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THE PROBLEM OF DEVELOPING STUDENTS' ANALYTICAL COMPETENCE

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Abstract

Today, research universities are engaged in the process of improving the quality of education, which implies the expansion of the role of the university as a participant in market relations and a driver of innovation processes. This paper analyzes the experience of applying monitoring methods for assessing students' satisfaction with learning at Peter the Great St. Petersburg Polytechnic University. The authors consider research methods of monitoring as an effective tool for developing the analytical competence of a student as an economic agent, which involves professional maturity and self-evaluation skills as well as the evaluation skills of the services quality. Analytical competence is understood as metacompetence of a student, which characterizes his ability to self-management in the process of learning. This paper observes the dynamics of students' satisfaction with learning obtained during monitoring and highlights some positive trends. The improvement of educational programs and involvement of the students in analytical procedures and university studies with the aim of developing students' analytical competence are considered. New trends that characterize the practice-oriented approach of students to learning set the task of adjusting educational programs. The identification of factors that affect satisfaction with learning allows us to reveal problem areas and set the directions for improving the organization of the educational process. The conclusion is made that the participation of students in evaluation procedures and university research results in a higher level of analytical competence.

Keywords: Analytical competence, feedback, monitoring studies, students.

1. Introduction

The social trends initiated by the fourth industrial revolution involve a revision of the educational strategies and the emergence of a new cultural and educational model, which is focused on the self-realization of students' creative abilities and on the practice-oriented approach to knowledge acquisition (Ababkova & Leontieva, 2018). Today, the university meets the requirements of the "knowledge triangle" concept, which transforms the links between the traditional functions of universities - teaching, research and social activities. Within the framework of this concept, universities generate knowledge, implementing educational programs and scientific projects, and wide communication with the general public helps them find application of these projects in creating new products, processes and services (Vonortas, 2017). The role of universities as centers of academic research is changing as they become the drivers of the innovative economy (Rucker, Fischer, & Queiroz, 2018), which highlights the problem of training creative specialists ready for designing new projects and searching the areas for their implementation.

This evolving field of collaborative research puts forward great demands on the research and analytical competence of the graduates, which they develop in the course of training at university. The quality of specialists training has become the first priority thing in the professional education, which encourages educational organizations not only to improve their technologies, but also to monitor the level of learning satisfaction, relying on the monitoring methods used world-wide (Zotova, 2017). Competing for prestigious places in universities ranking, universities are having difficulties in meeting the requirements and showing high results according to a complex system of indicators (Vkusov, 2018). In this regard, the development of human capital and the training of highly qualified specialists capable of adequate self-assessment in accordance with the up-to-date requirements and of managing the process of knowledge acquisition is the main task. The development of these competencies is facilitated by widely used sociological research methods (monitoring, surveys, focus groups) that provide feedback and make it possible to tackle the problems of the educational process.

Quality as applied to education involves a set of characteristics of educational services that make it possible to provide the required level of graduate training. In the field of educational services, the quality assessment takes into account the competitiveness of the educational organization and is reflected in academic ranking (Barnet, 1992). The system-forming component in education quality assessment is students' satisfaction with educational services (Kazakova, 2016). The level of students' satisfaction with learning reflects the student's readiness to enter the job market with the developed competences. The most important areas of consumer monitoring to study clients' satisfaction and quality assessment, are the following: determination of indicators related to external consumers (applicants, parents, employers); teaching quality assessment; determination of indicators reflecting the level of students' performance.

Monitoring of satisfaction with learning is based on studying the feedback in the relationship between the university and the student, which is considered to be the factor of success of the educational organization (Harvey, 2003). The opinion of students about the quality of education in the process of mastering the educational program is understood as feedback. This opinion is based on the perception of teaching methods, the organization of the educational process and the necessary support in the course of training (Konstantinovskij, 2016). Students should be aware that the reforms taking place at universities

are also caused by the system of feedback. As part of monitoring, it is important that the opinions of students be collected professionally and consistently so that they could contribute to the process of continuous improvement of the quality of education.

2.   Problem Statement

The analytical competence of the students is an essential prerequisite for their adequate assessment of their satisfaction with learning. It is based on the subjective attitudes of the participant of the evaluation process. The maturity level of the evaluator is clearly expressed in the proportion of those who chose the answer "I find it difficult to answer", i.e. those who have not formed a clear position on the issues of correlating their own expectations and the quality of educational services.

Analytical competence falls into the category of meta-subject competencies and includes a set of educational competencies related to cognitive, logical, exploratory, research, creative processes of students' learning. Analytical competence can be represented as a complex of mental processes aimed at identifying, evaluating and generalizing the knowledge acquired, analyzing and translating this knowledge into a new qualitative state. Analytical competence contains several blocks: target, essential, technological, evaluative and theoretical (Bushmeleva & Razova, 2016). They reflect the development of analytical skills in the process of solving educational problems and mastering professional competencies.

- The motivation-target block reflects students' motivation and their goals.
- The cognitive-activity block demonstrates the level of proficiency in analytical technologies, knowledge of methods and means for carrying out analytical work.
- The evaluation block allows you to evaluate the skills of applying methods and tools, formed as a result of the analytical experience.
- The reflexive block reflects the level of the reflexive culture.

Analytical competence is evaluated in order to determine the level of development of students' analytical competencies. Today, the students 'analytical skills can be evaluated using such diagnostic tools as: observation, questioning, analysis of students' works (practical, laboratory and written assignments), expert assessments and the analysis of students' answers in class.

The development of information and analytical competencies of students becomes an integral part of universities' educational policy in the era of information. The study of various elements and mechanisms of forming analytical competence of the students make it possible to assess the flexibility and integration complexity of the university as a system, which contributes to the development of effective management (Astakhova, & Trofimenko, 2011; Krasovsky, 2012; Silvania, 2008).

Sociological polls conducted in Russia show that quite often years spent at the university make students disappointed in the chosen profession (Andreev, 2016). This fact stimulates the largest universities in Russia to conduct serious research of the factors and indicators of students' satisfaction with the quality of education. First of all, this applies to technical universities, which are now at the center of public attention due to the growing need for the new class of highly qualified technical professionals. Satisfaction with the quality of engineering education underlies the training of the innovatively thinking engineer, which contributes to the development of the main competence, i.e. the ability to create "human-sized" systems and work in the mode of "organizational creativity" (Shipunova, Berezovskaya, Gashkova,

& Ivanova, 2017). The ability to address complex problems creatively increases the managerial potential of the specialist. The creative approach provides a pool of multiple opportunities, which is the key to success in the current conditions of uncertainty (Shamsi, 2017). Satisfaction with learning reflects the relationship between the realization of the student's social expectations and the effectiveness of the university as an educational organization (Tanova, Evseeva, Pozdeeva, & Trostinskaya, 2018). The positive dynamics of this relationship means that universities are able to correspond with the modern market mainstream, while students rely on the university education in bringing their competencies to the required level. At the moment, the problem of unsatisfied expectations in the market of educational services requires in-depth research (Myagkov, 2016). Students are willing to develop their business qualities, while employers need specialists with other competencies and viewpoints. This generates a request for "transprofessionals", with a universal set of competencies and aspirations (Perkin, 2002).

3. Research Questions

The category "satisfaction" implies two meanings, i.e. a state of consciousness and a behavioral response. Satisfaction is measured as a derivative of a certain set of factors, including the synthesis of the value of education and the quality of the evaluator of educational services (student). Thus, satisfaction with learning depends on the basic value of education and the acquired knowledge, which is reflected in the educational motivation (Frolov, 2015). At the same time, the semantic value of education is based on such semantic meanings as development of abilities, the need for cognition and general culture. Attitude to the acquired education is influenced by important social factors: belonging to different social groups, financial situation, education of parents, changes in the education system due to modernization. Together they determine the situational aspect of the attitude of young people towards education. A key aspect in this regard is the acquisition of new knowledge and the mastery of up-to-date technologies, where "up-to-date" is the most vulnerable feature due to the speed of knowledge advancement. The obsolescence of presented ideas, approaches and proposed technologies identified by the students, significantly reduces their motivation and satisfaction. The sociological surveys of learning satisfaction in technical universities shows that satisfaction is viewed as a complex assessment, the core of which is the motivational component. The positive parameters of motivational component clearly correlate with the satisfaction indicators (this approach was implemented by universities during monitoring (Andrienko, 2011) at technical universities in Tyumen, the Republic of Bashkortostan, the Republic of Komi).

4. Purpose of the Study

The aim of the study is to bring up the problem of importance of analyzing the development of students' analytical competence in terms of monitoring students' learning satisfaction, which allows them to assess adequately the quality of education and its role in designing their own educational trajectory.

5. Research Methods

At Peter the Great Saint-Petersburg Polytechnic University sociological surveys of students are conducted online and in the form of written questionnaires, which allows us to monitor their learning satisfaction and assess the quality of educational programs. A sociological survey focused on these goals

was conducted in May-June 2017 (Pankova, Trostinskaya, Pozdeeva, & Tanova, 2017) and in June 2018. The sociological complex assessment was based on the concept of learning satisfaction, in which satisfaction is understood as a result of the system interaction between the following parameters (Razinkina et al., 2018): the correspondence of the received education to the expectations of the student; the intention of students for further employment according to their received qualification; opportunities provided by the university for creative development and self-realization, acquisition of knowledge and skills relevant to the market situation; the conditions for broad and adequate information support, as well as support from the academic staff; the accessible material and technical support; satisfaction with the organization of the educational process; well-developed communication environment.

The survey also took into account the influence of the following factors: high prestige of the university, scientific focus of training, the opportunity to learn foreign languages, meeting interesting people and participation in challenging projects. Today, these aspects of the university's activity are important for the evaluation of the leading national universities performance and are especially appreciated by young people striving to build up their career ladder.

Particular attention was paid to the indicator of students' awareness that reflects the degree of student's involvement in the educational process and the performance of the management bodies of the university. Therefore, the main hypothesis of the research was the assumption of the direct dependence of the learning satisfaction assessment on the student's awareness of the opportunities provided by the university and its departments in the framework of educational programs.

The following assumptions were proposed as additional hypotheses: learning satisfaction assessment is affected by the lack of students' awareness of the opportunities for implementing such components of the educational program as project training, distance technologies, elective disciplines, mobility module; aspiring for the future employment according to their qualification, students attach great importance to the practice-oriented approach in teaching.

About four thousand students of all institutes of Peter the Great SPbPU were selected for the poll (proportionally to the number of students). The results of the poll showed a slightly positive dynamics of satisfaction in comparison with 2017: 67% (2018) and 66% (2017). The interrelation of the main indicators of students' learning satisfaction was found: for example, 66% (65% in 2017) of the respondents answered that their training meets their expectations, 49% (68%) of the students are aware of their employment after graduation, 66 % (64%) of respondents after graduation are going to work according to their qualification and more than 80% confirmed the fact of well thought out decision to choose this very major. The results of the poll made it possible to conclude that more than two-thirds of the university students implement a strategy of practice-oriented learning, acquiring the knowledge and skills demanded at the job market. However, the students began to take a more serious approach to their professional future, which gave way to their doubts about the exact sphere of future employment in the current market situation. In addition, the intention to start their own business was mentioned more frequently in their answers. As before, about a third of students find it difficult to answer key questions, which shows the lack of analytical competence of the students and underdevelopment of their own position. Students admit that their expectations were met in such aspects as "the opportunity to begin realizing themselves in scientific activity already in the first year of study", "students support in project

and scientific activities", "obtaining a variety of professional skills". However, about one third of the students expressed the opinion that they are not well informed about the profile of their education, and 46% do not receive the help they expected regarding the formation of an individual educational trajectory (choice of elective disciplines, places for internship, participation in projects).

69% (68%) of the students mentioned the usefulness of internship in terms of their future employment by the profile of the educational program.

In the assessment of the material and technical facilities, the respondents' attention was focused on the following indicators: the conditions of the classrooms, socio-cultural infrastructure, sports facilities and the material and technical equipment of the university. The results of the poll show that students do not pay much attention to the level of material and technical equipment of the university, with high marks (4-5 points) given by about a third of students, which signals the necessity to raise the awareness of material and technical component, and confirms the assumption that satisfaction is concentrated in another area, less associated with the conditions of training.

The activity of students during extra-curricular time is also an important indicator. The study showed that 36% of students are satisfied with the organization of leisure activities at SPbPU (they estimated it at 4-5 points). According to the sociological research conducted by the Center for Sociological Research of SPbPU, about a third of students actively participate in extracurricular activities (Bylieva, Lobatyuk, Nikiforova, & Petrova, 2017), others estimate the organization of leisure activities not as active participants, but as spectators, making up the audience of events held at the university.

An important prerequisite for the development of the students' analytical competence is their right to choose their own educational trajectory. Following this trend, it can be noted that 62% (38%) of the respondents said that they are offered disciplines (or modules) of their choice in the framework of their training program. Project activity, which is intensified now at SPbPU, allows the students to check up their creative abilities and organizational skills. This is also confirmed by the polls: 16% of respondents stated their active participation in the projects, and 26% mastered the course "Basics of Project Activities", which indicates their readiness for this activity.

6.   Findings

The survey confirmed the hypothesis of the importance of information support for the introduction of educational elements and technologies in the educational process. The results of the study show that the students are getting accustomed to distance learning and demonstrate the willingness to study the disciplines remotely: 54% of respondents chose a third of the educational program as an acceptable share of distance courses, and 32% of the respondents suggested not more than half of the courses as an acceptable share of distance courses. Lack of students' awareness affects their right to choose disciplines to form their own educational trajectory. The emerging trends in students' participation in project activities have demonstrated the need to update the current university model by implementing the interrelation of teaching the basics of the project activity with providing the opportunities to obtain project experience.

7. Conclusion

The current situation concerning the search and development of new tools for individualization of Russian universities education and the intensive introduction of students' motivational mechanisms require close attention to the expansion of the pool of research technologies that allow tracking the problems and determining the dynamics of changes. Sociological monitoring allows you to analyze the actual level of students' satisfaction with learning and reflects the development of their analytical competence and assessment skills that are required for their future professional success. The prospective tasks of universities are related to the further comprehensive development of the material and technical facilities and increasing flexibility and individualization based on the wider application of the latest technologies. The key factor in the management of the educational process is the adjustment of the university information system to prompt information delivery and more extensive introduction of the research component, as well as the advanced modeling of the educational trajectories, clear feedback, interaction and discussion with the students of their future professional prospects in the view of the new trends.

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