OLYMPIAD AS A MEANS FOR FOSTERING THE READINESS OF STUDENTS TO FOLLOW THEIR TRAJECTORIES OF PROFESSIONAL GROWTH

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Abstract: This paper describes the experience of organizing professional olympiads for pedagogical university students directed at the development of their ability to build an individual trajectory of professional growth as a subject teacher. The assessment tools for student olympiads on Chemistry Teaching Methods and Biology Teaching Methods have been described. The teaching and methodical materials are intended to develop professional competencies as envisaged by the educational program consistent with the job functions of a teacher laid down in the Professional Standard for Teachers and requirements and assessment criteria for the General and Secondary School Teacher competence. The definition of the term "olympiad on subject-specific methods" and the key characteristics of the olympiad on subject-specific methods have been formulated.

Keywords: higher education, pedagogical education, quality of vocational education, professional competences, student olympiad, olympiads on subject-specific methods, biological education, chemical education.

1 Introduction

When all spheres of life in our country are rapidly gaining momentum, the most significant projects in the field of general education are geared towards the improvement of the staffing mechanisms for the industry as one of the major factors having impact on the quality of training at school. It is important to teach students to overcome the sociocultural challenges related to the general education from the perspective of contemporary realities. They are primarily related to the acquisition of fundamental knowledge of general purpose, rational methods and technologies of teaching and cognition, strategies and tactics of behavior based on the spiritual and moral orientations, values of labour, science and art, ways to preserve health and cultivate the healthy life style. That's why the requirements for professional readiness of a teacher come to the forefront, especially as concerns comprehension by a teacher of the content of modern education, innovative tools for teaching, educating and developing students to ensure achievement of formal, non-formal and informal goals of education. In the current situation, a teacher should be constantly seeking and using the ways for independent management of pedagogical career upon determination of a trajectory of their own professional growth, realistic and achievable goals, and transfer of the acquired skills to other environments both within and outside an educational institution.

As is known, in 2019 our country launched the national project "Education. One of its priority objectives is to produce documents of national importance requiring the constant professional growth of pedagogical staff members. In connection therewith, by the end of 2020 *the National Teacher Growth System (NTGS)* should be implemented, which is based on the innovative form of teacher certification using *the Unified Federal Assessment Materials (UFAM).* This form implies assignment of new qualification categories corresponding to the educational sphere of teacher's work. Taking into account the complexity and omnidirectional nature of teaching, an objective need arises to modernize vocational pedagogical education already within the walls of a pedagogical university. The study of various disciplines included in the curriculum, with a particular attention to pedagogy, psychology and subject-specific methods, as well as the organization and conduction of professional focus events of non-formal content for students may help to purposefully foster their readiness for building a trajectory of professional growth and performing professional activities in the ever-changing socio-cultural environment. One of the recognized ways to foster the indicated aspects of future teachers' readiness already within the walls of a pedagogical university is the opportunity for students to gain experience of participation in subject-specific and profession-related olympiads.

2 Literature Review

The modern society and the renovated educational space in our country impose high standards on the preparation of pedagogical staff. Qualification of the other level may be ensured contingent upon the permanent control over all components and procedures of vocational training of future teachers. The control should be mainly directed towards revealing the quality of developed professional competences. The Federal State Standard of Higher Education (FSSHE) 44.03.05 Pedagogical Education requires that such competence as "readiness to build trajectories of own professional growth and personal development" be mandatorily developed. The experience of many higher education institutions shows that one of the effective ways to develop this competence and assess its level among students is the holding of subject-specific and profession-related olympiads. The same conclusion can be drawn upon review of the publications of Russian scholars in the field of higher education. Thus, in the publications of V. I. Balabanov, V. Yu. Boykov, N. A. Vyskrebentsev (2009) the emphasis is made on the approaches and ways to develop the methods of organizing and holding the subject-specific olympiads. The materials prepared by G. Ya. Grevtseva (2015), N. A. Savinova, T. A. Shukshina (2013), and I. V. Gladkaya (2011) reveal the role of subject-specific olympiad in the professional evolvement of specialists trained at universities of various specialization, including pedagogical universities. The issues related to elucidation of such concepts as "the olympiad" and "the olympiad movement" are addressed in the works of E. A. Maksimova, N. N. Patronova (2016), A. I. Popov, G. I. Dubrovina (2016). The same papers give a general overview of the olympiad movement in our country. The olympiad from the angle of complex assessment of the quality of vocational pedagogical education is considered in the works of S. V. Arkhipova, A. N. Gamayunova, M. A. Lavrentyeva, N. G. Minaeva, N. V Ryabova (2017, 2018). I. B. Buyanova and S. K. Kudryashova (2018) in their studies argue that student participation in the pedagogical olympiad contributes to the success of a future teacher in profession. In the work of G. Kh. Vakhitova (2012), the pedagogical olympiad is viewed as a factor underlying the development of professional competencies of pedagogical university students. In addition, while analyzing the problem of search for new methodological approaches, concepts, technologies for vocational development of specialists, the author highlights the necessity to encourage students to participate in subject-specific olympiads, and also considers the peculiarities of mentoring in the olympiad movement (Vakhitova, 2019). Describing the experience of organizing the pedagogical olympiad, G. A. Karakhanova and E. E. Orudzhalieva (2017) come to a conclusion that the pedagogical olympiad is an effective form of teaching, which boosts students' motivation for learning and strengthens their interest in the subjects of the psychological and pedagogical cycle. Unfortunately, in the research into and coverage of the topic of student olympiads, the olympiads on proprietary teaching methods remain out of sight. Besides, olympiads in such disciplines are conducted most often within universities and rarely at the interregional level. Meanwhile, the content and assessment tools of these very olympiads are in many ways oriented towards the check of the readiness of pedagogical university graduates for professional activity in the conditions of the upcoming introduction of the new teacher certification system.

3 Research Methodological Framework

The research purpose was: to draw attention of the teaching community to the relevance of olympiads on subject-specific methods held at universities training pedagogical staff for the initial involvement of students in the forthcoming professional activity as a subject teacher; to present the unique experience of organizing and conducting olympiads on the chemistry and biology teaching methods in the conditions of a particular pedagogical university.

The research objectives were as follows:

- Theoretical: analysis of the relevant literature, comprehension of the educational process in own and other universities from the point of view of the practice-oriented approach to the vocational training of future teachers (including teachers of chemistry and biology);
- Applied: development of scientific and methodological materials, their testing in the educational process at university.

The results of experimental research were obtained using certain methods of theoretical and empirical levels. The methods of theoretical level were used to analyze the pedagogical and methodical literature, to define the essence of the olympiad as a means to foster the students' readiness to follow the trajectory of professional growth, to generalize and systematize the materials obtained experimentally. The methods of empirical level included conversations with students followed by interpretation of their answers regarding the value of olympiads on subject-specific methods in terms of application of the acquired knowledge and skills in the forthcoming professional activity, and also definition of the elements of the professional growth trajectory.

4 Results and Discussion

4.1 Theoretical Stage

As noted above, the student olympiads today are the focus of attention of many researchers and practicing teachers. Thus far, the understanding of the concepts "olympiad" and "olympiad movement" has been established, the general content of student olympiads has been defined, and the elements of their methodological support have been identified and in certain aspects already implemented in educational practice. This allowed us to clarify the meaning of the concept "olympiad on subject-specific methods" and to describe characteristics of the olympiad in the mentioned field taking into account the university educational process designed to foster students' readiness to follow the trajectory of professional growth. Relying on the definitions of the term “olympiad” formulated by O. Yu. Korsunova (2003), O. N. Makarova (2009, 2012), N. S. Kasatkina (2016) and G. Ya. Grevtseva (2015), we propose our definition of the term "olympiad on subject-specific methods". Olympiad on subject-specific methods is an organizational form of short term competition between students, which requires from its participants the demonstration of methodological, academic, methodical and technological knowledge and specific skills, value orientations, creativity, as well as professionally significant personal qualities essential to an effective implementation of scientific, methodological and educational activities with the use of external and internal resources when addressing the upcoming tasks within the context of development of the relevant competences in the direction of further professional growth.

Considering that the individual trajectory of a teacher's professional growth presupposes their commitment to expand the opportunities available within the educational space, to choose the most effective ways of teaching their subject, to enrich the content of various aspects of professional competence; based on the proposed definition, the key characteristics of the olympiad on subject-specific methods may be formulated. Such characteristics include:

- Demonstration of knowledge of methodological, academic, methodic and technological content, and its specifics in terms of relevant requirements for general education;
- Demonstration of understanding of educational needs of the modern students with account of their individual, group and collective distinctions;
- Demonstration of the top priority aspects of scientific, methodological and educational activities of a subject teacher in terms of addressing the urgent problems of general education school;
- Demonstration of flexibility and adequacy of response to changes in pedagogical, methodical and technological situations;
- Demonstration of professional and pedagogical interest and personal commitment to address the upcoming challenges.

On the basis of the above, it can be asserted that the student olympiad on subject-specific methods may spur individual needs and profession-oriented expectations, initial experience, level of university training, psychological and cognitive distinctive features of a future teacher. Indeed, on the threshold of their pedagogical career, a pedagogical university graduate gets an opportunity to express personal preferences concerning their specific needs in order to build their own individual educational trajectory while carrying out professional activities. As a result, this may make him/her highly demanded, or conversely, the acquired competences may turn out to be non-demanded in the labor market.

4.2 Applied Stage

For several years, at the Mordovian State Pedagogical Institute named after M.E. Evseviev (MSPI) under the educational program in the field of study Pedagogical Education, specialty Biology. Chemistry, the targeted efforts were made to encourage students to participate in the olympiads on chemistry and biology teaching methods. The main purpose pursued when organizing the olympiads is to identify the most gifted and talented students, improve the quality of professional training of students, improve their professional competence, unleash their creative potential through contest tasks, boost the motivation and creativity of teachers of graduate chairs in the performance of mentoring functions.

The programs of olympiads developed at the Department of Science and Technology are based on the understanding of the activity of a subject teacher as an ability to solve pedagogical tasks. When creating the variants of tasks, the peculiarities of the UFAM were mandatorily taken into account, which in the future will serve as a basis for a new system of teacher certification. As is known, three categories of tasks are supposed to be introduced, namely, a written paper on the academic discipline of teacher’s specialization, watching a video lesson followed by an analysis of the work of students, and solving a psychological and pedagogical task or case. It should be noted that a written paper on the academic discipline will be intended to check the academic and methodical competencies. For example, a chemistry teacher should not only solve computing tasks and write equations of chemical reactions, but also answer questions concerning lesson design, lesson objectives, and logical expression of the content of learning aids on the topic under study.

Participants of the olympiads on the specific methods of two subjects referred to above are students of 3rd to 5th years of study of bachelor's degree course and 1st and 2nd years of study of master's degree course seeking Chemical and Biological Education specialties. Junior students are invited to participate in subject-specific olympiads, which are annually organized at the department on the fundamental disciplines included in the academic block of the educational program. Participation in the olympiads greatly contributes to fostering the students' readiness for competitions and olympiads of a higher level.

The practice of organizing olympiads on subject-specific teaching methods shows that the best way is to structure the

olympiad in three stages – theoretical, practical and demonstrative.

At the theoretical stage, the contestants should demonstrate the knowledge of the educational program materials on the disciplines of the academic block. In order to do this, they should complete two tasks. The first task requires them to make a smart presentation of their reflections on the essence of one of the fundamental categories of science – biology or chemistry. The second task on the chemistry teaching methods is to solve a computing task, and on the biology teaching methods – to perform a practice-oriented task. Each offered solutions should be supported with relevant methodical comments. Let us present some examples of tasks used in our practice.

4.3 Task in Biology (Science)

One of the exponents of fundamental biology, as commonly known, is the theory of hierarchical organization of wildlife. Give it a thought and provide convincing written answers to the following questions:

1. Which scientists were involved in formulating the provisions of this theory?
2. Which provisions reflect its essence - formulate them and provide your brief comments?
3. Results of which contemporary studies complement provisions of this theory?
4. Why does this theory underlie the substantive foundations of the model curriculum in biology for the general education school?

4.4 Practice-Oriented Task (Biology)

You have at your disposal a task from the state exam in biology which consists in finding correlations between the traits and types of animals and a scan copy of its solution by the examinee. Recollect the general evaluation principles for such tasks express the criteria for evaluating this task and evaluate the exam paper. Explain the score you assigned to the paper.

4.5 Computing Task (Chemistry)

Make the computations: "What mass of sodium should be added to 100 ml of sodium hydroxide solution with a mass fraction of 8% (solution density 1.085 g/cm3) to obtain a solution with a mass fraction of sodium hydroxide equal to 10%?" Describe the algorithm you used to solve the task and propose the criteria for evaluating the task solution.

It should be underlined that for several years of organizing the olympiads we have accumulated our own fund of evaluation materials, which students may use in preparation for the state final certification. The data and similar tasks are to a certain extent aligned with the NTGS guidelines as concerns their structure and content, and are oriented towards application of mainly subject-specific and partially methodical competencies.

At the practical stage, the olympiad participants should demonstrate their readiness to apply the acquired theoretical knowledge on the subject in teaching practice. Moreover, students also had to solve a certain psychological and pedagogical situation which may arise in the work of a biology teacher or a chemistry teacher. Let us present some examples of tasks used in our practice.

4.6 Task in Chemistry within a School Curriculum

Plan the content of a lesson fragment using the available reagents and equipment to perform a demonstration experiment under the topic "Redox Reactions". Describe a chemistry teacher's action plan and show the committee members the sequence of steps to ensure the required academic performance of 9th grade students. Solve the below situation that occurred during the demonstration experiment: "Chemistry teacher: "Pay attention to the conditions and profile of chemical reaction...". That's when the teacher notices that one of the students spins the phone in his hand: "Please put the phone away or turn it off! Student: "I can't. I'm chatting in ICQ. I never put it away or turn it off, I sleep with it. I have no interest whatsoever in your chemical reactions." How will you react - what will you do and what will you say in this situation and why?

We would like to highlight that these and similar tasks are also to a certain extent aligned with the NTGS guidelines and are oriented towards the use of methodological, psychological and pedagogical competencies learned at university.

At the demonstration stage, the olympiad participants were asked to deliver a biology or chemistry lesson to a certain class at secondary school with the use of earlier prepared methodological materials on the topic as indicated by the jury chairman. At this stage, both students and teachers of the chosen schools acted as experts. Their evaluation of the olympiad participant's work at the lesson according to the proposed scheme facilitates the decision of the jury members regarding the demonstrated competencies. Within the demonstration stage, the participants have to complete two tasks:

1. Develop lesson design (a lesson plan);
2. Demonstrate the implementation of lesson design (a lesson plan) in real school conditions.

The first task requires the use of knowledge and actions for proper description of the methodological and procedural parts of the designed lesson. Concerning the first part, from the perspective of modern requirements to a lesson, the lesson objectives should be formulated in line with the expected outcomes, the forms, methods and means of effective training should be defined, and the core concepts of the academic content to be studied should be expressed. Concerning the second procedural part of the designed lesson, depending on the chosen form and type of a lesson, its structural components should be defined and filled with appropriate didactic content. The second task requires that a full lesson be organized and conducted for a certain category of students. Here the olympiad participants should demonstrate readiness to ensure achievement by students of the target academic, personal and meta-subject results through implementation of own didactic, methodical knowledge and appropriate ways of action, as well as readiness to develop such professionally significant qualities of a teacher as endurance, emotional balance, clear and convincing speech, sociability, ability to listen and distribute time.

It should be highlighted that these tasks are also to a certain extent aligned with the NTGS guidelines and are oriented towards the use of methodological competencies.

For summing up the olympiad results it is better to choose the format of a round table, where participants may share their impressions and discuss the difficulties they encountered when performing the tasks. The round table moderator should incite discussion on the aspects concerning development prospects of the olympiad and building a development trajectory for each olympiad participant in the forthcoming professional activity of a biology or chemistry teacher.

5 Conclusion

The presented materials regarding organization and holding of the olympiad on subject-specific teaching methods should be recognized as one of the means for developing the professionally oriented knowledge, skills, value orientations and experience of creativity as the starting elements vital to the career of a teacher of a certain school subject. In general, such olympiads undoubtedly spur and induce personal and intellectual development of pedagogical university graduates, facilitating their self-determination and encouraging them to continue education after graduation. The diagnostic procedures we used for several generations of students participating in the olympiads of two types described above have yielded positive results in several aspects of the forthcoming professional activity. It is noteworthy that almost 100% of students have expressed their willingness to dedicate their life to school in order to realize their

potential in the capacity of a teacher of biology or chemistry. Moreover, about 85% of students expressed their willingness to perform not only traditional teaching, developing and educational functions, but also the functions that correspond to the realities of modernity – diagnostic, research, emotional-corrective, reflexive, communicative-stimulating and creative. The majority of students (78%) recognized the offered tasks as valuable means for successful overcoming of the challenges faced by the modern education in the field of natural science that contribute to the acquisition of fundamental academic knowledge on the subject and practical skills by the younger generations and their use to achieve educational objectives and in everyday life. Approximately 80% of students gave a positive feedback regarding their understanding of the meaning of personal self-determination, as well as professional growth after graduation. In this regard, they highlighted the major problems that could be overcome while still in university. Those include mastery of materials on the methodological component beneath the content of biology and chemistry under school curriculum, comprehension of theoretical foundations of success in conduction of general methodological and reflexive lessons, organization of educational and cognitive activities of students with disabilities at the biology and chemistry lessons, expansion of educational potential of biology and chemistry.

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