IBL on physics lessons ... in the eyes of a students

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Abstract. In my school, I guided a pedagogical innovation called A high school student as a scientific researcher. I chose one 1st class where I taught one out of four lessons per month using the IBL method., from October 2018 until April 2019. During the implementation, I conducted my Practitioner Inquiry to get the answer: How do students perceive IBL in physics lessons? I performed surveys, tests, and interviews with students. I prepared recordings of my lessons and analyzed student responses. During my presentation, I will present the results of these tests, my conclusions, and my recommendations for further work.

Introduction

The initial situation for the practitioner inquiry to answer the inquiry question: How do students perceive IBL in physics lessons?

- A group of four boys and 14 girls, humanistic and biological-chemistry profile
- 1st grade of High school
- Lessons started in September, when students did not know each other yet.
- Introductory physics at the basic level
- 1 hour per week only for one school year (after one year, the subject is finished)
- Students worked in the IBL method for the first time in their life
- Guided inquiry level
- Anonymous surveys: after the first and the second part of the implementation

Implementation and Results

Part I.

Two topics: (1) *The Moon – a companion of the Earth* and (2) *A centrifugal force*

The students had a great time in class, were eager to engage in the experiments, conducted research, discussed the results, and formulated conclusions. After completing two topics, the teacher administered a test to the students, and right after the test (when students did not know the results yet), students were asked to honestly answer an open question: Did the IBL method help you write the test?

Most of the students disagreed or strongly disagreed – exemplary answers:

- If the IBSE method means the experiments that we conducted in the lessons, I think that it did not help me to write the test because I do not remember anything about the course of these lessons; to be honest, even when conducting them, I did not understand much. Traditional learning with a textbook is more effective for me.
- It seems to me that the IBSE method did not fully help me prepare for the test, although I like that we could come to some conclusions in physics lessons, and they were not boring.
- It seems to me that the IBSE method did not fully help me prepare for the test.

When I started the discussion about the answers, it turned out that students did not believe that by using the IBL method, they could learn anything and that it was only a kind of having a good time. That is why, when preparing for the test, they used the traditional methods: reading the book or even searching the internet, but what they learned at home was not asked at the test. I prepared the test questions based on the association of different pieces of information, drawing

conclusions, and interpretation of the physics phenomena and laws. So in fact, the students perceived they got lost during the test. The method of learning and the test were different from what they were used to.
However, when I corrected the test, the results showed that the average score was 72%, compared to the average score of 60% obtained in another traditional test based on facts and administered after traditional lessons.
I was really broken. I brought these results to the PLCT meeting. I concluded that maybe IBL does not work. During the discussion in PLCT, the group convinced me to continue with IBL since "maybe it worked, but somehow, the students did not realize that."
Indeed, students were very surprised with the test results, but they somehow realized (and got convinced) that they had learned more when developing research skills, not only content knowledge, as is usually the case.

Part II.
Topic: *Radioactive decay*
After completing the topic, the teacher asked the students to fill in the survey about their perception of IBL and what they learned. The change was enormous:
72% agreed that IBL is helpful for learning
61% agreed that during IBL lesson, their practical skills are developed
67% agreed that through IBL, they develop the skill of drawing conclusions
67% agreed that IBL has a good impact on a better understanding of physics
89% agreed that the IBL method is more interesting than the traditional one
83% agreed that they prefer IBL to other methods of learning physics
I was again very surprised, this time positively. When I started talking to the students about this change of perception, students admitted that they needed more time to get used to the method. Some of them even said that they normally prefer to have all the information handled. However, when they were convinced that it was possible to learn while investigating, they started to accept this method and enjoy it.
Final opinions of most students: IBL enables *learning by playing, better acquisition of content knowledge, teaches how to "be up to," remember the lessons, do experiments by themselves, and cooperate between teacher and students*. Very few of them pointed out weaknesses: *slight chaos*; *there are a few students doing nothing, some problems with remembering part of the content*

Conclusions

I conclude that whenever you start with IBL, you should not give up after the first trial. If students are not used to the method, they may be very distrustful and lack confidence in what they acquire. At first, the method looks like only playing and having fun, and in a traditional school system of teaching with the most common method of learning facts and laws by heart, "playing" is a loss of time. Such an opinion is embedded also in students' minds. Only being persistent in using the IBL method can convince students that they learn more with IBL than in the traditional format. The method itself is so engaging and interesting that sooner or later, the students realize that they learn a lot.

References

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