FORMATION OF SELF-ANALYSIS SKILLS DURING USING CRITICAL THINKING STRATEGIES IN LEARNING

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Abstract*. The main goals of this research are developing self-analysis skills through the using of critical thinking strategies in learning. The article presents the importance of self-analysis and the impact of reflection on the planning of further educational activities, managing education through the use of strategy data. The main critical thinking strategies are listed, special tools are identified and developed that are applicable in the study of an advanced biology course. A self-analysis table has been make, in accordance with the development of certain skills and abilities necessary for studying an advanced biology course and preparing for formative, summative assessments and an international exam.*
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Introduction. The main idea and goal of our research is the formation of the self-analysis skill in high grade students. Students need to analysis their own activities and results during the lessons. Critical thinking skills in learning can contribute the development of reflection skills. The students analyzes his previous experience, plans, corrects their activities. Strategies for the development of critical thinking were identified as a tool for developing the skill of introspection.

The choice of the direction of our research is directly related to the problems that arose during the teaching of high grade classes during distance learning. Students choose core subjects in grade 11. These subjects are studied in depth and in English. All students must be motivated to study the subject and prepare for the exam diligently, the results of which will give them the opportunity to enter good higher education university. A detailed analysis of the student's formative and summative assessments shows that they do not make conclusions after completing the formative work. Many students make the same mistakes. Together with the students, we came to the conclusion that they do not analyze their mistakes, they just fix their errors, but do not make reflection about why they make certain mistakes, and how to prevent them in the future.

Therefore, we decided to research this problem and select tools as a strategy for critical thinking which allows to form and develop the skill of introspection in high school students. Self-reflection can be recognized as a process that gives students the opportunity to stop and reflect on what happened during the learning process [1, p. 132].

As with any research, the work began with consultation with colleagues and study of the literature Agran, M., Wehmeyer, M. L., Cavin, M., & Palmer, S. «Promoting student active classroom participation skills through instruction to promote self-regulated learning and self-determination», Belenkova Y.S., "Teaching metacognitive skills and methods for assessing their development", Kathryn Price «The Effects of Self-Assessment on Academic Performance», A. Belobrovy "Theories on Self-Reflection in Education", Magdeleine D. N. Lew, Henk G. Schmidt "Self-reflection and academic performance: is there a relationship?".

Effective strategies for critical thinking in learning should include such as:

- reflective questions and motivation;
- "metacognitive forests";
- modeling;
- questions for yourself;
- thinking out loud and explaining to yourself;
- self-assessment;
- graphs, drawings, diagrams, etc. [2, 208 p.]

Using the technology of critical thinking in the classroom, we develop a person's ability to question incoming information, including their own beliefs. We selected critical thinking strategies aimed for developing introspection skills in our students. Studying these literary sources helped us to clearly formulate the topic and questions for study. How to develop students' self-analysis skills through the application of critical thinking strategies?

Research results. Together with students we created the self-analysis application form during assessment their papers by each topic. We included some following chapters:

1) Knowing and understanding − questions are aimed at determining the level of knowledge and understanding of content, terms, keywords, quality of assignments;

2) Language competencies − the subject (biology in our occasion) is studied in English, this item was included in the questionnaire, as there were problems with spelling, use of incorrect terms, misunderstanding of tasks, in some cases, not studied synonyms of terms were used;

3) Calculations − this item refers to tasks related to any mathematical calculations that are found in laboratory and practical work, when studying topics such as: "Linear cell enlargement", "Statistical processing methods: T-test, Chi-square, The Simpson Diversity Index", "Volume to Surface Area Ratio". Students often make mistakes in calculations, they do not correctly round off, they do not use units of measurement correctly;

4) The results analysis − it is used when performing laboratory, practical work, which corresponds to the third component of the external exam. Creation of graphs, execution of drawings, interpretation of the results obtained in a practical way;

5) Other − this paragraph indicates the individual characteristics of students, not attentiveness, the pace of work of students, etc.

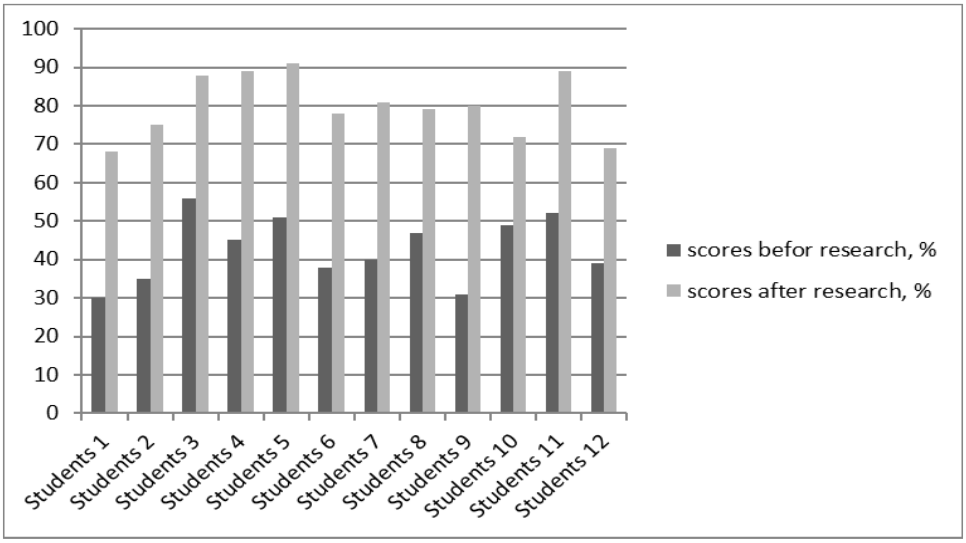
Table 1. Self-assessment sheet

Reason for losing scores		The number scores lost by this reason	Total scores lost
Knowledge and understanding of content			
Didn't remember the facts			
Didn't understand the topic			
Misunderstood the meaning of terms / keywords			
The assignments did not provide enough information			
A lot of conflicting information was given in the assignments			
Other			
		Total	
Language competencies			
Incorrect key terms			
Incorrect / incomprehensible command words (describe, explain, compare)			
Correct wording of questions in English	Spelling		
	Punctuation		
	Grammar		
	Use of terminology		
Other			
		Total	
Calculations			
Chose the wrong equation			
Used wrong values / numbers			
Used the correct values / numbers, but made a calculation error			
Didn't use units / incorrect units			
Other			
		Total	
Analysis of results			
Can't describe the trend, the ratio			
Did not use values and numbers in the description of the results			
Unable to use data for forecasting / not enough data			
Wrong axes when plotting / used wrong ruler / weights			
When drawing / plotting, I used broken / indistinct lines / line of the best fit			
		Total	
Other			
Skipped the question			
Not enough time to complete assignments			
Didn't read the assignment carefully			
Other			
		Total	
		General	
The main reason why I lost points in my work was because….			
To avoid similar mistakes in the future, I need to (repeat / study / use)….			

In addition to the introspection sheet, we used a strategy like "Collaboration and reflection". During distance learning, this strategy was carried out using Microsoft Teams. Group reflection involves joint work on mistakes. Each of the groups worked in their own channels and analyzed the proven work with an indication of the number of points scored. First, the answers are read out with the lowest number of scores, after the student with the maximum number of scores read out his answer. Students discuss and supplement each other's answers, thereby peer learning and structuring their knowledge.

Thus, there is an equal dialogue student-student, student-teacher. This process Maslow described as the joint acquirement of knowledge and involvement in the process of "exchange of thoughts" [3, 139 p.].

The study was conducted over six months. The percentage of completing formative, summative and mock examination tests has significantly increased in the process of using these two tools for analyzing one's own activities. The data is displayed in graph 1.



Graph 1. The results of summative assessment before and at the end of the research

Conclusions. These indicators not only reflect the results of the development of self-analysis skills. It should be noted that most students appreciate this experience and note that it is easier to analyze their activities and build strategies to solve certain problems associated with the educational process, in the framework of studying other subjects.

There were several typical introverts students in our classes. We assumed that this activity would increase the motivation of them and that students can involve a team work. But it was difficult to involve them in group work. They entered into dialogue with difficulty and reluctance. We also associate this with the limiting possibilities of distance learning. In the future, we plan to hold a consultation with a school psychologist and a more detailed study of the students diagnostic cards.

In the future, we are going to expand the applied methods and strategies of critical thinking for the development of metacognition. We were interested in some aspects of this direction when we were studying literary sources. Each person, including the student, determines the starting point, determines the goals, objectives and ways to achieve their needs only by realizing their capabilities [4, 512 p.]. Students can achieve the highest level of self-regulation because the assimilation of a certain material in educational activity begins from the creative transformation of the study material [5, p. 302].

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