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**Thematic area:** Advances in STEM Education

**Title: Biology education practice in Polish secondary schools from the perspective of Scientific Method.**

Background: Biology is often perceived as a factual school subject, however since 2009 core curriculum for biology includes and underlines proactive educational objectives regarding: biological research methodology, and reasoning skills. Only 30% of Science lessons (ISCED 1) include experimental methods and 40% of experiments last not more than 5 minutes<sup>1</sup>. Among research projects for Biology Olympiad (students ISCED 3), poor quality of experimental design, lack of data analysis and unjustifiable conclusions are observed massively<sup>2</sup>.

Aim: The survey explores the education practices during biology lessons in Polish secondary schools. The aim of the survey was to detect whether biology lessons are the important factor to shape students' interest in biology, what is the frequency that teachers apply reasoning and experiments on biology lessons, do they require science research activity, hands-on practice or refer to achievements of scientists.

Method: The population of students (ISCED3 level) taking part in the National Biology Olympiad competition (BO) in 2016/2017 school year was surveyed (1485 respondents). Students filled in an on-line obligatory anonymized questionnaire during the registration to the Olympiad.

Results: Respondents indicate that indeed biology lessons are the most important to shape students' interest in biology and their scientific literacy comes significantly from school. 82% of students indicates that they frequently formulate research questions, hypothesis, draw conclusions from experiments during biology lessons. However about 60 % of them indicates that they rarely or even never had a chance to perform or observe experiments and collect data.

Conclusions: The quality of didactics introducing scientific skills may be doubtful - students do it only theoretically, they do not perform real biological experiments and observations at school education. The question that remains open is - do the students really prefer passive methods of teaching, or they rather never had a chance to experience active ones?

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<sup>1</sup> T. Piątek, Doświadczenie (nie) oswojone. Stosowanie metody badawczej na lekcjach przyrody. Raport z badania ilościowo-jakościowego, Centrum Nauki Kopernik 2015.

<sup>2</sup> J. Lilpop., M. Chrzanowski The Polish Biology Olympiad: analysis of the students' research projects in the context of the scientific method competence and the selection of research topics, Conference DidSci 2016.