THEORETICAL MODEL OF RESEARCH:
EXPLORING THE POSSIBILITIES OF INNOVATIVE TECHNOLOGIES
FOR ECOLOGY EDUCATION OF THE STUDENTS IN BIOLOGY
TEACHING USING NON-CONVENTIONAL METHODS
/SITUATIONAL, PLAYING, PROJECT AND MODELING METHODS/

Z. Vakleva*

Department of Botany and Biology for teachers, Faculty of Biology, Plovdiv University, Plovdiv, Bulgaria

ABSTRACT
The presented project deals with the ecological education of students through biology teaching and the possibilities for its renewal with innovative technologies for implementation of non-traditional methods of education – situational, playing, project and modeling.

Key words: non-traditional methods of education, situational, playing, project and modeling.

Research description
Explanation of the need of such research
The activity of mankind towards preservation of environment has rapidly increased recently. Ecological education, though, is still falling behind the development of the ecology crisis. What are the reasons for that?

Whether this crisis will further develop, or it will be resolved, depends on the ecological culture of students, who will, in the near future, be active or passive in noosphere, as a reflection of their ecology knowledge.

The building of ecology culture is a slow, complex and contradictory process, and biology in the secondary school plays a significant role and has a strategic place in it.

The newest strategies for ecology education are presented in Programme 21 at the Conference on Environment And Development /Rio de Janeiro, 1992/. Article 36.3 of the programme says: 1/ overloading with fast ageing information is ambitious and insensible; 2/ all theoretical achievements and effective methods of education should be used in the practice of ecological education.

The thorough theoretical study and analysis of the research in the field so far made it necessary to work out a philosophy of the project. In general it comprises the following: Presenting too much information to the students in most cases leads to suppressing of their interest in acquiring ecology knowledge. This fact makes it necessary to make ecological education both rational and interesting. Students tend more and more to improve themselves by participating in activities that are challenging, attractive, non-standard, and satisfactory. That is why, students point their attention not to the amount and complexity of information, but to the skills to implement their knowledge in activities that prove to be interesting.

There are examples, when a student who fully understands the harm influence of pollution on environment will through synthetic litter on the street.

Therefore, the student cannot use the knowledge in practice and could not benefit
We will get the change in student’s behavior if we could give them a possibility to explore their attitude and conduct in critical ecological situations. This will make it possible for the students to understand that everyone, now and in the future, could have a key role in solving an ecological problem.

Using situational method in solving minor problems or their simulation (playing roles) in working out of an ecological project or a model, the students should be trained in making positive steps towards revitalization of environment. Thus, we give them ideas how to adapt their own activities to their personal life.

**Brief characteristics of the methods**

**Situational method** - students are acquainted with a real situation, which is a complex and surprising one. Students are asked to analyze the situation, so that to find the main contradiction in it, to state their attitude and to point out an optimal decision. There are two variants of this method: event - bigger amount of information included in the description, and incident - a situation defined with fewer facts, and conditions for its emerging.

**Playing method** /variance - playing game/. The students are put in a virtual situation, they are being asked to improvise its development. Thus, the students check out their attitude and possibilities for conduct in such situations.

M. Andreev (1), H. Longfellow (2), L. Tzvetanova-Churukova (3) are the authors of the *projects method* in our country. It is pointed out that in this method of education the students are included in working out of projects, connected with the school programme. Compulsory elements, which should be included in an ecology project, are clarified, as well as the steps for its implementation.

The *modeling method* is based on the theoretical achievements, of M. Andreev (1) S. Stamboliev (4) and others. Due to the wide specter of problems, its analysis is being specified, for example in the field of making and operating with sigh-symbolic, mathematical and other symbols.

That analysis, along with other surveys of Z. Kostova (5) end Zl. Vakleva/Hristova/ (6, 7, 8, 9, 10,11, 12) underlying theoretical model.

**Research targets**

- Working out and experimental check-up of a model of ecological education of students through biology teaching, using innovative technologies for realization of non-traditional methods of education – situational, playing, project and modeling;
- Approbation of the study and experimental results by conference participation, issuing articles, methodical guidelines, as well as helpful materials in working with such educational methods;
- Including both the working model and adjunctive methods for its implementation in biology education.

**Object** of study is the educational process of students in learning knowledge with environmental considerations in biology lessons.

**Subject** of our work is experimental study of methodical model with application of training methods – situational, playing, project and modeling in assimilation of ecological knowledge in biology lessons.

**Target groups** – students, teachers, pupils.

**Tasks to be performed**

Certain tasks will be implemented for the implementation of the above as follows: 1) Investigating the problem of ecology education - situational, playing, project and modeling; 2) Working out of methodical models and their application in biology lesson. Deductive materials will be prepared for purposes of this study; 3) Selection of a system of criteria for the evaluation of the results of the experiment; 4) Fulfilling a pedagogic experiment in different schools in the country; 5) Processing and analyses of the results; 6) Making experiment results popular; 7) Working out and issuing of materials the adoption in everyday practice.

The study will be done with the help of basic methods of pedagogic research: checking up sources, observation, questionnaires, interviewing, lectures, modeling, diagnostic and didactic terms, quantitative and qualitative analyses.

**Working hypotheses**:

1. Application of methods of education – situational, playing, project and modeling in the adoption of the biology programme will lead to: acquiring of great amount of
knowledge; formation of active thinking, as well as skills in taking decisions in model situations; it will increase the interest towards biology.

2. Popularizing of the methodical model and the results of experimenting will increase teachers interests in applying the methods at school.


**Expected results**
The project will enrich didactics with a newly worked out methodology for the implementation of non-traditional methods in ecology educational, technological decisions, and helpful materials for their inclusion in practice. It will renew the process of ecology education of the students though biology teaching. The students will participate in a more attractive and engaging teaching process, which will result in increasing the interest towards it. Forming of professional skills in students. Some variants will find their place in other spheres of education. It will provoke innovative and research activities of the teachers.

**Preliminary research to date**
1/ Theoretical studying on the problem out of different sources - scientific popular encyclopedic reference literature, Internet.
2/ Creating and experimental check-up of methodical methods for variant implementation of situational playing project and modeling methods separately in the lesson.
3/ Working out of criteria indexes and instruments for reporting of the results of the experiment.
4/ Interpretation of data reporting positive and negative features of the worked out model and the consequent changes in some of its components.

**Work plan** - preparatory steps are presented in table №1.

### Table 1. Workplan – preparatory steps

<table>
<thead>
<tr>
<th>№/ Stage</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Clarifying disputable moments and optimizing The model establishing of results. Mathematical and statistical processing and proving the efficacy. Making popular the model and the achievements of the study. Working out methodic to help the teachers in their everyday practice.</td>
</tr>
</tbody>
</table>
Presented a model of study, does not claim to completeness and presents a vision of the need for interactivity in the classroom.

REFERENCES