

Chapter 10

Inquiry and Chain Reaction in Slovakia

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ABSTRACT

The chapter presents how the Chain Reaction project was implemented in the context of science education in Slovakia. The educational reform highlighted inquiry as a leading approach in science education. But teachers were not prepared for implementation of such approaches. There was a lack of resources and a strong time pressure caused by a reduced number of science subjects lessons. Students' motivation to do and to study science was weak. Thus, the project team from Matej Bel University Banska Bystrica concentrated on two main issues: gaining teachers' engagement in non-traditional ways of science subjects teaching and motivating students to put their effort into inquiry-based science projects. The main problems connected with delivery of the Chain Reaction approaches in Slovak schools are discussed and the impact on secondary school students, science teachers, and teacher trainees is demonstrated. The developed pre- and in-service teacher training courses will serve as a tool of sustainability of the inquiry-based approaches in science education in Slovakia.

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BACKGROUND

Inquiry-Based Learning in the Educational Policy of Slovakia

Schools, teachers and students in Slovakia have experienced considerable school reform since 2008. This reform maintains the traditional form of teaching science as three separate subjects (biology, chemistry and physics) at both the lower and upper secondary school levels (student age ranges 10 – 14 and 15 – 18). However, common goals between the three subjects have been formulated and the main objective is that schools students should develop an understanding of natural phenomena through targeted activities in which inquiry-based approaches dominate. The curriculum states that the development of inquiry skills including competence in observation, perception of relations between objects and phenomena, classifying, and measuring are the common goals and tasks of all scientific school subjects (Statny pedagogicky ustav, 2015b, p. 7). Approaches that promote discovery, exploration and investigation should enable students to develop basic inquiry skills and support the development of positive attitudes towards science as a way of understanding and exploring the world (Statny pedagogicky ustav, 2015a, p. 1). This demonstrates that the curricular reform since 2008 has been underpinned by a belief in inquiry as an effective approach to teaching and learning about science.

Implementation of Inquiry-Based Science Education (IBSE) in Secondary School Classrooms

Although the reform strongly emphasized students' active learning with the use of inquiry based strategies, its practical implementation in schools has been problematic.

Firstly, the numbers of science lessons at both the lower and higher secondary levels decreased dramatically after the reform, but the content was not proportionally cut to reflect this reduction in time. For example, at the lower secondary education level hours of science subjects formed 21% of the total programme before the reform and only 10% of all hours in the reformed programme (Lapitkova, 2008). Also, the number of compulsory physics lessons at secondary grammar schools decreased by 50%. Physics teacher educators felt, that one of the aims of the reform, to dedicate more hours for foreign languages, was gained at the expense of science subjects. No specific arguments were given for this decision by the key author of the reform strategy, except that “numbers of teaching hours are not important” (Zelina, 2007).

In addition, before the reform, students used to be split into two groups during laboratory work or other practical activities at physics and chemistry lessons. Two “theoretical” lessons per week when the physics (or chemistry) teacher worked with the whole class were followed with a two hour practical-oriented lesson when only one half of the class was doing experimental activities. Physics and chemistry teachers were supposed to manage practical activities of the class as a whole after the reform.

Moreover, the teachers were not prepared for the reform and were not trained in the use of an inquiry approach. They felt unable to implement the wide educational goals including the development of inquiry skills within the limited time in classrooms with too many students. A lack of available teaching materials and as well as traditionally used inappropriate methods of assessment were further negative factors obstructing the implementation of inquiry activities in science lessons in Slovakia in the last decade (Jeskova et al., 2016).

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