

TECHNIQUES OF ASSESSING KNOWLEDGE IN METHODS OF TEACHING BIOLOGY

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Abstract

The article gives insights into ongoing research with respect to techniques of assessing knowledge in methods of teaching biology. Finally, the developed measurement techniques help to assess the learning preconditions of future biology teachers. Thus, several types of assessing and controlling in methods of teaching biology have been discussed.

Keywords: assessment, biology, formative assessment, technique, method, student-centered assessment, embedded assessment, learner-centered assessment, classroom assessment, preliminary control, current control, periodic control, final control

I. INTRODUCTION

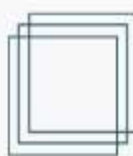
The methodology of teaching biology examines the content of the educational process in this subject and the patterns of assimilation of biological material by schoolchildren. The methodology is built in accordance with the goals and objectives of general education and upbringing, is based on the foundations of pedagogical science common for all school subjects, taking into account the specifics of the study of biology, considers the problems of theories of teaching and learning biology, considers the problems of theories of teaching and upbringing associated with teaching the subject "Biology".

The method of teaching biology is the science of the system of the process of teaching and upbringing, due to the characteristics of the school subject.

Science is a field of research aimed at obtaining new knowledge about objects and phenomena. Science includes knowledge about the subject of study, its main task is to know it more fully and deeper. The main function of science is research. The subject of the study of the methods of teaching biology is the theory and practice of teaching, upbringing and development of students in this subject.

The methodology as a science is faced with the task of identifying the regularities of the process of teaching biology in order to further improve it, increase the effectiveness of training students as highly conscious, comprehensive development of students in this subject.

Systematic control of students' knowledge and skills is an important part of learning. Methods of control or testing of knowledge and skills are closely related to the methods of all other links of the educational process: methods of presentation of educational material, consolidation and repetition, generalization and systematization of



knowledge. The purpose of the control is to check, determine how the passed material has been mastered by an individual student and the whole class, to find out the quality of knowledge, skills and abilities. Such verification is an integral part, an important component of the learning process. Control over the quality of student achievement in the educational process is one of the important means of increasing the effectiveness of teaching biology. Systematic information about the state of knowledge and skills of students allows the teacher to quickly use rational methods and means of teaching, accurately and correctly manage the educational process, anticipate its logic, and predict the results of knowledge assimilation.

In addition, there are several types of assessment that can be used to describe the understanding of the learner, informs teaching practice, and is embedded in the classroom: “Formative assessment,” “student-centered assessment,” “embedded assessment,” “learner-centered assessment,” and “classroom assessment”.

II. LITERATURE REVIEW

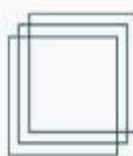
If we analyze some biology scientists' feedback about assessing knowledge in methods of teaching biology, for example, Seidel et al. (2011) investigate teachers' perception of classroom situations.

Exactly, classroom conditions are presented in the form of video vignettes and teachers are asked to analyze them. In this study, rather general criteria (as opposed to subject-matter specific criteria) are used, such as e.g. the difference between describing and explaining a classroom situation. The distinction, however, is well taken. It is relevant for item development in the study presented here.

Scientists Goodwin and Sherin (The concept of professional perception) states that the mere description of a lesson puts lower requirements on a teacher than explaining and predicting. This aspect of analysing a lesson is taken into account in ExMo for the development of tasks and code manuals as well.

According to Baer et al. teacher trainees' knowledge about important aspects of planning a lesson. The focus of their research is the teacher trainee's knowledge of main concepts, for example, knowledge of teaching methods and curricula. The degree of specificity, however, required for answering the items, is very general. The teacher trainees, for example, can solve an item by simply stating that it is important to plan longer teaching units (as opposed to individual lessons) and that it is important to make choices against the background of their knowledge of curricula.

Thus, famous scientist Dübbelde examines diagnostic competencies of biology teacher trainees concerning the domain of knowledge acquisition. The project aims at developing a test instrument with closed task types for status and process diagnostic competencies. Among other things, it is recorded how far biology teacher trainees assess students' outlines and work processes when experimenting with the help of given assessment criteria. Dübbelde continues a partly identical purpose as we do



within ExMo regarding assessment competencies. In her test instrument teacher trainees are given, for example, a worksheet filled out by two students to document the steps of their experiment. The teacher trainees are asked to estimate the students' outcomes with regard to the given measurement. For each criterion, the teacher trainees have to choose one of three (or four) alternative answers. For instance, they have to assess or the students' hypothesis is related to the research question by ticking off "yes", "no" or "don't know".

The test instrument used in Dübbelde includes comparable criteria pertaining to experimentation as the ExMo test instrument. In ExMo, however, it is of central interest to find out to what extent the teacher trainees know (and activate on their own) criteria with respect to experimentation, typical prejudices, and difficulties students have when experimenting. In addition, we are interested in knowing to what level teacher students are able to independently utilize these for the evaluation of student's accomplishments. For a differentiated evaluation of the teacher trainees' assessment competencies open tasks are used in ExMo. The tasks depict students' performance in experimenting and then ask the teacher trainees to assess either the formation of hypotheses, planning of experiments, or data analysis. For this, the teacher trainees have to be aware of the criteria and apply them correctly and in a sophisticated manner.

III. ANALYSIS AND DISCUSSION

Assessing and recording knowledge is an important aspect of any biology lesson. Therefore, assessing must be organized in such a way that it activates the cognitive activity of each student, allows student to independently operate with the learned educational material.

Verification requires very large labor costs from the teacher and attention. Its effectiveness increases depending on the variety of methodological techniques that provide both repetition of previously studied and explanation, consolidation of new material through various types of independent work. Conscious assimilation of new content should be logically connected with previously acquired knowledge, as well as with life observations and experience of the student. Over the years, teachers have accumulated a wealth of experience in testing knowledge and skills, which, unfortunately, has not yet found a proper generalization in the methods of teaching biology, although there is a certain classification of forms of control. (Table 1.)

Considered in the recent past as a universal methodological method - testing knowledge by asking questions that require detailed and detailed answers from the student, is now far from the only one. In the classroom, teachers often use verbal, visual and practical methods of controlling knowledge and skills. For example, the following forms of knowledge accounting can be cited:

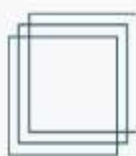


Table 1. Techniques and form of control of students' knowledge in biology

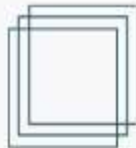
Highlighted feature	Techniques and form of knowledge control
The quantitative composition of the students	Individual (personal), group, frontal, class-generalizing checks
Features of the organization of student activities and teacher guidance	Written, oral test, workshop, role play, role play, work, home independent practical work
Technology and nature of the image	Graphic, programmed, automatic checks, testing
Check intensity	Test, condensed survey, combined control
The level of cognitive independence of students	Reproductive work, independent work on an assignment, independent practical research

These techniques and form of knowledge testing revitalize the lesson, make knowledge control non-standard, interesting and, as a result, activate the educational process. The most common form of control is considered to be an oral test of knowledge. It makes it possible to check each student, therefore it is called an individual survey. The student's oral answer can be accompanied by showing natural objects, tables, models, sketching diagrams, setting up experiments. It is important to revitalize the entire class so that the verbal review does not have a "one student" character. Schoolchildren can supplement, correct mistakes, ask additional questions on the topic of the oral answer, evaluate the knowledge of a friend. The teacher can reveal not only the volume and level of assimilation of the material, but also the student's ability to build a coherent story, analyze, classify facts, and give examples from personal observations. Questions for oral verification must be formulated so that they are understandable and feasible for the student, prompting him to a detailed story, and not to a monosyllabic answer.

A frontal oral check (or a cursory survey) differs from an individual one in its brevity, it comes down to answering a series of consecutive questions. As a rule, this form activates children, the teacher can "raise" from their place poorly and moderately performing.

Condensed questioning essentially differs from the traditional oral check in high efficiency and intensity. The questions asked to the students should be understandable so that they do not have to be further explained. Some students take turns answering at the blackboard, using tables, models, drawing on the blackboard, others answer from the spot, supplement, correct mistakes, and still others do written work.

Written work is often used to test knowledge of biology. Its results objectively indicate the level of mastering the material, the correctness and completeness of the formed knowledge, as well as the nature of cognitive activity and the effectiveness of training.



With the help of written work for 10-15 minutes, you can test the knowledge of a large number of students.

However, when preparing a written work, we should remember about the accuracy of questions and tasks that do not require detailed descriptions and characteristics.

There are four types of knowledge control, preliminary, current, periodic and final (final). They are distinguished depending on their location and purpose in the educational process. The fact is that in didactics and teaching methods, testing the success of learning is considered as a stage of cognitive activity, when the teacher has every reason to control the development of the studied material in students (B.P. Esipov)

Therefore, this or that type of control of knowledge and skills actually represents a cut of the qualitative achievements of students in the educational process by a given time, at this stage of mastering the content of education. The larger the gap between the slices, the more material is included in the check.

The teacher chooses the types and methods of testing knowledge, abilities and skills depending on the content of the academic subject, specific educational tasks of the lesson, topic, section and course.

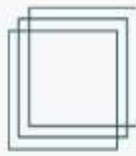
The task of the teacher is to take measures to eliminate them on the basis of the revealed shortcomings in the achievements of students, while improving their pedagogical skills, since a large share of success in learning depends on the teacher's activities.

IV. CONCLUSION

In the final analysis, we stop following conclusion: assessment of knowledge is given not only when controlling the studied content, but also when presenting new material. The teacher, presenting new material, asks questions, asks to explain the observed phenomena, to reveal the causes or effects. Pupils compare certain properties of living objects, participate in the explanation of some facts. At the same time, the teacher checks how the children use the previously acquired knowledge and skills, in what form they present their answers. Using techniques of assessing knowledge in methods of teaching biology is very important instrument in teaching biology.

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