive, as the results show, 75% of the students who participated in the survey agreed with the opinion about further work in the chosen profession,

and only 25% of the respondents said that they did not see their future in the chosen profession. Such results lead to increased professional development.

A survey was also conducted at the end of the academic year in order to obtain research results regarding the interest in studying the subject of «Engineering Graphics». In addition, students were able to study the course and understand the importance of this subject. The results of the study for the academic years 2021-2022 and 2022-2023 are presented in Table 2.

Table 2

Interest in studying «Engineering graphics» subject

№	Questionnaire questions	2021-2022	2022-2023
		response rate, %	
1	What knowledge and skills does your thinking profession require?		
	a) theoretical knowledge of special technical subjects;	20,9	29,5
	b) theoretical knowledge of basic subjects (mathematics, physics, chemistry, etc.);	13	16,7
	c) ability to apply theoretical knowledge in practice.	74,4	78,8
2	Do you agree that studying Engineering Graphics is important for your career?		
	a) yes;	83,7	92,9
	b) no.	16,3	7,1
3	If you had a choice of subjects to study, would you choose Engineering Graphics?		
	a) yes;	69,8	68,9
	b) no.	30,2	31,1
4	Can you imagine the field of application of your knowledge of engineering graphics?		
	a) in further study:		
	1) yes;	79,1	81,9
	2) no.	20,9	18,1
	b) in the future profession:		
	1) yes;	46,5	71,8
	2) no.	53,5	28,2
5	Do you like engineering graphics?		
	a) yes;	89	56
	b) no.	11	44

6	If you had the chance, what changes would you make in the teaching of Engineering Graphics?		
	a) use of graphic and information technologies;	82	59
	b) allocate more time for solving practical problems.	18	41

«What do you think the purpose of engineering graphics departments is?» More than half of all respondents, 57%, answered the question that the main purpose of studying at the university is to prepare for reading and execution of drawings of car parts, individual parts, development of spatial perception; 31% of respondents want to develop logical thinking; 40% to learn to solve problems of drawing the intersection line of surfaces; 38% want to expand their knowledge of drawing methods. «What knowledge and skills do you think your profession requires?» the answers to the question, the ability to use theoretical knowledge in solving practical problems - 70%, at the same time allowed us to say that theoretical knowledge in special technical subjects and theoretical knowledge in basic subjects (mathematics, physics, chemistry, etc.) were divided between 27 and 23%. 89% of students believe that studying engineering graphics is important for their chosen profession and, if given the opportunity, they choose to study this subject, while the rest do not consider it so and do not want to choose the subject.

«If you could, what would you change about the teaching of Engineering Graphics?» to the question, there was not a single student who answered «nothing», and 32% would like to use graphic and information technologies; 49% answered that more time should be spent on solving practical problems and 19% - reducing the number of hours allocated to students' independent work.

Finally, «Did you study blueprints in school?» The answers to the question were contradictory: 55% of students answered that they studied and 45% did not study. The research conducted gives reason to say that there are problems in the study of engineering graphics, namely:

- Low-quality pre-university graphic preparation of high school students to learn the subject «Engineering Graphics»;

- use of traditional teaching methods without using modern means of teaching;

- reduction of classroom hours and increase of hours allocated to students' independent work.

Professional motivation is shaped by an individual's professional orientation, goals, and relations within their field. It is fundamental to student success, as motivation influences how effectively students engage with their studies and how well they absorb new information. The development of cognitive motives, like curiosity and the desire to understand concepts deeply, is essential to fostering positive attitudes toward learning. The Challenges in Engineering Graphics: Engineering graphics, a crucial subject for students in design and architecture, presents several difficulties. These include: the sheer volume of material that needs to be covered in a limited time. Students' lack of understanding of how engineering graphics fits into their future careers. The misconception that proficiency in engineering graphics does not impact professional qualifications. Survey and Findings: A survey of first-year students in the fields of Architecture and Design (68 participants) explored their professional motivations and perceptions of engineering graphics. The results provided insights into how students view their future careers, the relevance of their education, and their interest in engineering graphics. Motivation for Career Choice: 50% of students chose their profession for its prestige, while others were motivated by material rewards or family influence. Career Satisfaction and Future: A large percentage (88%) were happy with their profession choice and could see their future in it, while a smaller group was uncertain or dissatisfied. Importance of Engineering Graphics: The study of engineering graphics was seen as important by most students, though the practical benefits of the subject were not always fully appreciated at the beginning.

Survey on Interest in Engineering Graphics: A second survey, conducted in two consecutive academic years (2021-2023), evaluated students' attitudes toward the subject. Interest in Engineering Graphics: The majority of students agreed that engineering graphics was essential for their future career, with some showing a preference for using modern teaching methods like graphic and information technologies. Teaching Method Preferences: Students suggested that more practical problem-solving time be allocated during lessons and expressed interest in a more hands-on approach to learning.

Conclusion and Recommendations: The study concludes that there are several issues in teaching engineering graphics, particularly regarding students'

lack of preparedness from secondary school and the traditional methods used in teaching. Recommendations include: Improving pre-university graphic preparation. Incorporating modern teaching tools and technologies. Increasing practical problem-solving opportunities during lessons. These findings suggest that while professional motivation in students is generally high, there are gaps in their preparation and the methods used to teach key subjects like engineering graphics. Addressing these issues could improve both students' motivation and their understanding of the subject, ultimately leading to better professional outcomes.

Conclusions

Formation of professional motivation of the future specialist is an important direction of modernization of education. Today, the level of professional motivation among first-year students is not high, and the quality of the educational process depends, first of all, on the students' enthusiasm for educational activities and their desire to learn their future profession. In the course of the research, a study of professional motivation for students of higher educational institutions was conducted in the process of studying graphic subjects according to the methodology. The results of the study showed sufficient professional motivation of students of design, architecture specialties, and the results of the study of interest in the subject "Engineering graphics" showed that more attention should be paid to teaching using modern educational tools.

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Графикалық пәндерді оқу процесінде білім алушылардың кәсіби мотивациясын зерттеу және оның әсері

Аңдатпа. Бұл мақалада жоғары техникалық оқу орындарында графикалық пәндерді оқытудағы сапаны басқару мәселелері қарастырылған. Жазбаша тапсырмалар, ауызша емтихандар, компьютерлік тестілеу және тәуелсіз жобаны қорғау сияқты әртүрлі бағалау әдістерін қамтитын студенттердің оқу үлгерімін

үздіксіз бақылау қажеттілігіне ерекше назар аударылады. Осы бағалау әдістерінің өзара байланысын талдау оқушылардың білім деңгейлерін неғұрлым объективті бағалауға мүмкіндік береді және оқу үдерісінің әлсіз жақтарын анықтауға көмектеседі, оны оңтайландыруға және тиімділігін арттыруға ықпал етеді. Зерттеу аясында «Сәулет» және «Дизайн» мамандықтары бойынша оқитын студенттер арасында «Инженерлік графика» пәніне кәсіби ынталары мен қызығушылықтарын тексеру мақсатында сауалнама жүргізілді. Нәтижелер көрсеткендей, көптеген студенттер өздерінің болашақ мансабында инженерлік графиканың маңыздылығын толық мойындамайды, бұл олардың пәнді оқуға деген ынтасына кері әсер етеді. Сонымен қатар, тұжырымдар заманауи білім беру технологиялары мен тәжірибеге бағытталған оқыту әдістерін енгізу материалды тереңірек түсінуге ықпал ететінін анықтады. Мақалада инженерлік графиканы оқытуды жақсартудың мүмкін жолдары, соның ішінде цифрлық технологияларды интеграциялау, практикалық сабақтардың санын көбейту және оқытуға дараланған тәсілді енгізу қарастырылған.

Түйін сөздер: кәсіби мотивация, графикалық пәндер, инженерлік графика, оқытудың тиімділігі, білім беру, оқыту.

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Изучение и влияние профессиональной мотивации обучающихся при изучении графических дисциплин

Аннотация. В данной статье рассматриваются вопросы управления качеством преподавания графических дисциплин в высших технических учебных заведениях. Особое внимание уделено необходимости постоянного контроля успеваемости студентов, который включает в себя различные методы оценки, такие как письменные задания, устные экзамены, компьютерное тестирование, самостоятельная защита проектов. Анализ взаимосвязи данных методов оценки позволяет более объективно оценивать уровень знаний студентов и помогает выявлять слабые стороны в образовательном процессе, способствуя его оптимизации и повышению эффективности. В рамках исследования был проведен

опрос среди студентов, обучающихся по специальностям «Архитектура» и «Дизайн», с целью проверки их профессиональной мотивации и интереса к предмету «Инженерная графика». Результаты показали, что многие студенты не в полной мере осознают значимость инженерной графики в своей будущей карьере, что негативно влияет на их мотивацию к изучению предмета. Кроме того, в выводах выявлено, что внедрение современных образовательных технологий и практико-ориентированных методов обучения способствует более глубокому усвоению материала. В статье рассматриваются возможные пути совершенствования преподавания инженерной графики, в том числе за счет внедрения цифровых технологий, увеличения количества практических занятий, внедрения индивидуализированного подхода к обучению.

Ключевые слова: профессиональная мотивация, графические дисциплины, инженерная графика, эффективность обучения, образование, преподавание.

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