INNOVATIVE FORMS OF EXTRACURRICULAR ACTIVITIES IN BIOLOGY WITHIN THE FRAMES OF FEDERAL STATE EDUCATIONAL STANDARDS

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Abstract: The article considers the problems of the necessity of using the innovative forms of extracurricular activities in biology. Psychological and pedagogical techniques were used for determination of the efficiency of innovative technologies application. As a result of the research of the 10th grade students, it has been revealed that in the experimental group, where the innovative technologies were actively implemented, informative qualities of each pupil, interest in a subject of biology and evaluation of students' knowledge have increased, the interest in discussion of urgent problems of biology has appeared. In the control group, the changes in training were practically not detected, since in this group the method of teaching biology remained unchanged. The use of innovative technologies in extracurricular activity allowed to consider various interests of pupils, to deepen and expand them in the necessary direction, and also to prepare the students for further professional activity. The obtained data can become a basis for the development of curricula and methodical grants, can be used at advanced training courses of teachers, deputy directors, directors, and also in the system of higher education, when studying pedagogical disciplines.

Keywords: innovative activity, federal state educational standard (FSES), information and communicative technologies, extracurricular activities, pedagogical experiment, information and education environment (IEE).

1 Introduction

Application of modern pedagogical technologies and analysis of their effectiveness are among the most urgent tasks of the national education system today. Due to the introduction of the federal state educational standard, high requirements are imposed to the student, which can't be realized with the help of traditional methods and means of pedagogical technologies (Kamakhina & Lokhotskaya, 2015). The modern system of education undergoes changes, which lead to a reduction in the hours, designed for the subject. The demands for the knowledge, abilities and skills of students rise, and the volume of necessary information increases. In this regard, there is a need to apply new approaches in education, based on modern information and communication technologies. The main purpose of which is the proper use of various types of information and didactic possibilities during the educational process.

To date, applying innovative forms of education, there is a significant impact on the content, forms and methods of teaching. You can present the material visually and unconventionally, using the capabilities of special software, various video and multimedia presentations. This increases the effectiveness of training (Fadeeva, 2016). The use of innovative forms in the learning process creates the most favorable conditions and greatly contributes to motivation in the study of a particular subject (Jumanova & Tulegenova, 2015; Zaidullina & Demyanova, 2017). The importance of use of innovative forms in organizational learning processes was also noted by U. Brandi and R.L. Iannone. They considered various possibilities and application of teaching technologies from the perspective of organizational learning (Brandi & Iannone, 2015).

At present, many countries, including Russia, are not satisfied with the results of school education, and due to this, there is a need for its reformation. Another important problem of school education is the low level of natural sciences teaching, and hence the low quality of knowledge among a significant number of students. This trend is connected with a reduction in the number of hours, designed for the subject. Due to this, the study of a large amount of complex scientific information is carried out in a short time, and studied material is poorly related to the interest of students and everyday life.

With the introduction of the federal state educational standard of the second generation, the structure and content of the new system of biological education is being developed. Due to this, the quality and results of biological education will be defined in a new way.

The importance of biology in the school course is undeniable. It is the basis of general biological concepts, theories and laws, needed in high school, and it is the basic link in the system of continuing education.

In the federal state educational standard particular importance is given to extracurricular activity, which plays an important role in the development and training of schoolchildren. After-school activities are the system, which is aimed at education of students, development of their moral, ethical and social principles.

Recently, the importance of extracurricular activities has significantly increased. It has become an integral component of the educational program of basic general education.

Due to the modern information and educational environment (IEE), the implementation of the information-methodological conditions of the FSES main curriculum of general education is carried out in extracurricular activities (Rean, 2004).

With the help of ICT technologies, such an organization of educational process takes place, the result of which is the interaction between the teacher and students. It stimulates and motivates them for experimental and creative activity (Dmitrieva, 2012).

Particular importance is given to the use of information and communication technologies in extracurricular activities, due to which the educational work in the new conditions is intensified, and the interest of students is increased.

More complete, in-depth and versatile study of wildlife is carried out in the process of extracurricular activity. It is developed taking into account the propensities and interest of students. As a result, the talents and abilities of schoolchildren are improved. All this ensures the use of innovative technologies in extracurricular activities (Serovayskaya, 2012).

2 Methodology

The following methods were used in the research: analysis of pedagogical and methodological literature, study of normative and methodological documentation, pedagogical experiment, questioning, testing. During the research, the following psychological and pedagogical techniques were used: "Student's orientation to the mark", "Student's orientation to acquiring knowledge", "Motivation for success and fear of failure", test "Interest in biology" (Ilyin, 2002; Kalinova, 2012; Villalobos Antúnez, 2018).

3 Results and Discussion

The study was carried out on the basis of the Municipal Budgetary General Education Institution "Secondary magnet school №171" of the Sovetsky District of Kazan (School – is the competence center in electronic education) among the students of the grades 10 "A" and 10 "B". The experiment involved 26 students of the grade 10 "A" (experimental class) and 28 students of the grade 10 "B" (control class). To find out the cognitive qualities of each student and change them during the indicated period, questionnaire methods and pedagogical experiment were used.

The purpose of the work was to define the features and effectiveness of use of innovative forms in extracurricular activities, as well as their influence on the formation of cognitive interests in the subject of biology. The research was carried out in three stages.

I. The ascertaining stage of the experiment was carried out at the beginning of the study. It was conducted with the help of monitoring the educational process, the analysis of students' marks in class journals, revealing the orientation to the mark, to the acquiring of knowledge, interest in biology. All this give the grounds for judging the interests of schoolchildren in the process of extracurricular activities. In the course of initial study, two groups were identified. So, the 10th “A” graders were included in the experimental group, the 10th “B” graders formed the control group.

II. At the formative stage of the experiment, it was necessary to develop theoretical bases and specific methodological measures to resolve the problem under study. So, taking into account the purpose of this work, such extra-curricular activities (using ICT) were conducted on the following topics:

1. Additional educational program "Molecular genetics".
2. Detailed plan-compendium of the lesson at the biology circle in the 10th grade on the theme "Ontogenesis: Embryogenesis."
3. Development of out-of-school activity for senior classes on the topic: "Trip for a "recipe for happiness" (Braverman & Prosveschenie 2012).
4. Virtual excursion "Biocenosis of mixed forest".

As a result, a new situation is created, in order to determine whether extracurricular activities with innovative forms really affect the schoolchildren's learning process for the better (Yakovenko et al, 2016).

III. At the control stage of the experiment, the second questionnaire was carried out and the second analysis of students' progress was made, in order to determine the effectiveness of the work done.

Fig 1 shows the results of the technique "Orientation to the mark".

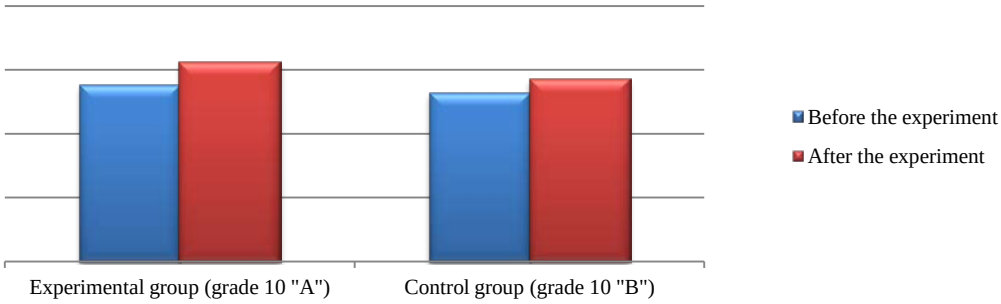

Fig 1. Pupils’ orientation to the mark, before and after the experiment

As a result of the analysis of the obtained data, it was revealed that the level of orientation on the mark before the experiment was high enough, the mean value of which was 6.53 (10 "A") and 6.28 (10 "B"). After the second analysis, the mean value increased to 7.26 in the experimental group, and to 6.71 in the control group.

In the course of the technique "Orientation to acquiring knowledge", the purpose of which was to reveal the degree of students’ commitment to the acquisition of knowledge, the following results were obtained (Fig 2).

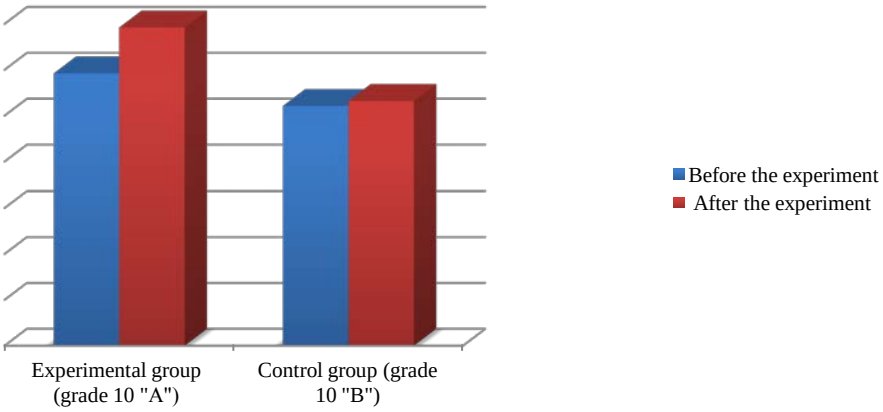

Fig 2.Studying the results of pupils’ orientation to acquiring knowledge before and after the experiment

In the experimental grade (10 "A"), it was found that the mean value of the results of considered technique before the experiment was 6.92, after the experiment it increased and amounted to 7.92. In the control group, the analysis of the results showed that the mean value changed insignificantly, so after the first analysis it was 6.21, and after the second analysis, the average value was 6.32.

According to the methodology "Motivation for success and fear of failure", students had to agree or disagree with the statements. The results are shown in Fig 3.

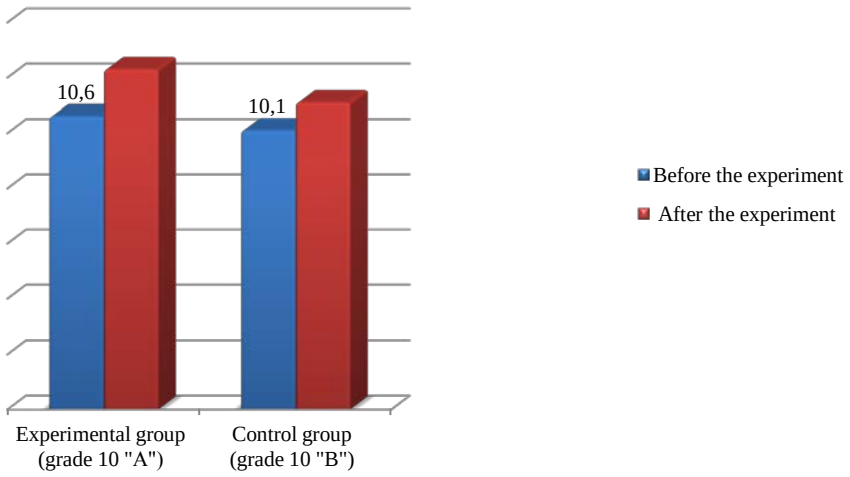

Fig 3. Progress of pupils of the grades 10 "A" and 10 "B" in biology

The analysis of the data, obtained in the experimental group, showed that before the experiment the average value of the results was 10.6, and after repeated research this value increased and amounted to 12.3. In the control group, the primary analysis showed that the mean value was 10.1, and after the second analysis it was 11.1.

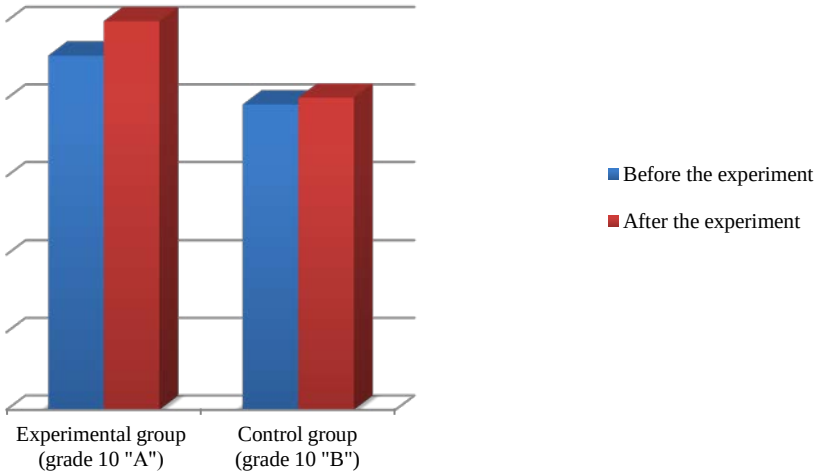

Fig 4. Results of the test "Interest in biology"

According to the conducted test "Interest in Biology", it was revealed that in the experimental group (10 "A") the obtained mean value was 9.11, and after the experiment it was 10.0. As a result of the analysis of the control group data, the mean value after the first research was 7.85, and after the control testing it was 8.03 (Fig 4).

It was found in our study, that the degree of students' orientation to the mark is quite high. This is due to the fact, that senior pupils are interested in getting good marks in connection with the completion of the second quarter. After the repeated investigation, a slight increase in this indicator was detected. So in the experimental grade (10 "A") it increased by 0.73, that was evidenced by the heightened interest in learning and evaluation of their knowledge. When conducting a second research in the control grade (10 "B"), this indicator changed insignificantly - by 0.4.

According to the data of the second technique, the analysis of the results of students from experimental group showed, that the orientation to acquiring knowledge increased by 1.0. This indicates heightened interest of students in biology. In the control grade ("10" B), the average value of the orientation to acquiring knowledge after the experiment was slightly changed, and increased only by 0.11.

According to the results of testing "Motivation for success and fear of failure", conducted in the experimental class, the average level of motivation for success among students after the experiment increased by 1.7 points. This indicates that due to the work in extracurricular time, the students have an interest in biology, they want to discuss current problems, and there is no fear of expressing one's own opinion (Fig 3). In the control grade, the average level of motivation for success after the experiment increased insignificantly, only by 1 point. This was due to the fact that the methodology of teaching biology in the control class remained unchanged.

The obtained data of testing "Interest in Biology", conducted in the experimental grade, indicate that the average level of interest in biology after the experiment among students increased by 0.89. This means heightened interest of students in biology during the course of extracurricular work. In the control grade, the analysis of the conducted testing showed that the average level of interest in biology after the experiment was slightly changed, and increased by only 0.18 (Didenko & Grinchenko, 2015).

The importance of extracurricular activities in biology is noted by many pedagogical researchers and methodologists. Didenko N. and Grinchenko B. investigated the innovative approaches in the learning process of extracurricular activities. The results of the research show that extracurricular activities are important for social and academic achievements (Marsh & Kleitman, 2002; Balyer et al, 2012). Education with the help of innovative forms makes a great contribution to the educational process. After all, education is responsible for providing the current generation with the necessary skills and values, which will help them to cope with the difficulties of the modern world (. Vlasova et al, 2016).

Thus, due to the extracurricular activities, it is possible to expand and deepen the knowledge of students on the subject. During the school hours, this is not always possible, because of the catastrophic reduction in hours, designed for the subject.

Taking active part in extracurricular work, carrying out observations and experiments, students acquire concrete ideas about phenomena and objects of the surrounding reality, on the basis of direct perception; they pay attention to environmental problems, etc.

The use of different tasks in extracurricular work, which are connected with the experimental activities and observation, contributes to the development of students' research abilities. This process greatly influences the development of thinking, observation, and attention of schoolchildren. There are the individualization of learning process and the implementation of differentiated approach in the process of extracurricular work.

4 Summary

As a result of the research, we found that the use of innovative technologies in extracurricular activities positively affects the learning process. This is evidenced by the data, obtained by us as a result of the analysis of applied techniques. Thus, in the experimental grade, the interest in the subject of biology, and the evaluation of students' knowledge have increased; the interest in discussing the actual problems of biology has appeared.

The use of innovative technologies in extracurricular work has allowed to take into account the diverse interests of schoolchildren, to deepen and expand them in the proper direction, and also to prepare the students for further professional activities.

5 Conclusions

Extracurricular activities play an important role in the study of biology, since it allows to combine the theory and practice in the most productive way. Biological education in general, and extracurricular activities in particular, involve the student in various feasible work, teach the responsibility and the ability to bring the matter to the end. Based on the conducted research, we can conclude that extracurricular activities with the use of information and communication technologies can take into account the diverse interests of schoolchildren, deepen and expand them in the right direction, and can also prepare the students for further professional activities.

Acknowledgements

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