

**INFORMATION AND EDUCATIONAL ENVIRONMENT IN THE SYSTEM OF PRACTICES OF
THE FUTURE TEACHER OF CHEMISTRY**

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Abstract. The article defines the target characteristics and features of the preparation of a student, the future teacher of chemistry, to professional activity in accordance with the requirements of the educational standard through the system of practices during the university studies. Organization of a continuous and planned system of practices for undergraduate students in the field of “Pedagogical Education. Chemistry is focused on the gradual immersion in the pedagogical activity of students in accordance with the requirements of the professional standard for teachers. The information and educational environment of the university’s electronic resources contribute to a more complete preparation of students for the forthcoming certification of bachelors as their final certification. At present, the personnel policy of training specialists acquires national importance. Applied nature of the significance of this article is determined by practical recommendations on formation of professional self-determination of students through a system of practices for the self-development and self-improvement of future teachers of chemistry.

Keywords: school, chemical education, teacher, student, practice.

1. INTRODUCTION

1.1. The topicality of the problem

One of the main indicators of the effectiveness of the leading department of any university is the demand for its graduates in the labour market. The article describes the basic principles of planning the professional activity of future teachers of chemistry, the weighty advantages and problems of the system of practices in a modern university.

1.2. Explore Importance of the Problem

At present, the personnel policy of the state assumes a dominant continuous nature, which is confirmed by the implementation of such public projects such as the National Doctrine of the Russian Federation, the federal state educational standard of the third generation, "Development of Education for the Period 2013-2020" program, etc. Taking into account the peculiarities of the new paradigm of education, set out in the "Concept of the Federal Targeted Program for the Development of Education 2016-2020", the results were summed up in the previous concept (2011-2015). The relevance of the research topic is determined by the existing contradiction between the increased requirements for the personality of the graduate, the future teacher of chemistry, and the level of professional training of students in a modern university in accordance with the requirements of potential employers (Valeeva & Amirova, 2016) (Osipov, 2013) (Stepanenko, 2015) (Zelenko & Mogilevskaya, 2009). This training of human resources ends with the certification of bachelor graduates.

1.3. Status of a problem. Practical preparation of pedagogical activity of students in the modern educational environment requires more profound improvement, which has determined the problem of our research (Kosmodemyanskaya, 2007) (Gilmanshina, Kosmodemyanskaya, Khalikova, Sklyar & Vagizova, 2014) (Kosmodemyanskaya, 2016). The relevance of this topic is determined by the need to select a set of tasks for the gradual immersion of a student in the process of pedagogical activity from the first year of university studies with subsequent adaptation.

2. MATERIALS AND METHODS

2.1. Objectives of the study

- The purpose of the first part of the study includes determining the level of preparedness of students of

chemical education for professional activities in the framework of implementation of a continuous and variable system of practices, providing a certain competence in the further professional life. The purpose of the second part of research is to analyse the existing independent work of students of chemical education in the system "school – bachelor's degree (university) – master's degree (university) – school" for solving issues of personnel training.

2.2. Theoretical and empirical methods

The afore mentioned goals were achieved with the use of the following methods:

- theoretical;
- empirical;
- praximetric;
- predictive.

In accordance with purposes and objectives of research, methods of pedagogical observation and statistical analysis were used in the processing of the results of research.

2.3. Base of research

The study was based at Alexander Butlerov Institute of Chemistry (Kazan Federal University).

2.4. Stages of the study

Research issues include: determining the level of preparedness of students of chemical education for professional activities in the framework of the implementation of a continuous system of practices; the analysis of strengthening of the independent work of students of chemical education in the system "school – bachelor's degree (university) – master's degree (university) – school" in training young professionals, graduates of a pedagogical university, self-development and self-realization in the course of continuous professional activity.

Research is based on the results of pedagogical observation, analysis of reports on practices for the period from 2011 and analysis of students' responses in the field of "Pedagogical Education. Chemistry" of one of the leading federal universities in the country in the Volga Region.

3. RESULTS

Research of students, future teachers of chemistry, was held in two stages. Results of pedagogical activity of 287 respondents, students of 1-4 years of study and undergraduates of 1 year of master's degree study of one of the leading federal higher educational institution of the Volga Region in the field of "Pedagogical education. Chemistry" and "Chemical Education" were analysed. In the first part of the work (2011-2017), we determined the level of the preparation of students, future teachers of chemistry, for practical pedagogical activity through the variation system of practices. The results of work of 221 respondents were analysed.

We analysed the results of pedagogical observations, the final certification of graduates of 2015/2016, feedback from teachers of chemistry of basic educational institutions in Kazan, the results of the pedagogical activity of masters. As a result of the final state certification of graduates, the quality of knowledge at the final exams and passing the final qualification works defence was 93%. It is noted that the experimental part of the overwhelming majority of works was carried out in the educational institutions of Kazan. Researches were continued, since 77% of the group's graduates are currently studying (2016/2017) for the master's degree in chemical education.

The system of practices in chemistry includes the following types of practices: educational, pedagogical, practice in obtaining professional skills and professional experience and pre-diploma. Special importance for immersion in pedagogical activity of the teacher of chemistry and further adaptation of the student has a teaching practice in the structural divisions of the university - general education boarding schools "IT Vocational School" and "N.I. Lobachevsky Vocational School", as well as in other educational institutions of the City of Kazan, which contributes to a more complete and positive adaptation of students to the chosen profession, to the teacher's and student's collectives. At the first stage of the system of practices, students get acquainted with the teaching methods of the leading teachers of chemistry, depending on the level of the students' training and the profile of the educational institution, and the material and technical base of the school chemistry cabinet in accordance with the requirements of the standard.

For the variation selection of basic schools for practice, we used the following: the method of re-passing pedagogical practices (3rd and 4th years of study) in the same schools as the teaching practice,

and the method of immersion in the pedagogical activity of schools of different levels (secondary schools, gymnasiums, vocational schools). The choice of basic educational institutions of students was based on the principle of voluntariness, taking into account the analysis of previous practices. According to the findings of the first experiment, it was determined that the vast majority of respondents (75%) preferred to stay in the same basic schools, where their practices took place at 1st and/or 3rd years of study. The obtained results created the basis for the forming experiment with further correction of the method of students' distribution by educational institutions.

For the gradual entry of students into the pedagogical activity, creative tasks of electronic educational resources were used in methodological disciplines "Theory and Methodology of Teaching Chemistry", "Methodology of Teaching and Training (in the Field of Chemistry)", "Theory of Teaching Chemistry", "Didactic Games in Teaching Chemistry", "Methods of Chemistry"). These resources were developed and presented in LSM MOODLE system. This system is the main system of electronic / distance learning in our university. MOODLE (Modular Object-Oriented Dynamic Learning Environment) as a modular object-oriented dynamic educational environment. This system is not only translated into dozens of languages, but also has more than 1 000 installations in Russia (Kosmodemyanskaya, 2016) (Kosmodemyanskaya & Kudryavtsev, 2014) (Kosmodemyanskaya, 2014a) (Kosmodemyanskaya, 2014b)

Chemical and methodological influence on the immersion of a student in the pedagogical activity and further adaptation was recorded in terms of master students of 2016/2017. Given the length of obtaining reliable results of the study, it was continued in practices of students of other years of study. The results of the ascertaining experiment were used in organizing and conducting a formative experiment. This experiment in the experimental and control groups of students showed a correlation of students' choice of basic schools to practice from objective and subjective indicators of the results of previous practices (45% and 56%). The basic principles of experimentation were met.

We analysed experience of working with a graded and rating system for evaluating the results of students' education in universities. It was determined that this kind of independent work of students represented a more complex variant of

forming the algorithmic culture of students for the development of management of personal time and educational space. Positive growth was noted: from 2013 almost 14% of students, participating in the adaptation of the distance course, had difficulties in forming and sending answers to tasks, explaining them with subjective reasons (for example, “there was not enough time,” “did not have time,” “forgot,” “I do not know how”). In 2016/2017, there were 5% of underachievers of students. Positive dynamics are observed.

Previously, we analysed the results of research of formation of self-determination of students as future teachers of chemistry through self-regulation and self-determination (Kosmodemyanskaya, 2016) (Kosmodemyanskaya & Kudryavtsev, 2014) (Kosmodemyanskaya, 2014a) (Kosmodemyanskaya, 2014b) (Kosmodemyanskaya, 2013). It was noted that the main attention is paid to issues with the use of variation methods and elements of educational technologies. Therefore, we focus on the correct organization of pedagogical reflection in the further pedagogical practice for teachers of chemistry of professional development.

In the second part of research, the analysis of the existing independent work of students of chemical education in the system “school – bachelor’s degree (university) – master’s degree (university) – school” was made to address personnel training issues. 66 respondents participated.

We developed and adapted the electronic educational resource “System of Practices for the main types of practices of students during the period from the first year to the fourth year of study, including preparation for certification as a kind of final certification of bachelor’s graduates. The developed course (LSM MOODLE) assumes to conduct training in 2 characteristics - synchronous and asynchronous. Questions of methodological support of students with a gradual immersion in the pedagogical activity cover the whole process of teaching students (1-4 years of bachelor’s degree) in training of teachers, including the whole system of practices: from study (1 year) to pre-diploma one (4 year). We examined the specifics of the preparation and organization of the federal Internet examination of graduates of bachelor’s degree, introduced in Russian universities in 2015. This type of certification involves working with pedagogical measuring materials, allowing to determine the level of competence of graduates to meet the requirements of the federal state educational

standard. By analogy with these materials, we have developed and tested similar methodological and pedagogical assignments in the framework of electronic educational resources regarding methodological disciplines and in preparation for practices (Kosmodemyanskaya, 2016) (Kosmodemyanskaya & Kudryavtsev, 2014) (Kosmodemyanskaya, 2014a) (Kosmodemyanskaya, 2014b).

The analysis showed that by the end of studies, all students master all kinds of practices (100%). A special role is played by the issue of determining the significance of the type of practices in the system of professional self-determination of students. So, for students of the second year of study, the results of the training practice are important as a stage of consolidation of theoretical knowledge in practice (70%). According to the results of the production (pedagogical) practice, students of the third year not only sing out the same criterion (82%), but also regard the practice as the first step in the future profession (63%). Graduates of the bachelor degree, in addition to the above aspects (67% and 53%, respectively) note the possibility of further employment (20%). This is confirmed in practice: two people are already employed in school. One third (31%) of the interviewed respondents singled out the possibility of a comprehensive solution of all the learning tasks, provided by the practice program on this practice base. Students of the final year of study appreciate the receipt of methodological assistance from heads of the practice base (school, lyceum, gymnasium) the most fully – 27%. The reflexive analysis of the results revealed causes of difficulties in the practice of students. Most often, respondents indicate personal qualities of a young specialist, and, depending on the year of study, the data vibrates: 30%, 36% and 20% (respectively, second, third and fourth years). It is necessary to note the increased anxiety of third-year students, because unlike the second-year teaching practice, they begin to give chemistry lessons and hold extra-curricular activities with a certain student group. Students of the fourth year show great confidence in their methodological abilities, noting the absence of difficulties among a quarter of the respondents. However, the effectiveness of the results of practices is determined by almost half of the respondents. Interestingly, they are more satisfied with third-year students (55%) compared with fourth-year ones (47%). 53% of the surveyed graduates indicate gaps in special training, which show more objective results compared with third year students (27%). Positive results of practices and the desire to work in school are confirmed by the digital data of

students of the 2nd and 4th year (60% and 65%, respectively).

Formation of critical thinking of activity is defined as a factor of student readiness for the pedagogical profession. Many researchers pay attention to the leading role in assessing the practice of students. O. Rogovaya (Rogovaya, 2010) notes that the low level of organization of assessment of the practice, as well as the lack of its cultural processing and reflecting the results, do not give proper student self-determination in professional activities.

To conclusions

- The urgency of the problem determines the need for a variation choice of actions for self-development and self-determination of students, future teachers of chemistry, through the system of practices covering the entire period of study from 1st to 4th years of bilingual education. To solve this problem, it is necessary to approach in a comprehensive manner, proceeding from the interests not only of an employer and the society as a whole, but also of the direct participant in the process - student.

- This process should include both students and undergraduates of master's degree in the process of study:

- preparation and execution of creative tasks regarding methodological disciplines with the use of distance educational resources for obtaining meta-subject results of study;

- use of innovations and elements of modern educational technologies to create personal methods of teaching chemistry for each student throughout the entire period of study;

- thorough reflexive analysis of the results of each stage of the practices: educational (1 year), industrial (pedagogical) practice (3 and 4 years), practice in obtaining professional skills and professional activity in chemistry (3 year), pre-diploma practice (4 year);

- preparation for the final certification of bachelor's graduates through the entire system of practices, starting from the first year;

- improving the methodological support of students in all types of practices;

- inclusion of pedagogical practice for masters in the general system of practices.

We believe that this work should be conducted in the university for students and undergraduates of master's degree of teacher education for further entry into the professional pedagogical activity. We have come to the conclusion that a properly organized and implemented system of university education practices determines the internal self-determination of students, future teachers of chemistry, even in the process of study. All this contributes to the correct organization of self-management training, formation of a student's portfolio as an alternative way of presenting their achievements (Sakhieva, Gilmanshina, Gilmanshin, Kosmodemyanskaya, Achkurina & Sagitove, 2015) (Gilmanshina, Sagitova, Kosmodemyanskaya, Khalikova, Shaveleva, Valitova & Motorygina, 2015). It is these factors that determine the mobility of a young specialist in obtaining the most important professional competencies, the desire to work effectively with the younger generation. All this creates deeper preparation of students as future teachers of chemistry through the information and educational environment.

Thus, it is possible to note the relevance of the identified problems, since this covers the issues of the secondary and higher schools, directly pedagogical universities that train the human resource for the society. This problem is significant enough, and at this stage of the study, has not yet received its logical solution.

4. DISCUSSIONS

The question of the system of practices of students, future teachers of chemistry, through the information and teaching environment, is not yet sufficiently developed.

5. CONCLUSION

We examined how the system of students' practices in the field of chemistry contributes to the systematic professional self-determination of students.

RECOMMENDATIONS

This article is written for the attention of university teachers involved in preparing students for teaching activities.

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