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Research Article

THE EFFECTIVENESS OF DEVELOPING STUDENTS' CREATIVE THINKING IN TEACHING BIOLOGICAL SCIENCES

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ABSTRACT

This article discusses contemporary approaches to developing students' creative thinking in teaching biological sciences.

KEYWORDS

Students, creativity, innovation, thought, scientific research, activity, task, analysis, lesson, research, experience, tool, method, idea, experiment.

INTRODUCTION

There is a growing interest in using innovative technologies, interactive methods, and pedagogical and information technologies for teaching in the current education process. One of the reasons for this is that traditional education has focused on simply imparting prepared knowledge to students.

On the other hand, modern technologies enable students to independently search for and analyze the knowledge they acquire, and even present their own conclusions. In this process, the teacher creates conditions for the personal development, formation, acquisition of knowledge, and upbringing of the students, while also fulfilling the roles of management and guidance.

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It should be emphasized that even in higher education institutions, qualities such as curiosity, creativity, and inventiveness are not always considered to be of high importance to students. However, in shaping the students' ability for creative thinking, it is crucial to consider these aspects in the pedagogical process. Specifically, in order to effectively develop the skill of creative thinking, attention is paid to the inclusion of necessary verbs in questions that stimulate students' thinking. For example, if this situation is illustrated with examples, the monitoring question "Define the relationship between single-celled and multicellular organisms" does not promote creativity in students. In contrast, the phrase "define" in the question content is equivalent to saying "simply state your existing knowledge." Utilizing words (verbs) in monitoring questions that encourage students to think facilitates their creative thinking. Therefore, in developing creative qualities in individuals, it is appropriate for educators to use various words (verbs) that require diverse, non-traditional, and well-thought responses. For example: "discover the connection," "create," "predict," "logically explain the idea," and "imagine." The use of such words (verbs) in monitoring questions proves to be effective in practical terms.[1].

The manifestation of activity in creating goals that contribute to the development of personal qualities for creative thinking, as well as actively utilizing effective pedagogical achievements and experiences, and engaging in the exchange of ideas with peers, demonstrates the student's ability to shape their professional activities in the future [2]. Creative thinking is the ability to find innovative (new, novel, original, non-standard, extraordinary, etc.) and effective (practical, result-oriented, progressive, optimal, etc.) solutions, to generate goals aimed at acquiring new knowledge, and to express the imagination in an impactful way in the process of creating, evaluating, and improving.

In teaching biological sciences, methods aimed at enhancing students' creativity are considered one of the important innovations in the field of biology education today. This is because students' possession of creative thinking qualities assists them in creating new goals that differ from traditional approaches, fostering a mindset that is non-conformist, unique, and proactive in organizing their learning and upbringing processes.

If you look around, you will come across countless examples of human creativity and ingenuity in every direction: electronic services, virtual reality, square watermelons, soilless cultivation, and several other examples. All of these are products of human imagination and thinking. What was once merely a figment of the imagination and a dream for us, such as ordinary everyday objects like books, music, buildings, airplanes, and even light bulbs, eventually became a reality through the power of human intellect and innovation.

Innovations create convenience in our daily lives, making our tasks easier and shrinking distances. In this way, creativity is closely tied to the progress of development. There is a great demand

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for creative thinkers in all fields. Every day, renowned software companies and mobile phone manufacturers ask for new ideas from their specialized professionals. As the demand for creative thinkers increases in the labor market, shaping and developing students' creative thinking skills becomes crucial in the educational process. It is important to note that, up to now, many teaching approaches and methods have focused on analysis and repetition rather than fostering creative thinking, which involves understanding and delivering information accurately, synthesizing multiple sources of information, and drawing conclusions[3].

Creativity is considered an essential aspect of human thinking and a fundamental part of one's inner world. It is not solely based on the accumulation of knowledge that an individual possesses but rather manifests in the generation of new ideas, challenging and transforming established stereotypes, and finding innovative solutions to real-life problems. In other words, creativity cannot be achieved through mere repetition of given knowledge; it requires the emergence of new thoughts and ideas in the process of creative thinking. For instance, even if you memorize words and grammar rules in English, if you cannot write an essay, it is all in vain. Therefore, imagination plays a crucial role in the process of creative thinking. Albert Einstein emphasized the significance of imagination in science when he said, "Imagination is more important than knowledge." Often, unconventional ideas and solutions emerge from the realm of imagination. Thus, it is essential to nurture and encourage a mindset that values uniqueness and creativity in the thinking process.

Thomas Edison said, "Creativity is an extraordinary process." However, every day, many professionals feel the need to find essential solutions to problems. Can they deliberately harness this extraordinary process? Naturally, there is no "magic wand" that brings forth new ideas, but there are various methods that can assist experts in their creative thinking. For this, allocating time for creative thinking and developing creative skills are necessary. Creative thinking helps us find essential solutions to problems. According to PISA research, evaluating students' creative thinking is based on a model that involves solving scientific or social problems and requires expressing their own ideas in written or visual form [4].

It is important to emphasize once again that qualities such as curiosity, creativity, and inventiveness are not always considered highly valued traits at elementary schools, even in higher grades. However, in the pedagogical process, shaping the ability for creative thinking in students and young learners is of great importance, taking into account these aspects. In particular, teachers pay attention to the inclusion of necessary verbs in the form of thought-provoking questions to develop the skill of creative thinking in students. For example, if this situation is illustrated with examples, the monitoring question "Define the relationship between single-celled and multicellular organisms" does not promote creativity in students. In contrast, the phrase "define" in the

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question content is equivalent to saying "simply state your existing knowledge" [2].

In natural science education, giving assignments related to creative thinking is significant in expanding students' imagination, enhancing their thinking ability, and engaging their attention. In this regard, apart from tasks such as labeling, drawing, and illustrating various essential drawings related to biology, it is also possible to create intriguing questions. For example, "Draw a picture of a nonexistent animal in the world," "Imagine yourself as a specific flower or tree and draw its picture. Why did you choose that particular flower?", "Describe your sensation while being inside a bubble and write it down." or "Write your imagination while being one-day-living-butterfly." Assignments like these are aimed at achieving the goal of fostering creativity.

It is important to note that such creative assignments play a significant role in engaging students in their learning activities, increasing their motivation, directing them towards independent and creative learning, organizing tasks in a systematic manner, ensuring continuity, and implementing effective supervision and monitoring.

• In teaching biology subjects, innovative methods aimed at developing students' creative thinking, such as diagnosis, empathic imagination method, and evidence-based methods, are considered important pedagogical approaches in enhancing traditional education. These methods contribute to fostering students' creative abilities, addressing pedagogical challenges, conducting scientific research or projects, and promoting collaborative creativity. As an example, let's consider the following assignment.

• 1.2. Creative assignment: Why? For what reason? Use the words and come up with 10 questions about an amoeba.

• 1.3. Assignment: Fill in the table using theoretical materials.

• 1.4. Creative assignment: Reflect on what happens if all the flagellatesdisappear. (Method of identification)

• 1.5. Creative assignment: Reflect on what happens if all the insects disappear. (Method of identification)

• 1.6. Creative assignment: Write a short essay from the perspective of anOdonata. (Empathic imagination method)

• 1.7. Assignment: Define Mitesas "Dangerous Criminals" (Using the evidence-based method)

As seen from the examples given above, these assignments are carried out with great interest by students.

As mentioned above, creating pedagogical conditions is crucial for enhancing students' research activities. During the lesson, students are encouraged to express their ideas, provide evidence and justifications, engage in mutual questioning and answering, utilize methods to enhance knowledge and experience, identify gaps in understanding, and delve deeper into subjects that require in-depth comprehension.

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Research findings demonstrate that using creative assignments aimed at fostering students' creative thinking contributes to the organization of the learning process, the effectiveness of activities beyond the classroom, and the development of students' research skills and activities towards specific goals. It helps to increase students' curiosity in acquiring knowledge and directs them toward achieving better results.

All in all, incorporating activities that stimulate students' thinking during the teaching of natural sciences is considered one of the current requirements in the educational process.

REFERENCES

1. Elmuratova D., Misirova N. Pedagogical competence and creative education. Study guide. - Gulistan, 2021 (Pedagogical Competence and Foundations of Creativity. Teaching Handbook - Guliston, 2021.)
2. Amirov Nurbek Islamovich. "Problems and effective ways of developing creativity qualities in educators." Journal of Higher Education, 2019.
3. M. Usmonboeva, associate professor of the network center at TDPU, senior teacher A. Toraev. Teaching-methodological manual for the module "Basics of creative pedagogy", 2016. (Teaching Methodology Handbook on the Module "Foundations of Creative Pedagogy" by TSPU Network Center, 2016.)
4. Internet sources.