

## TEACHING BIOLOGY TEACHING METHODOLOGY IN HIGHER PEDAGOGICAL SCHOOLS

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### Abstract

A pedagogical experiment was conducted to determine the interest of students in the teaching of biology in higher pedagogical schools. The experiment covered three stages. The first stage is called the defining, the second is called the teaching, and the last is called the formative experiment.

The work was carried out at the Azerbaijan State Pedagogical University, where the author works. The dissertation has been working at the Department of Biology and its Teaching Methods for 15 years. Constantly monitored and made observations. Students were involved in a public survey, observations, discussions and interviews were conducted. The purpose was to determine the level of teaching biology in higher education.

**Keywords:** teaching, biology study, teaching methods, high schools

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### INTRODUCTION

At this stage (2012-2014) the dissertation was implemented in one of the III-IV courses of the university where he worked on the methodology of teaching biology. In other courses, the lessons were taught according to the methodology adopted by most teachers at that time. At this stage, students showed great interest in the new content and methodology. preparations have been made.

At the beginning of this phase, students were asked to answer a series of questions. The first question was about the specialty: "Who wants to be a biology teacher?"

Of the 120 students surveyed, 50 are highly motivated to become biology teachers, while 40 are somewhat indifferent. That is, it may or may not be. 30 people say they do not want to be a teacher.

At the initial, defining stage of the experiment, students' learning activities, creative and cognitive independence were observed.

In the second stage (2014-2016) the experiment was of different directions and purposes. At this stage, the experiment was conducted with the students of the Faculty of Biology of ADPU, the Faculty of Biology of SSU, the Faculty of Biology of LSU. 6 groups of bachelors and 1 group of masters of ADPU; 4 groups of bachelors and 1 group of masters of SSU; Khazar University participated in the experiment. There was an exchange of views with the teachers participating in the experiment, both individually and in small groups, and suggestions were heard.

The analysis of the identified issues related to the current situation in the university allowed to move to the second test phase of the experiment. Experimental and control groups

were identified. Some groups of universities were taken as experimental and some as control groups. Lectures and laboratory classes in the experimental groups are based on special training, along with teaching materials, providing students with information from additional sources and studying their attitudes, focusing on students' independence, hobbies, cognitive and creative activity, initiative, information and communication technologies, innovations, interactive teaching methods. organized by taking advantage of.

As a result of purposeful, systematic work, the level of the subject of methodology of teaching biology in experimental groups was significantly higher. Below are the questions students are asked about teaching biology.

Teaching of biology teaching methods in connection with other subjects.

1. Are there any links with other subjects during the teaching of biology teaching methods?
2. Is there a connection with pedagogy?
3. Is there a connection with psychology?
4. Is there a connection with philosophy?
5. Is there a connection with biology?
6. Is there a connection with ethics and aesthetics?
7. Interdisciplinary relations during lectures and laboratory classes is created?
8. Are topics relevant to life?

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As can be seen, as a result of conversations with the students of the experimental groups, they noted that integrative relationships were widely covered in these groups, both in lectures and laboratory classes. At the same time, they talked about how these relationships were established.

Teaching secondary school biology course related to other subjects.

1. Is it necessary to use integration in the teaching of high school biology?
2. What subjects can be most connected?
3. Can a high school biology course be relevant to life?
4. What types of integration should be used the most?

Our other research questions are about the procedure for conducting lectures on biology teaching methods.

Organization of lectures on biology teaching methods.

1. To what extent is the teacher's speech and communication style satisfactory during the lecture?
2. Are you satisfied with the given theoretical knowledge?
3. Are you satisfied with the methodology of teaching lectures?
4. Do you agree with the pedagogical approach to students during the lecture?
5. Is ICT used during the lecture?

6. Does the lecture give preference to the student's free thinking about the problem?
  8. Are you interested in lecture materials on biology teaching methods?
  9. Did your interest in biology teacher increase after listening to lectures on biology teaching methods?
  10. Can you call the lesson you are listening to a modern lecture?
  11. Is there a discussion in the lecture?
  12. Do you have the necessary literature to study lectures?
- We also clarified how laboratory classes are taught.

Questions about laboratory classes.

1. To what extent does the teacher's behavior and attitudes meet the requirements of pedagogical ethics?
2. Are you satisfied with the level of theoretical knowledge?
3. Are you satisfied with the organization of laboratory training?
4. What is the level of methodological analysis of topics in biology?
5. How important is ICT in making laboratory classes interesting?
6. Are modern teaching methods used in laboratory training?
7. Along with modern training, it is related to the topics in high school "Biology" textbooks  
is the experiment being conducted?
8. Has the laboratory training been designed in accordance with the stages of modern training?
9. Do you use any funds for laboratory training?

The following questions were also asked to the undergraduate students of higher pedagogical schools for research purposes:

1. What are the personal professional qualities of a biology teacher?
2. What are the main pedagogical abilities of a biology teacher?
3. What methods would you use to develop students' thinking in biology lessons?
4. What is the educational value of biology classes?
5. What forms of practical methods do you use the most in biology lessons and why?
6. What forms of visual methods do you use the most in biology lessons and why?
7. What topics are used in the teaching of role-playing games?
8. What topics are most often used in the teaching of brainstorming?
9. What should a student be able to do during a pedagogical practice?
10. What knowledge, skills and habits does the student have at the end of the pedagogical practice?
11. How do you imagine a modern biology classroom?

12. What should a teacher do to better understand a concept in any given subject in biology?

13. What forms of integration are you familiar with? What forms of integration do you use the most in teaching biology topics? And why.

Research work on the methodology of teaching biology in higher pedagogical schools was conducted among students studying at both bachelor's and master's degrees. Below are the surveys conducted among the masters.

Master's questions:

1. What other sciences are related to the teaching of biology?
2. What are the personal qualities of a teacher?
3. Describe the professional qualities of the teacher.
4. What should a student be able to do during a pedagogical practice?
5. What knowledge, skills and habits does the student have at the end of the pedagogical practice?
6. What would you do to develop creative thinking in students in the teaching of biology?
7. What would you do to develop students' critical thinking in teaching biology?
8. What would you do to develop students' logical thinking in the teaching of biology?
9. What is the educational significance of teaching biology?
10. What forms of integration do you use the most in biology topics?
11. What forms of practical methods do you use the most in biology lessons and why?
12. What forms of visual methods do you use the most in biology lessons and why?
13. What knowledge, skills and habits should be instilled in the teaching of plant subjects in biology?
14. What knowledge, skills, and habits should be instilled in the teaching of animal subjects in biology?
15. What knowledge, skills, and habits should be inculcated in the teaching of human subjects?
16. How do you think a biology textbook should be written? What is the main thing to consider?
17. What can you say about Methodists and pedagogues of Azerbaijan?
18. What can you say about STEM, PISA and curriculum in the world education system?
19. Information about Dale Carnegie's views and your attitude to it.

In the last stage (2016-2018), ie in the formative experiment, the relevance of the teaching materials in the previous experiment was assessed on the basis of students' skills.

The main purpose of the experiment is to teach the subject of biology teaching methods in accordance with modern requirements, more interesting. For this purpose, 108 students consisting of bachelors (90) and masters (18) from three universities (Azerbaijan State Pedagogical

cal University, Sumgayit State University, Khazar University) were involved in the study in two groups (control group 54 people, experimental group 54 people). Members of the control and experimental groups participating in the study answered questions prepared in 6 areas related to the problem studied. These five areas include:

1. Teaching biology teaching methods in connection with other subjects.
2. Teaching secondary school biology course in connection with other subjects.
3. Organization of lectures on the subject of methods of teaching biology.
4. Organization of laboratory classes on biology.
5. Conducting research surveys with undergraduate students.
6. Conducting research surveys with undergraduate students.

Hence, the experimental factor was the teaching of biology in relation to other subjects, the method of organizing lectures and laboratory work in the context of related teaching. Working with the control group was in the traditional form and the teaching of a purely biological subject. That is, in the teaching process, the topics in the textbooks were taught only from a biological point of view, without establishing a connection between biology and other subjects. However, when working with the experimental group, using a different and integrative method, the topics related to biology were explained more broadly and comprehensively in connection with different subjects, links were established with other subjects, and lectures and laboratory works were organized. Both groups (control and experimental) were asked 5 sections of questions and answered by the respondents, excluding the experimental factor. After collecting the grades given by the student for each section, the situation is described on the basis of "average grade" (diagrams), taking into account the different number of questions for each section. At the same time, depending on the purpose and assumptions of the study, "T Test" analysis was used and group comparisons were made. A comparison of the values between the independent groups shows that both groups had the same approach to the questions asked before the experiment.

The description and analysis of the data (obtained data) was carried out using the SPSS program (Statistical Package for the Social Science).

Table 1: 5 Table of statistical indicators of the first group of the two groups on the section (numerical average) SECTION	Group	N	Mean	Difference between groups (-)	Std. Devia-
1	Control	54	30.4	-2.5	6.58
Experimental	54	32.9	7.56		
2	Control	54	44.7	0.6	7.00
Experimental	54	44.1	8.54		
3	Control	54	46.2	-1.1	7.30
Experimental	54	47.3	9.56		
4	Control	54	32.5	-0.6	9.17
Experimental	54	33.1	9.81		
5	Control	54	53.2	-1.1	7.23

Experimental 54 54.3 7.93

In the first stage (excluding the experimental factor), after the attitudes of the two groups to the variables (questions) in each section were assessed on an ordinal scale, the combination (composition) of the variables in each section was implemented and students' attitudes toward the variables became quantifiers (interval scale form). The new sections are called "Section 1, Section 2, Section 3, Section 4, Section 5".

Table 2: T Test analysis of the difference between the prices obtained in the first stage for two independent groups Levene's Test for Equality of Variances

t-test for Equality of Means

SECTION	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Lower					Upper			
1	.357	.552	-1.819	106	.072	-2.48148	1.36409	-5.18591 .22295
2	1,362	.246	.382	106	.703	.57407	1.50281	-2.40539 3.55354
3	.367	.546	-.702	106	.485	-1.14815	1.63664	-4.39295 2.09665
4	.401	.528	-.345	106	.731	-.62963	1.82735	-4.25253 2.99327
5	.089	.765	-.761	106	.449	-1.11111	1.46057	-4.00683 1.78461

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In the second stage, after the attitudes of the two groups to the variables (questions) in each section were assessed on an ordinal scale, the combination (composition) of the variables in each section was implemented and the students' attitudes toward the variables became quantifiers (interval scale form). The new sections are called "Section 1, Section 2, Section 3, Section 4, Section 5". This stage was in fact the stage after the application of the experimental factor, during which two semesters of biology were taught for the experimental group in a form related to other subjects, and seminars and laboratory work were organized in the context of related teaching.

The numerical averages of the two groups for each section were compared, and according to the table obtained, it was observed that the difference between the groups in each of the 5 sections in the second stage was higher than in the previous stage (Table 3 and diagram 2).

Table 4: "T Test" analysis of the difference between the prices obtained in the second stage for the two independent groups Levene's Test for Equality of Variances

t-test for Equality of Means

SECTION	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Lower					Upper			

1 .844 .360 - 106 .000 - 2.51 -  
7.602 19.09259 141 24.07171 14.11347

9. Solving the problems of interdisciplinary relations, lectures and its requirements, laboratory training and classification and systematization of its requirements during the teaching of biology teaching methods in higher pedagogical schools.

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