

## How IBL Method Affected Classes in Physics Lessons Students Were Not Interested in?

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**Abstract:** Physics is a hard but important subject at school. A lot of students think that it is not necessary to learn it. That's why two years ago I started an IBL innovation in one of my two physics classes, consisting of students aged 12–13. In school year 2018/2019 I studied how the IBL method affected the classes in physics lessons students weren't interested in. Two classes took part in the study: I – a class in which IBL method was implemented (23 students), and II – a class taught in the traditional way of education (21 students). In all classes behavioural and specific problems had been detected from time to time. My study started from a pre-test. All groups obtained very similar results: I – 54%, II – 55%, III – 53% on average. During my PI I recorded my lessons and took observational notes. Students worked with worksheets prepared by myself. I had about five lessons per month leading by IBL method.

**Key words:** IBL method, physics lessons, creative learning, community for science, spread education

### 1. Introduction: IBL Method in Physics Lessons

Physics lessons are associated with boring lecture, difficult formulas and incomprehensible calculations, but does it really have to be so? There is only one way to learn — through action (inquiry) as Paulo Coelho said.

Teaching physics can be more effective and this can be achieved by strengthening or releasing in students the natural need to explore and change their environment. By acting on their own, with the teacher's stimulation. The students discover the laws of nature and the beauty of the surrounding world. This is undoubtedly the case with the IBL teaching method, which has a flexible approach to teaching. Pupils, through their own work and of course teamwork, solve the solution of physical problems — learning about processes, understanding their mechanisms and formulating the laws of nature. This is carried out on a programmatic basis, but by focusing their attention on the problem under consideration and by integrating the subject of science, mathematics and technology.

During working with IBL method, students acquire problem-solving skills, learn critical thinking and at the same time, through teamwork develop communication skills. Furthermore, they master and develop complex skills, technical, mathematical and measurement skills. They pose questions that enable them to solve a problem posed by the teacher or perceived by themselves. They observe phenomena, collect experimental data and analyse them draw conclusions and share the results of their work. Asking questions and thinking freely in group work

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highlights the student's individuality as a person, but also "opens" the mind, stimulates creativity and builds self-confidence. All this results in an increase in self-awareness and interest in natural objects their "liking".

## 2. My Research Lead by IBL Method in Physics Lessons

I started an IBL innovation in one of my two physics classes, consisting of students aged 12–13. In school year 2018/2019 I studied how the IBL method affected the classes in physics lessons students weren't interested in. Two classes took part in the study: I — a class in which IBL method was implemented (23 students), and II — a class taught in the traditional way of education (21 students). I documented my observation by recording films, preparing work sheets, questionnaires.

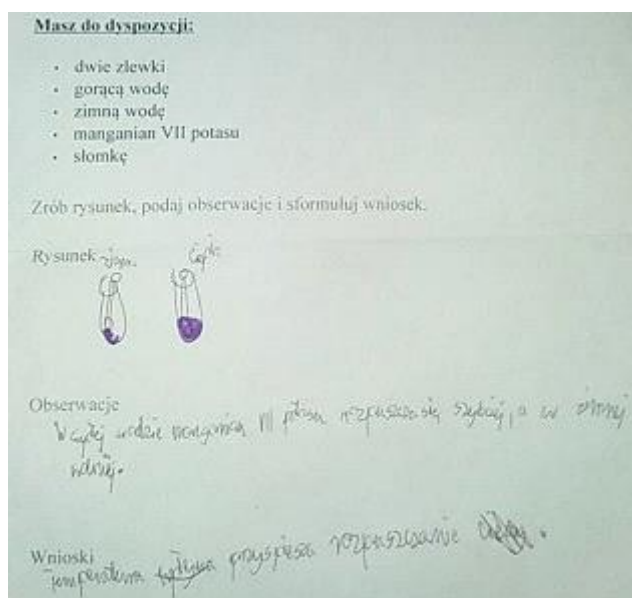


Figure 1 Example of Worksheet

In the middle of the school year, I administered to students a questionnaire which consisted of four questions.

### 2.1 Which Lessons Stick to Your Mind?

Class I: 78% — lessons with experiments, 9% — I do not know, 9% N/A, 4% — other

Class II: 63% — lessons with experiments, 16% — I do not know, 21% N/A

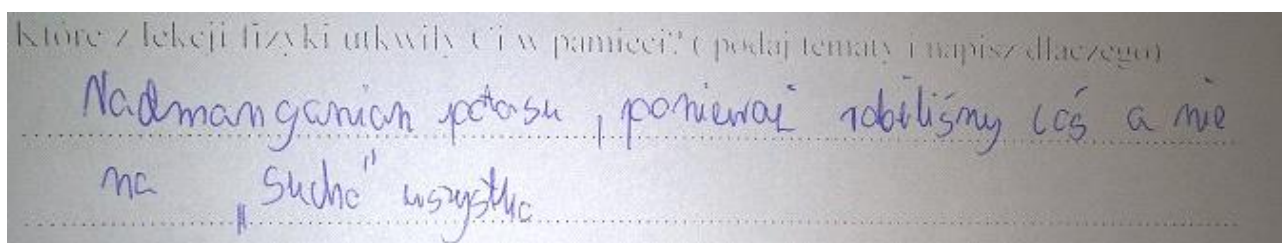


Figure 2 Student's Answers at Question Number 1

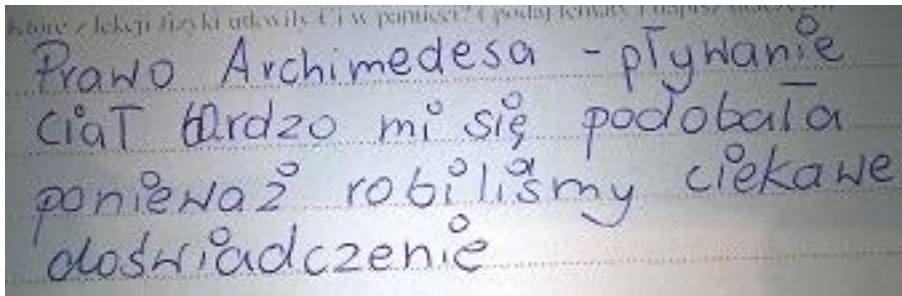


Figure 3 Student's Answers at Question Number 1

### 2.2 What Kind of a Lesson is Attractive?

*Class I:* 48% — with experiments, 17% — in a good mood, 13% — I do not know, 9% — without homework, 9% — others, 4% — N/A.

*Class II:* 74% with experiments, 11% — all are attractive, 5% — it depends on topic, 5% — lessons without calculations, 5% — I do not know.

### 2.3 Do You Like When the Teacher Provides and Explains Everything or It Is Better When You Do Inquiry by Yourself?

*Class I:* 61% — when teacher explains, 26% — when teacher helps and is close to me, 9% — I do not know, 4% — it doesn't matter.

*Class II:* 74% — when teacher explains, 21% — when teacher helps and is close to me, 5% — it doesn't matter.

### 2.4 What Would You Change in Physics Lessons?

*Class I:* 40% — experiments all the time, 17% — nothing, 17% — I do not know, 17% — others, 9% — less tests.

*Class II:* 53% — more experiments, 32% — nothing, 5% — less counting, 5% I do not know, 5% — N/A.

After school year I did post-test. The results obtained in a post-test: I — 63%, II — 67%, III — 56%.

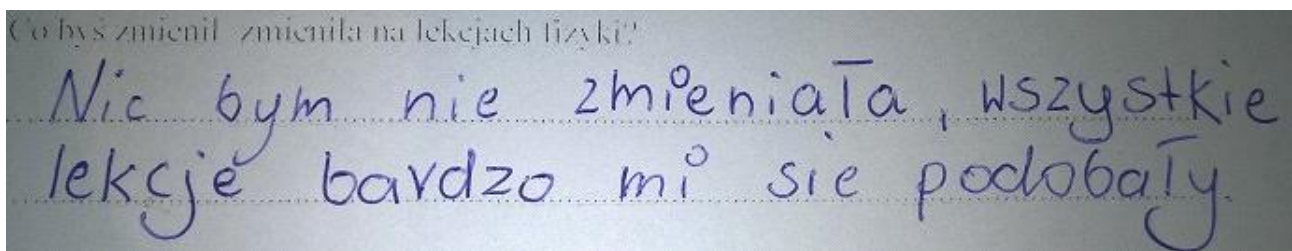


Figure 4 Student's Answers at Question Number 4

## 3. Conclusions (Summarizing)

In the teaching process, or rather in cooperation with the students, the teacher not only supports and stimulates the work of team (for example: He asks questions that help to understand the problem, asks questions that probe the problem, gives support, helps students assess their pace of the development, progress, creates a learning environment) but also develops his own subject knowledge and pedagogical skills. Students and teacher learn together the skills to formulate questions, make hypothesis and observation, collect data, infer and build

models. Everything take place in a teamwork atmosphere (spirit). Both in and outside the classroom and leads to the sharing of knowledge, ideas and technical solutions.

During IBL lessons, the teacher and students undergo a process. The teacher opens up to the students, notices more of their problems and develops different sensitivity. Students value lessons where they can do experiment in groups and come to conclusions on their own. However IBL in primary school needs to be implemented at a structured level.

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