# Science and Math teachers performance assesment to develop personalized professional learning

**Dace Namsone**

University of Latvia

The Interdisciplinary Center for Educational Innovation

Lead Researcher

26-30.2019

# Introduction

- Latvia undergoes a curriculum reform
- Teacher performance is cruical
- The difference in teacher classroom performance is observed
- Teacher assesment at school and/or municipality level
- Personalized Science and Math teacher professional development (PD)

# Theoretical framework

The Framework of Teacher Performance Assessment to Support Teaching 21st Century Skills (designed by the authors; Bertule et al., 2019)

| Categories | | II 1 | II 2 | II 3 |
|---|---|---|---|---|
| | | Planning | Teaching | Classroom environment |
| IA 1 | Student self-regulation | 1.1. Learning goals | 1.2. Metacognitive skills | |
| IA 2 | Student cognitive activation | 2.1. Learning tasks for cognitive depth | 2.2.Classroom discourse | |
| IA 3 | Student collaboration | 3.1.Learning tasks for collaboration | 3.2. Student collaboration | |
| IA 4 | Leveraging digital | 4.1. ICT tools | 4.2. Meaningful ICT usage | |
| IB 5<br>IB 6 | Teacher techniques, basic skills | 5.1. Lesson design | 5.2. Teaching techniques | 5.3. Differentiation, personalization, support |
| | | 6.1. Curriculum | 6.2. Feedback to students | |

STARPNOZARU IZGLĪTĪBAS INOVĀCIJU CENTRS
LATVIJAS UNIVERSITĀTE

# Theoretical framework

The Framework of Teacher Performance Assessment to Support Teaching 21st Century Skills (designed by the authors; Bertule et al., 2019)

| Categories | | II 1 | II 2 | II 3 |
|---|---|---|---|---|
| | | Planning | Teaching | Classroom environment |
| IA 1 | Student self-regulation | 1.1. Learning goals | 1.2. Metacognitive skills | |
| IA 2 | Student cognitive activation | 2.1. Learning tasks for cognitive depth | 2.2.Classroom discourse | |
| IA 3 | Student collaboration | 3.1.Learning tasks for collaboration | 3.2. Student collaboration | |
| IA 4 | Leveraging digital | 4.1. ICT tools | 4.2. Meaningful ICT usage | |
| IB 5<br>IB 6 | Teacher techniques, basic skills | 5.1. Lesson design | 5.2. Teaching techniques | 5.3. Differentiation, personalization, support |
| | | 6.1. Curriculum | 6.2. Feedback to students | |

STARPNOZARU IZGLĪTĪBAS INOVĀCIJU CENTRS
LATVIJAS UNIVERSITĀTE

# The desired teaching profile

| Focus on | Desired level | Method |
|---|---|---|
| • Knowledge and beliefs | 3 | Tests |
| • Teaching | 3 | Lesson observations |
| • Planning | 3 | Lesson observations |
| • Category group IB5&IB6 | 3 | Lesson observations |
| • Personal skills, beliefs | Na | Survey, interview |

# Research

**Aim:** to identify differences between the teacher performance in the classroom and the teaching for 21st century skills, thus providing information for personalized PD.

**Hypothesis:** there are at least 4 groups of teachers with different professional learning needs.

**Research Questions:**

1. What is the observed Science and Math teacher performance in lessons according to the selected categories and criteria?
2. What teacher groups can be identified to develop PD solutions?

# Method

1. **Field work**
   6 experts, lesson observations 09.2017. – 11.2018.
2. **Data analysis**
   Obtained data was encoded, compiled, processed
3. **Expert focus group**
   Comparing desired and actual teaching profiles
   The weight of these differences for all individual teachers were mapped and categorized in 4 quadrants, representing 4 different groups

**Study of 2 sub-samples:**

- 36 Science and Math teachers, 9 schools, municipality, urban, X
- 11 Science and Math teachers, 4 schools, municipality, rural, Y

# Results

Table 1. The number of Science and Math teachers according to each PLD, 0-3+.

| | | IA, 2.1. | | | | IB, 5.1. | | | | IB, 5.2. | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PLDs | | 0 | 1 | 2 | 3+ | 0 | 1 | 2 | 3+ | 0 | 1 | 2 | 3+ | |
| Sc | X | 4 | 6 | 9 | 1 | 2 | 3 | 5 | 10 | 3 | 2 | 9 | 6 | 20 |
| | Y | 3 | 1 | 2 | 0 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 6 |
| M | X | 2 | 4 | 7 | 3 | 0 | 3 | 9 | 4 | 0 | 3 | 5 | 8 | 16 |
| | Y | 0 | 2 | 1 | 2 | 0 | 0 | 2 | 3 | 0 | 0 | 1 | 3 | 5 |

Table 2. 4 groups of actual vs desired performance level gaps, % of all teachers; 9% not included (see further).

| | |
|---|---|
| IV HOCS, BASIC LOW 4%<br>Science 1, Math 1 | I HOCS, BASIC GOOD 49%<br>Science 11, Math 12 |
| III LOCS ONLY, BASIC LOW 21%<br>Science 8, Math 2 | II LOCS ONLY, BASIC GOOD 17%<br>Science 4, Math 4 |

STARPNOZARU IZGLĪTĪBAS INOVĀCIJU CENTRS
LATVIJAS UNIVERSITĀTE

# Discussion and conclusions

- Teachers' actual teaching techniques and basic skills are close to Level 3+.
- Confirms previous study (2013; 105 lessons observed), stating that only around 10% of tasks in a lesson require HOCS (Namsone et al., 2018).
- Significant discrepancy between the current classroom practice and the teaching for HOCS.
- The study identifies five groups of teachers, each having different situation regarding the gap between the actual and the desired performance.
- The hypothesis of the study is partly approved.
- 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.

# Thank you for your attention!

Dace Namsone

dace.namsone@lu.lv

# References


- Bertule, D., Dudareva, I., Namsone, D., Čakāne, L., Butkēviča, A. (2019). *Framework of Teacher Performance Assessment to Support Teaching 21st Century Skills.* Manuscript submitted for Proceedings for International Technology, Education and Development (INTED).
- Campion, M. A., Fink, A. A., Ruggeberg, B. J., Carr, L., Phillips, G. M., Odman, R. B. (2011). *Doing competencies well: Best practices in competency modeling*, Personnel Psychology, 64(1), 225-262.
- Cauglan, S., Jiang, H., (2014). *Observation and Teacher Quality: Critical Analysis of Observational Insturments in Preservice Teacher Performance Assesment*, Journal of Teacher Education. 65 (5), 375 – 388.
- Danielson, C. (2013). *The Framework for Teaching Evaluation Instrument*, Instructionally Focused Edition.
- Farr, S. (2010). *Teaching as Leadership: the Highly Effectice Teacher's Guide to Closing the Achievement Gap*, Jossey-Bass, USA.
- Kunter, M. (2013). *Cognitive Activation in the Mathematics Classroom 25 and Professional Competence of Teachers*, Mathematics Teacher Education 8, New York: Springer Science+Business Media.
- Lipowsky, F., Rzejak, D. (2012). Lehrerinnen und Lehrer als Lerner - Wann gelingt der Rollentausch? Merkmale und Wirkungen effektiver Lehrerfortbildungen. *Schulpädagogik heute, 5*(3), pp. 1–17.
- Namsone, D., Čakāne, L., Volkinšteine, J., Butkēviča, A. (2018). *How to evaluate teachers 'performance and purposefully improve teachers' skills in Learning for Competence*. (University of Latvia & D. Namsone, Red.). LU Akadēmiskais apgāds. https://doi.org/10.22364/ml.
- Nieveen, N., Plomp, T. (2018). *Curricular and Implementation Challenges in Introducing Twenty-First Century Skills in Education*, In Assessment and Teaching of 21st Century Skills, Springer, Cham, 259-276.
- OECD. (2016). *Education in Latvia, Reviews of National Policies for Education*, OECD Publishing, Paris.
- Pecheone, R. L., Chung, R. R. (2006). *Evidence in Teacher Education. The Performance Assesment for California Teachers*. Journal of Teacher Education, 57 (1), 22 – 36.
- Takahashi, A. (2011). *Helping teachers work together to improve teaching & learning*. Retrieved from http://www.LSAlliance.org