

## Generation of professional competencies of technical students as the formation of a specialist for the modern labor market

### Генерирование надпрофессиональных компетенций у студентов технического вуза как формирование специалиста для современного рынка труда

Received: February 3, 2020

Accepted: March 25, 2020

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#### Abstract

This article is devoted to the study of the problem of forming a model of a future specialist in the modern labor market through the generation of professional competencies among students in the form of research work. The study was conducted with first and second year students of the department "Oil and Gas Business" of the Tyumen Industrial University on the basis of a branch in Nizhnevartovsk. The relevance of training a competent specialist who is able not only to navigate in his professional sphere of activity, but also his interest in continuous professional development is considered. The role of competence and competence in generating a model of a future specialist is highlighted (Petrovsky & Yaroshevsky, 2009; Slastenin, Isaev & Shiyarov, 2013). A large analysis of the literary sources of world-class scientists and educators dealing with the problem of forming a model of a future specialist for the modern labor market has been carried out. The analysis of sociological research by means of express diagnostics is described in detail, which is dedicated to identifying and assessing the degree of development of professional competence at the level of knowledge and understanding, as well as the willingness of future specialists to master professional competencies. Based on the study, the results of express diagnostics are formed in the form of figures and tables. The conclusion is formulated.

#### Аннотация

Данная статья посвящена исследованию проблемы формирования модели будущего специалиста современного рынка труда через генерирование надпрофессиональных компетенций у студентов в виде научно-исследовательской работы. Исследование проводилось со студентами первого и второго курсов кафедры «Нефтегазовое дело» Тюменского индустриального университета на базе филиала в г. Нижневартовске. Рассмотрена актуальность подготовки компетентного специалиста, способного не только ориентироваться в своей профессиональной сфере деятельности, но и его заинтересованность к постоянному профессиональному развитию. Выделена роль компетенции и компетентности в генерировании модели будущего специалиста (Петровский и Ярошевский, 2009; Сластенин, Исаев и Шиянов, 2013). В работе проведен большой анализ литературных источников ученых-педагогов мирового уровня, занимающихся проблемой формирования модели будущего специалиста для современного рынка труда. Подробно описан анализ социологического исследования путем экспресс-диагностики, посвященного выявлению и оценке степени развитости профессиональной компетенции на уровне знания и понимания, а так же готовность будущих специалистов к овладению над профессиональными компетенциями. На основе исследования сформированы результаты экспресс-диагностики в виде рисунков и таблиц. Сформулирован вывод.

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**Key words:** competence, generation, professional competence, independent work of students, research work of students.

**Ключевые слова:** компетенция, генерирование, надпрофессиональная компетентность, самостоятельная работа студентов, научно-исследовательская работа студентов.

## Introduction

The formation of a model of a future specialist in the modern labor market is one of the key goals of the higher education system (Gonik & Guschina, 2008; Isaev & Slobodchikov, 2014). More and more often, employers need specialists of a new generation who will be in demand in modern high-tech industries of the country. More and more attention has been paid to the role of competence in generating a model for a future specialist. The teaching staff of the Tyumen Industrial University is aimed at the formation in a technical university of such a model of the future specialist for the modern labor market, the ability of which lies not only in orientation in one's professional field of activity, but also in its predisposition to constant professional advancement in development.

## Methodology

The results were obtained and didactically processed in the process of researching professional competencies in the form of students' research work, as the formation of a specialist model for the modern labor market in a technical university of professionally significant qualities among students of the Tyumen Industrial University branch in Nizhnevartovsk. In this work, anonymous questioning, theoretical analysis, and generalization were conducted with students. Processing the results was carried out using mathematical calculations. The data obtained during the study are given graphically in the form of dependencies and are listed in the table.

In the context of generating an “innovative economy” and improving education in Russia, it is knowledge that is one of the most constructive development funds.

This education is one of the areas of social and cultural life, interpreted as a comprehensive cultivation of a moral and free personality, capable of defending its point of view and its values. The direction and activity of a specialist is determined not only by the knowledge and skills acquired in the field of professional and personal qualities, but also expressed in the degree of their formation. The formation of

professionally significant qualities in students covers the individual development of the subject in the learning process (Mudrik, 2007; Slstenin, 2000).

In this regard, the training of a competent specialist is gaining relevance, the ability of which lies not only in navigating in one's professional field of activity, but also in its predisposition to constant professional advancement in development (Aismontas, 2016). Today, more and more attention has been paid to the role of competencies in generating a model for a future specialist.

Competence (from the Latin *Competentia* - to correspond, to seek, to approach) has several meanings: a cycle of powers allocated by law, charter or other act to an official or a specific body, as well as a fund of knowledge or experience in a particular field.

Competencies are the characteristics by which the highest efficiency is achieved, as well as fruitfulness in certain fields of activity. They combine personality characteristics, skills and motivation (Klimov, 2006).

Competence is the availability of knowledge and experience necessary for their successful application in specific subject areas.

In foreign practice, competence is sometimes replaced by the concept of “qualification”. Qualification is knowledge, skills, ability in a complex, which are an integral part for carrying out activities in various fields. With all this, it is important that the individual successfully uses his qualifications in various functions, positions, situations, as well as alone or in a group.

A psychologist from Britain, J. Raven, made proposals on the interpretation of competence as a specific ability for real, effective implementation of specific actions in a specific subject area, including methods of thinking, highly specialized knowledge and subject skills (Martinez, Payro & Santiago, 2020; Mendelson, Fakhrutdinova, Abutalipova, & Nurhamitov, 2019; Voinea, 2019).

In the Concept of Long-Term Socio-Economic Development of the Russian Federation for the period until 2020, signed by the Government of Russia, competencies are interpreted as a multitude of elements of universal knowledge, as well as experience in practical, independent activity and personal responsibility.

Such a concept as “competence” can be interpreted as:

- a set of knowledge in action;
- ability to solve problems with knowledge of the matter;
- qualities and personality traits;
- the integrity of knowledge and skills, as well as skills in the compartment, providing the basis for the functioning of the system as a professional activity;
- the ability of an individual to put into practice his competencies;
- emotional-volitional, as well as the motivational sphere of personality;
- such qualities as demonstrated in practice, such as the desire and willingness to realize one’s potential for a successful, productive professional activity in the social sphere, being aware of and understanding the social significance and personal responsibility for the results of this activity, the need for its continuous generation and improvement.

Having studied and analyzed the "Strategy for the modernization of the content of general education", it was concluded that the developers, V.V. Kraevsky, Russian scientist in the field of pedagogy, Honored Scientist of the Russian Federation, Doctor of Pedagogical Sciences, Professor, member of the Russian Academy of Education; E.A. Lenskaya, teacher and public figure, candidate of pedagogical sciences, dean of the faculty “Management in the field of education” (Loshkareva, Luksha, Ninenko, Smagin & Sudakov, 2017).

In this way, the most in-depth interpretation of the concept of “competency” is highlighted, including that it is interpreted as the most important part of “competencies”.

In this article, one more competency is added to a large number of competencies, which was not yet fully revealed by the previous generation in this field by researchers by the previous generation. With the global change in the student training system (bachelor - master), the need for students' research work has increased, and we will single it out as a separate competence

(Bezrukova, 2013; Zeer, Kormiltseva & Symanyuk, 2015).

## Results and discussions

Creative work in the form of research work of students studying (NIRS) is the main form of preparing students for the implementation of term papers and final qualification works (WRC) in accordance with the curriculum of the specialty and the requirements of the Federal State Standard. In the course of scientific research, a student studying conducts a search for scientific information, analyzes and systematizes it (Dinitis, 2003; Pogrebnaya & Mikhailova, 2019; Strategy for the modernization..., 2001; Pogrebnaya, Mikhailova & Ibragimova, 2019):

- he identifies the problem and determines the specific tasks necessary to solve it, collects factual material during the pilot study;
- he processes the received data, analyzes them, compares them with the information available in the literature;
- he draws conclusions based on the data received;
- he prepares the results of the study in accordance with the requirements for scientific manuscripts;

Thus, in order to realize competencies, which include independent work of students at a high level, it is necessary to apply:

1. An integrated approach to drawing up a work program, end-to-end planning, special educational and methodological literature, diagnostics of students' preparedness.
2. Ensuring quality control. High availability of computer technology, the possibility of free communication between students, the use of new technologies (Shmatko, 2012).

In addition to professional competencies, students' research work while working on professional ones should also generate general scientific and general cultural competencies, according to the new GEF 3 ++ standard, which include the most significant competencies (Polushkin, 2018).

General professional competencies include:

- the ability to improve and develop their intellectual and cultural level (OPK-1);
- the ability to self-study and master new research methods, as well as transforming the scientific and scientific-industrial profile of their professional practice (OPK-2);

- putting into practice the skills of organizing research and design work in team management (OPK-4);
- the ability to express initiative, including in situations involving risk, while taking full responsibility (OPK-5);
- the ability to independently master new knowledge and skills with the help of information technologies, to further use them in practice, including to cover new areas of knowledge that are not directly related to the field of activity (OPK -6).

Against the background of the implementation of various types of competencies, GEF 3 ++ recommend the use of general scientific competencies, which contain the ability to use basic knowledge in cognitive and professional activities;

- the ability to acquire new knowledge using modern educational and information technologies;
- collect, process and analyze data necessary to generate and form judgments on relevant scientific, social and ethical issues, using modern technologies;
- the ability to improve and develop their intellectual and cultural level;
- ability and readiness for active communication in the production, general cultural and scientific environment.

The scientific and research work of students in the form of professional competence is designed to generate the qualification level and competence of a future specialist, focusing on many different competencies in various forms of their interpretation (Fade, Bialik & Trilling, 2015).

Summing up the analysis of the foregoing, there was a need for a sociological study dedicated to identifying and assessing the degree of development of professional competence at the level of knowledge and understanding, as well as the willingness of students to master professional competencies in the future, drawing on the opinions of successful graduates of past years.

This rapid diagnosis was carried out in 2019, among 2 groups of students (I course –25 people and II year –24 people) on the basis of the Tyumen Industrial University in Nizhnevartovsk, anonymous questioning was used for diagnosis (Aismontas, 2016).

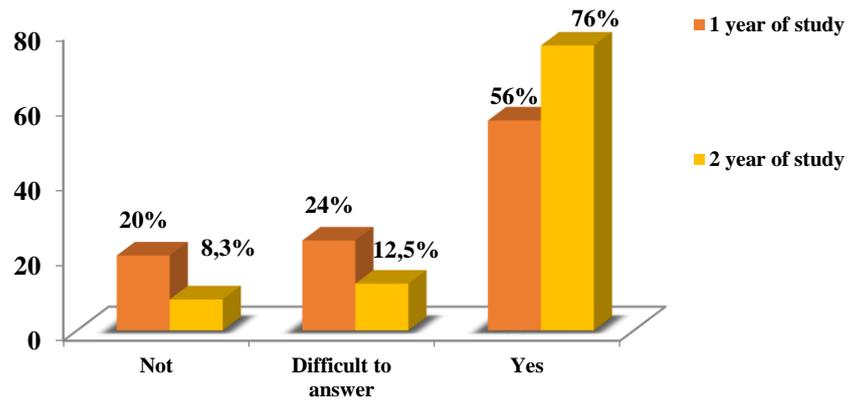
We got the output for the question “Does independent work form the professional competencies necessary for a needy specialist?”: They answered negatively (20% –I year, 8.3% –II year), had difficulty in answering (24% - I course, 12, 5% –II year), gave a positive answer (56% –I year, 76% –II year). The analysis is displayed in table 1 and figure 1.

**Table 1.**

*The formation of professional competencies through independent work.*

Proposed answers to the question “Do independent work form the professional competencies necessary for a future specialist?”	1 year of study		2 year of study	
	Number of students	%	Number of students	%
Not	5	20	2	8,3
Difficult to answer	6	24	3	12,5
Yes	14	56	19	76

Source: authors of the article.



**Figure 1.** The formation of professional competencies through independent work.  
Source: authors of the article.

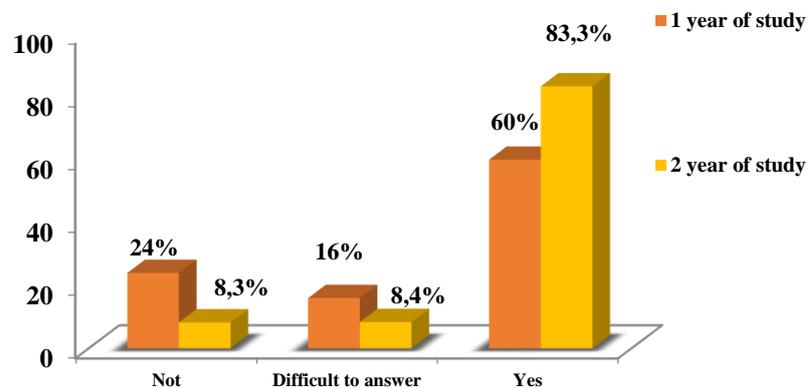
The question "Is it necessary to plan independent work in the ratio of volume and time costs?". After analyzing, we got the output: students answered negatively (24% - I course, 8.3% -II

year), had difficulty answering (16% - I course, 8.4% -II course), gave a positive answer (60% - I course, 83.3% -II course). The analysis is displayed in table 2 and figure 2.

**Table 2.**  
*The need for planning independent work.*

Proposed answers to the question "Do I need to plan an independent work in the ratio of volume and time costs?"	1 year of study		2 year of study	
	Number of students	%	Number of students	%
Not	6	24	2	8,3
Difficult to answer	4	16	2	8,4
Yes	15	60	20	84

Source: authors of the article.



**Figure 2.** The need for planning independent work.  
Source: authors of the article.

We received the following answers to the question “Do you use additional resources (information, funds) to carry out independent work of students?”: Students answered negatively (4% - I year, 4.2% -II year), had

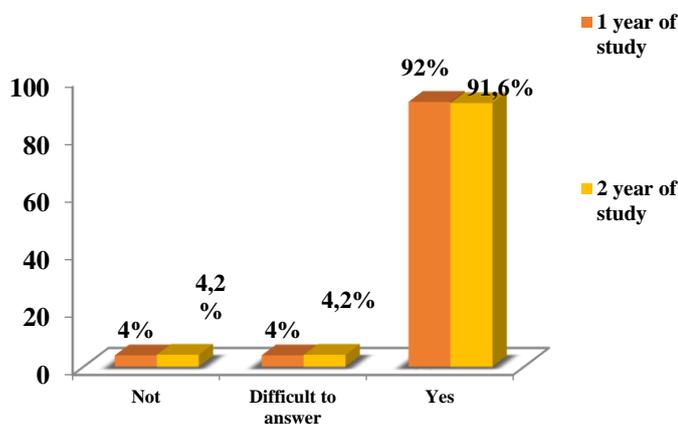
difficulty answering (4% - I course, 4.2% -II course), gave a positive answer (92% - I course, 91.6% -II course). The analysis is displayed in table 3 and figure 3.

**Table 3.**

*The need to attract additional resources.*

Proposed answers to the question “Do you use additional resources (information, funds) to carry out independent work of students?”	1 year of study		2 year of study	
	Number of students	%	Number of students	%
Not	1	4	1	4,2
Difficult to answer	1	4	1	4,2
Yes	23	92	22	91,6

Source: authors of the article.



**Figure 3.** The need to attract additional resources.

Source: authors of the article.

We received the following answers to the following question posed, “Do you complete the required amount of the task, showing creativity and initiative?”: students answered negatively (60% -I year, 20.8% -II year), had difficulty

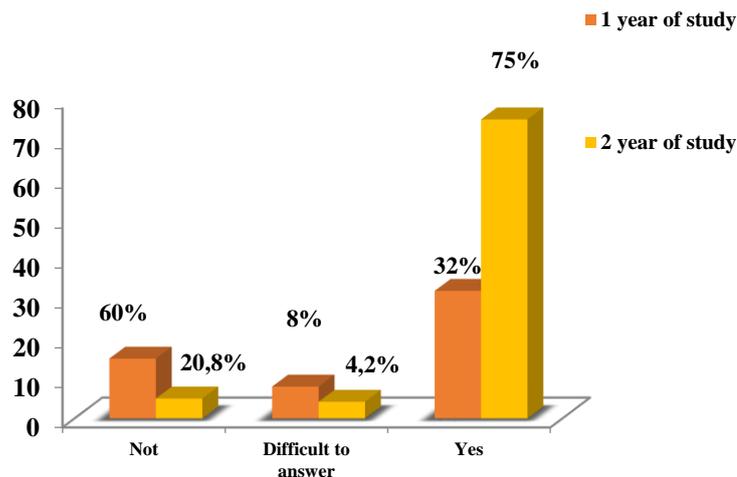
answering (8% - I course, 4.2% -II course), gave a positive answer (32% - I course, 75% -II course). The analysis is displayed in table 4 and figure 4.

**Table 4.**

*The implementation of a larger amount of the task along with the required.*

Proposed answers to the question: “Do you accomplish more of the required volume of the task, showing creativity and initiative?”	1 year of study		2 year of study	
	Number of students	%	Number of students	%
Not	15	60	5	20,8
Difficult to answer	2	8	1	4,2
Yes	8	32	18	75

Source: authors of the article.



**Figure 4.** Performing more task volume along with the required.  
Source: authors of the article.

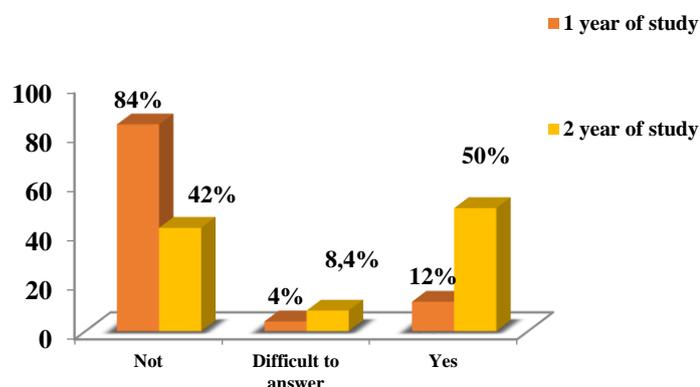
The final question was posed as follows: “Do you choose the more difficult task?” And we received answers: negative (4% - I year, 42% -II year), had difficulty answering (4% - I course, 8, 4% -

II course), gave a positive answer (12% - I course, 50% -II course). The analysis is displayed in table 5 and figure 5.

**Table 5.**  
Choosing the most difficult task option for independent work.

Proposed answers to the question “Do you choose the more difficult task?”	1 year of study		2 year of study	
	Number of students	%	Number of students	%
Not	21	84	10	42
Difficult to answer	1	4	2	8,4
Yes	3	12	12	50

Source: authors of the article.



**Figure 5.** Choosing the most difficult task option for independent work.  
Source: authors of the article.

## Conclusion

The generation of professional competencies of a graduate of a higher technical educational institution under the conditions of a competency-based approach is more productive due to clearly set goals and their compliance with labor market requirements. During the training, the competency-based approach encourages the student to a certain type of activity, which ultimately leads to the formation of the necessary competencies. The student begins to get used to the specifics of professional activity by creating conditions in the educational institution that are as close as possible to the future profession of the graduate at the training stage. Thus, the personality of a successful, competitive and creatively thinking, independent specialist is formed.

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