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How can we help teachers using guided discovery method, who have not used it before

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Introduction

In Hungary, there is a tradition of mathematics education focusing on problems and on mathematical discovery that we call Guided Discovery approach. This method was elaborated in the 20th century, first of all for the education of gifted students. Later the reform movement led by Tamás Varga in the 1960s and 70s developed a coherent general educational program for primary and lower secondary schools based on this approach (Pálfalvy, 2000). Although Hungarian specialists of mathematics education consider the approach actual and relevant until today, only a narrow circle of teachers follow it, and its large-scale dissemination remains problematic.

In my PhD research project, launched in September 2018, I would like to contribute to the elaboration of a more successful dissemination processes. In my analyses, I want to focus on one significant aspect of teaching by Guided Discovery: on the interactions between teacher and pupils, and amongst students. I plan to realize experimentations with teachers are willing to this approach and who want to discover it to improve their teaching practice. My purpose is to give an aid to teachers which could improve the number of “rich interactions” in their classroom.

Experiments

I plan to follow two directions. The first one is based on my previous project held during my master studies, when I have tried to develop teaching projects based on group work. The second direction will be realized in collaboration with the members of the MTA-ELTE Complex Mathematics Education Research Group. A subgroup of this research project focuses on one of the specificities of Varga’s Guided Discovery approach: the planning of teaching trajectories in form of series of problems (Gosztonyi 2018). They examine the work with series of problems of expert teachers following the guided discovery approach, and they elaborate a commented collection of examples of series of problems to initiate other teachers into the approach.

In my experimentations first, I will analyze some lessons focusing on the interactions in both cases. Then I will try to help to the teacher to use one of the methods mentioned above and check the following lessons in the view of how the selected method could improve the quality of the teaching. Especially I want to answer the following question: Does the number of ‘rich interactions’ rise as an influence of the new way of teaching? If the answer will be ‘yes, it does’, I believe the quality of the teaching will rise also.

The project above has five parts. The first and most important element is the definition of ‘rich interactions’. If the number of ‘rich interactions’ and its ratio with all interaction is rising, it shows at least three things: students become more active and thinking more intensively about the mathematical content, realize more effectively what they have not understand yet and become braver about asking from the teacher or from another student.

Secondly, I will try to help the teacher to familiarize with the ‘new’ method. This will be different in the two threads of the project. In the first one, the teacher will get a complete plan for a period of teaching which will take about five to ten lessons. During this time group learning will dominate on the lessons which is unusual in Hungarian practice so the teacher will get a short, practical summary about how he or she should organize and control work.

In the second project the teacher will get a commented series of problems issued from the above-mentioned collection of the MTA-ELTE project. It is not necessarily connected with the following topic of the lesson, it is just an example. Then he or she will get time to measure it. The purpose is to help the teacher be able to create his or her own series of problems for his or her own class for the next period. During this he or she will have the opportunity to consult with one of the expert teachers mentioned above.

The third part will be the classroom realization. I will film the lessons and let the teacher work alone with the class.

After this, in the fourth part I will take an interview with the educator about how useful or efficient the experiment was in his or her opinion and I would be also interested in what he or she sees the most critical points of the lessons.

The last part will be the analysis of the data collected. The whole experiment will be repeated for three times in case of both versions. We hope this experiment will help us to support enthusiastic teachers to improve their method.

The poster

The presented poster is available through the following link:

<https://drive.google.com/file/d/10ZRMvctH-snOqwTvG7e8dGqsyWOnhOqK/view?usp=sharing>

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