

# Improving the academic language of students in biology through the application of supporting strategies (scaffolding)

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## **Аннотация**

*При изучении биологии на иностранном языке учащиеся испытывают различные сложности. Для развития академического языка у учащихся необходимо оказать помощь и поддержку учащимся в обучении. Было решено провести исследование, чтобы выяснить, смогут ли поддерживающие стратегии (скаффолдинг) разного уровня в рамках образовательной технологии CLIL помочь учащимся развить академический язык по биологии.*

## **Abstract**

*In the study of biology, foreign language students have various difficulties. To develop the academic language in students, it is necessary to provide assistance and support to students in learning. It was decided to conduct a study to find out whether supportive strategies (scaffolding) at different levels within the CLIL educational technology can help students develop an academic language in biology.*

**Ключевые слова:** академический язык, скаффолдинг, поддерживающие стратегии, технология CLIL.

**Key words:** academic language, scaffolding, supportive strategies, CLIL approach.

The upbringing and training of the younger generation for the formation of a multicultural and multilingual personality is one of the foremost tasks of a modern teacher. In the modern world, the study of natural and mathematical disciplines (including biology) in English is fundamental in understanding a person in relation to the outside world. Educational technology CLIL (Content and Language Integrated Learning) is actively used everywhere by teachers from all over the world to integrate the study of a discipline through a foreign language, as well as the study of a foreign language through a taught subject.

According to O. Meyer (2010), one of the strategies that is necessary for the implementation of CLIL technology is a scaffolding strategy, which covers all 4 CLIL components (content, communication, cognitive thinking, culture).

The approach of CLIL is very flexible, having many strategies, but at the same time, having an exact concept of studying the subject and the language inextricably from each other, while covering the content of the subject, developing communication skills between participants in the educational process, developing the cognitive skills of students in the subject (using problem situations, high-order questions, etc.), as well as penetrating into the culture of the foreign language being studied.

In the process of using CLIL technology, subject teachers need to maintain a balance between the content and the language used, to organize training correctly so that students with a weak knowledge of a foreign language can freely study the subject, work with interest in groups without experiencing a barrier.

## **Methodology**

In our research, we focused on the use of supportive strategies (scaffolding) to develop an academic language in biology in high school.

### **Research Question**

How supportive strategies in CLIL technology can help develop academic the language of biology students?

### **Research Methods**

The study was conducted at the Nazarbayev Intellectual School of the Physics and Mathematics School in Taraz. Qualitative and quantitative methods were used. The study was carried out by the teacher and moderator of biology K.A. Lishanlayeva with the participation of 14 students of the 12th grade.

In preparation for the study, the teacher analyzed literary sources in the field of teaching the subject in a bilingual direction, especially the use of supportive strategies (scaffolding) in the classroom when studying the subject in a non-native language.

To provide comprehensive assistance to students, the main directions for the development of scaffolding strategies were identified: content support, language support, assessment support.

As part of a better understanding of the content in the academic language, the lessons were applied such support techniques as:

1. Working with terms: introduction of a daily glossary, mini-games ("Vocabulary football", "Find a pair", "Anthill", etc.), terminology tests, competitions.
2. Resource adaptation: be it text or electronic, identify key terms, include synonyms, L1 support, check source safety, include illustrations, organize the study of complex diagrams from simple to complex, etc.
3. Organize audio and video support in moderation: they should be functional, short, explanation in clear and simple language, include subtitles and transcripts, prepare clarifying questions about the video, choose an average pace of presentation of information.

Various techniques were used to organize language support, such as:

1. Using a functional language.
2. Possibility of including Soft CLIL for weak students.
3. Increase gradually the number of new terms and phrases, associate terms with different contexts and spheres.
4. Increase the Student-Talking Time (STT), decrease the Teacher Talking Time (TTT).
5. Use non-standard, high-order questions.

To develop student assessment skills, use:

1. Algorithm for self-assessment (for weak learners).
2. Prepare the "bank" of phrases for oral assessment of group work.
3. Respectful mutual peer-assessment in pairs, groups.
4. Ability to give feedback by the students themselves to each other.

### **Data collection**

During the academic year, the teacher adapted various supportive strategies, the amount of scaffolding used in the lesson depended on the needs of the students, on the level of complexity of the learning goals, the language goals of the lessons. Also, a differentiated approach to teaching made it possible to expand support tools both in the study of the material and in the assessment of student achievements. In the lesson, the teacher made observations during the training, where the involvement of students, the time for completing assignments, the development of communication and leadership qualities were noted. In addition, regular reflection from students on the results of the implementation of certain supporting strategies made it possible to evaluate the effectiveness of the introduced stage in the classroom.

Assessment for teaching was analyzed on the basis of students' oral and written work.

The assessment of the academic achievements of each student was based on the results of the summative assessment of each quarter, as well as the results of the Mock works carried out on the three components of the external summative assessment.

Supporting strategies in the classroom (in the study of content, the development of language competencies, as well as the development of self-assessment skills), together with the developed strategies for working with A-level assignments (developed by the teacher Lishanlayeva K.), as well as the development of self-regulation skills, contributed to comprehensive effective teaching and monitoring of student achievement.

In the course of the investigation, a survey and interview with students were conducted. The survey results were analyzed and the interview data helped us to establish the role of supportive strategies in the study of biology in academic English.

The study was conducted in strict accordance with all ethical principles and standards. Students took part in the study voluntarily and could terminate their participation at any time. The names of the study participants are not disclosed and confidential.

### **Data analysis**

In general, the results of the study showed that students in grade 12 improved their skills, increased academic performance in the subject of biology. It should also be noted that many students became more confident, self-efficacy increased during training. Working with authentic sources was more productive, language competence of students who had difficulties in teaching biology in English improved. It was noted that strategies for working with new material, A-level tasks, and the use of scaffolding at any stage of the lesson contributed to more focused learning in the same way both in the classroom and in extracurricular activities.

A more detailed analysis showed that 95% of students easily understand the instructions for assignments, the execution of multilevel assignments in the lesson was easier using supportive strategies in more than 92% of students. The ability to use scaffolding allowed students to organize their learning activities more effectively 96% of the time. The use of algorithms, various support methods in the classroom reduced the barrier for students to study the learning goals of a more advanced level already in the first quarter. More than 96% of students were able to improve their academic performance as a result of summative assessment. The results of the final summative assessment showed that 9 students received A\* (64%), 3 students received grade A (22%), and only 2 students received B (14%).

### **Reporting Findings**

The results of the research have shown that supportive strategies (scaffolding) should be implemented at all stages of the lesson to help students. Studying biology in English, student progress in academic achievement is based on the free, accessible use of any authentic material. Grade 12 students noted that support in the study of complex and in-depth material, the application and improvement of language skills, the use of effective self-assessment of their achievements contributed to an increase in academic performance, improved communication and leadership skills.

In addition, the tension and the barrier in weak students were removed, students with different levels of self-efficacy could complete tasks of an increased level of complexity, were able to build their own algorithm in educational activities.

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