

PRIMARY SCIENCE TEACHERS' PERFORMANCE ASSESSMENT ABOUT STUDENTS' COGNITIVE ACTIVATION

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Abstract

The research focuses on primary science teacher performance according to chosen criteria (cognitive activation, basic skills) to distinguish actual versus desired teaching performance accordingly to undergoing educational reform in Latvia. The purpose in this study is to identify personalized teacher professional development needs based on performance in observed lessons. The framework of teacher performance assessment to support teaching 21st century skills was used to get data about teacher performance in observed lessons (49 teachers). The data was analyzed and compared against the desired teacher performance level descriptors. As a result, the study identifies 4 groups of teachers with varied actual and desired performance differences to suggest the best personalized needs for further professional development, which are crucial to implement undergoing reform.

Key words: cognitive activation, performance assessment, personalized professional development

1 Introduction

Latvia is implementing a national education curriculum reform (Skola2030, 2017) directly related to the change of approach in teaching and learning process for students to acquire 21st century skills, values, attitudes and students' capacity to solve complex issues. Similar to what is happening in other countries (Care, Griffin, & Willson, 2018). The long-lasting need of science teachers in many nations brings within the issue of classroom educating quality (Farr, 2010). Furthermore, the difference in teacher classroom performance is observed (Bērtule, et al., 2019). With changing educational purposes, teachers' instructional work at the individual level must also change accordingly, which imply important human capital implications including those related to teacher professional development and learning (Saavedra, & Opfer, 2012). Thus, it becomes increasingly important to monitor if and how teachers manage and provide the classroom learning and whether it aligns with the goals of the reform (Cauglan, & Jiang, 2014). This then provides information for planning and delivering the necessary professional development (PD) support (Danielson, 2013). In order to implement the reform, uniform "one-size-fits-all" PD activities will only be informative (Lipowsky, & Rjezak, 2012), and are not enough to improve the teaching practice. Thus, varied professional preparedness of teachers could be a barrier for the implementation of the reform, as well as can limit the gains from the PD activities designed nationally (Namsone, Čakāne, Volkinšteine, & Butkēviča, 2018). In this paper authors discuss what information teacher performance assessment gives, especially in the context of PD at individual level. The paper focuses on primary science teachers; and the specific focus of teacher performance is student cognitive activation, considering that the reform prioritizes complex learning outcomes.

2 Theoretical framework

This study employs the Framework of Teacher Performance Assessment to Support Teaching 21st Century Skills (designed by the authors; Bērtule et al., 2019), consisting of 8 categories (identified with "I A" or "I B") that are characterized with 13 criteria and structured in three domains of teaching practice – planning (1), teaching (2), classroom environment (3).

Also, approved performance level descriptors (PLDs), on a scale from 1 to 4, offer assistance to decide the teacher's level of performance in understanding to the criteria created, and thus

informs about teacher’s performance. To assess teachers’ performance, this study focuses on two categories and selected criteria for each – IA2 “Student cognitive activation” is assessed according to 2.1. criteria “Learning tasks for cognitive depth” (as part of planning) and 2.2. criteria “Classroom disclosure”, criteria „IB5&IB6 “Teaching techniques and basic skills” is assessed according to 5.1. criteria “Lesson design” (as part of planning) and 5.2. – “Teaching techniques” (as part of teaching). Additionally, for this study PLDs for the level 3 and 4 are combined into one 3+ level.

Aim: to identify personalized teacher professional development needs based on performance in observed lessons.

Research Questions: 1. What is the observed primary science teacher performance in lessons according to the selected categories and criteria? 2. What lesson observation data show about primary science teacher learning needs?

3 Research methods

1. Field work: 6 experienced (7-17 yrs) and trained experts observed, transcribed and analysed lessons according to a procedure and PLDs from September 2017- November 2019. 2.Data analysis: obtained data was encoded, compiled, processed and a database of examples of observed lesson situations according to the criteria and levels with fixed quotations from transcriptions were created from previous researches. 3.Expert focus group: by comparing the individual actual teaching profiles with the desired teaching profile, performance level gaps in each category were identified. The weight of these differences for all individual teachers were mapped and categorized in 4 quadrants, representing 4 different groups – I: difference 0-1(IA),0-1(IB); II: 2-3(IA),0-1 (IB); III: 3(IA),2-3(IB); IV: 0-1(IA),1-2(IB). Study sample consists of 2 sub-samples of primary science teacher’s from different municipalities, different school sizes: 26 teachers (19 schools, 1st – 4th grade, 7 – 11 years old); 23 teachers (19 schools, 5th – 6th grade, 11-13 years old). Limitations of the research: the framework and PLDs are tested in 3 teacher samples representing one country, results may differ if tested elsewhere.

4 Results

Table 1 demonstrates the number of science teachers who reach PLD levels according to the selected categories (IA, IB) and criteria (cognitive activation 2.1., 2.2., basic skills 5.1., 5.2.).

Table 1. The number of science teachers according to each PLD levels (0-3+) and criteria.

Criteria	2.1.				2.2.				5.1.				5.2.				Total
	0	1	2	3+	0	1	2	3+	0	1	2	3+	0	1	2	3+	
Science 1st-4th grade	5	14	3	4	0	17	6	3	1	14	6	5	1	11	11	3	26
Science 5th-6th grade	13	8	2	0	4	15	2	1	6	6	8	3	6	11	4	2	23

In Figure 1 is shown the number of Science teacher’s divided in four groups based on chosen criteria (cognitive activation 2.1., 2.2., basic skills 5.1., 5.2.) to demonstrate groups with similar professional development needs.

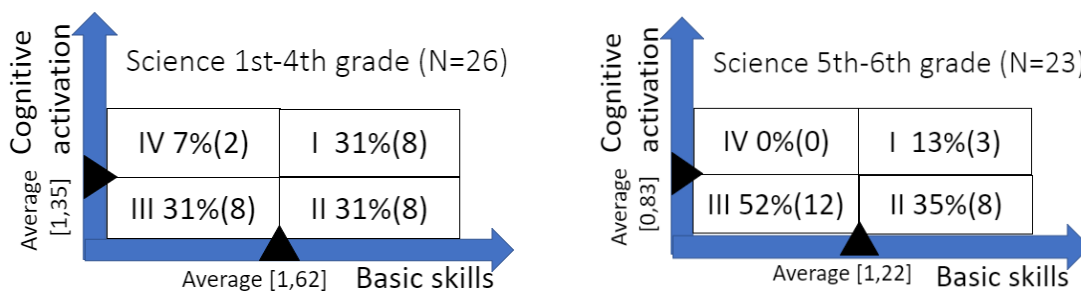


Figure 1. The number of primary science teachers' divided in 4 groups based on chosen criteria.

5 Discussion and conclusion

The data shows that there are differences between science teacher performances in different grades according to chosen criteria. In 1st - 4th grades student cognitive activation (average 1,35) and basic skills (average 1,62) were observed higher than in 5th - 6th grades. This study limitation is the small data sample, there is a tendency seen that only 31% (1st - 4th grade) and 13% (5th - 6th grade) teachers (group I) show performance with student cognitive activation and basic skills, meaning that they are ready to implement reform goals. For this group a model where they meet other teachers with similar needs and share best practices would be the best professional development. In this study can distinguish four different groups of teachers with different professional development needs. For teachers in group III (52% in 5th - 6th grades; 31% in 1st - 4th grades) focus for further development should start about basic skills and later on about cognitive activation. Their performance should and can be improved with individualized PD solutions at school-level (like expert in the classroom). For group II data shows, that teachers' implement good basic skills, but there is a need for learning about students' cognitive activation. The internalization of reform goals could be the solution for PD. For group IV (7% 1st - 4th grades) additional diagnostics is required, also individualized PD with an aim to progress against the most crucial criteria, as well as school level support is necessary. These results are similar to previous studies (Dudareva, Namsone, Butkēviča, & Čakāne, 2019) and shows a need for further individualized professional development to successfully implement reform goals.

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