How the implementation of the IBL method in the second grade of high school can help my students to overcame the fear of experimenting on physics lessons.

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Abstract.
Students with special educational needs in secondary schools often find it difficult to carry out actions during experiments in physics lessons. These difficulties are sometimes related to a lack of manual dexterity, a reluctance to touch objects or a feeling of alienation during the pandemonium. To demonstrate the use of the IBL method as a support for overcoming anxiety when carrying out experiments.

Introduction

Lack of practice in manual activities, courage to take action, and "breaking the ice" in group work - result in little educational success in effective experimentation and experimentation. Is it an increasing level of school stress when having to undertake independent activities in the lesson? In April 2019, the online portal "Health Service" published the article "School stress - non-stressful suffering of children" school stress is a result of the increasing pace of life, growing expectations and demands, as well as an overabundance of information and tasks, which increasingly results in so-called 'student burnout' [1]. For this, students chose the Inquiry-Based Learning method, which was applied to the topic "Melting and solidification." This is an inclusive class with a core curriculum in physics, and the pupils were asked the problem question, "How did the Titanic sink?"

Theoretical framework, research and research questions, original aspects

Inquire Based Learning (IBL) is inquiry-based learning; it is more student-centered. The idea is for students to actively and thoroughly analyze a situation or problem, depending on the different information available. During inquiry-based learning, students use their thinking skills to summarise or draw conclusions, and thus actively participate in shaping forms of 'knowledge' that become meaningful to them." [2]

The work cycle of inquiry-based learning consists of several stages:
1. Setting the scene and generating ideas → 2. Formulating an inquiry question → 3. Put forward hypotheses/predictions → 4. Planning investigation → 5.Carrying out the investigation → 6. Data analysis → 7. Draw conclusions → 8. Sharing the results → 9. Developing the problem → 1… Each stage of the IBL cycle is characterized by specific time requirements, its own dynamics, and principles of group management. [3]

By analyzing the structure of the IBL cycle, I wanted to explore "How the implementation of the IBL method in the second grade of high school can help my students to overcome the fear of experimenting in physics lessons?" Can it be a good teaching tool for this class team?

Methods and findings

In a physics lesson, a short trailer for the film Titanic was presented to pupils to celebrate its 25th anniversary as a blockbuster movie. Sixteen-year-old pupils were presented with the problem question 'How did the Titanic sink?' in the lesson, along with a set of various research tools, such as a stopwatch, tape measures, magnifying glasses, hammers, lasers as well as an ice ball, hot and cold water. The students planned the investigation and the instruments used in it themselves. The aim of the student groups was to investigate the ice ball, record their observations, and present their findings to the class with the support of large format posters - working time - 45 minutes.

Students took a questionnaire before and after the lesson measuring their stress levels in the lesson with the physics experiments, completed a self-assessment, and gave a 'supportive evaluation' to a designated group.

The fifteen students who participated in the survey were grade 2 high school. One of the questions: Did doing experiments on your own in class make you feel anxious? (Rate on a scale from 1 to 5, where 1- not at all, 5 - very much) - Fig.1 Before and after the IBL lesson.

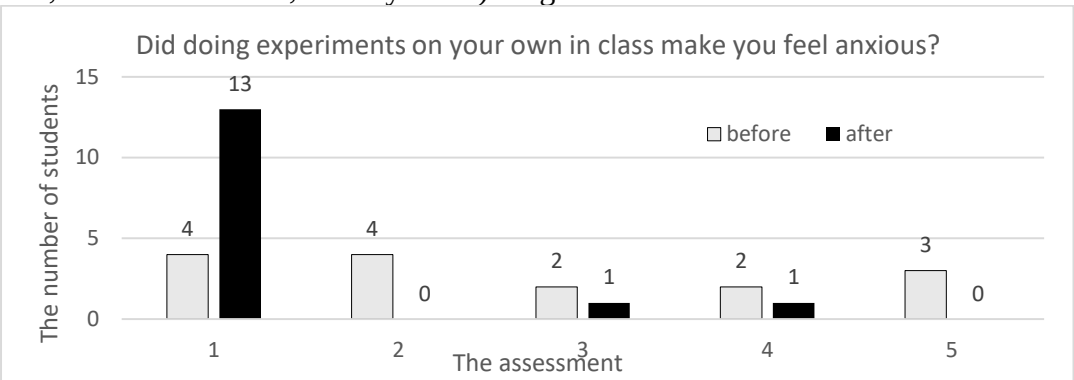

Fig.1 Before and after the IBL lesson

Question No 3: To what extent do the independent experiments used in the physics lesson make it easier to remember the lesson content? (Rate on a scale of 1 to 5, where 1- not at all, 5 - very much) Tab. 1 and question No. 4: To what extent do the independent experiments used in physics lessons reduce stress in the lesson? (Rate on a scale from 1 to 5, where 1- not at all, 5 - very much) Tab. 2

Tab. 1 Question No 3

Assessment	Number of students
3	3
4	6
5	6

Tab. 2 Question No 4

Assessment	Number of students
3	1
4	7
5	7

Conclusion

During the physics lesson conducted using the IBL method, the second-year high school students were very involved in the process set in the lesson. They worked as a group, shared observations, engaged in various activities, and collaboratively prepared a poster for presentation. The students were joyful and happy and at the same time kept an eye on all stages of the project, which had not happened before in this team. A teacher observing the lesson said "this is not the same class". Analysing the questionnaire data, it can be seen that the pupils identify the level of stress with the amount of knowledge gained and satisfaction with their own work as well as the achievement of the objective of the task. The IBL method in the second year of an inclusive secondary school helped my shy and inactive students overcome their fear of experimenting in physics lessons.

References

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