

# Estonian in-service teachers', pre-service teachers' and teacher educators' research literacy

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## Summary

Teachers' research literacy is considered to be part of a teachers' general pedagogical knowledge (Sonmark et al., 2017). Therefore, teachers are expected to implement the most effective and latest empirical results in their practice. Lillejord and Børte (2016) have emphasised that research-based teaching means asking "how" and "why" something is working instead of "what" works. In order to reach this level of interpretation, knowledge of research methodology is needed. Cooper and Stewart (2009) have added that teachers' research literacy is also seen as teachers taking a researcher's role. It means that teachers collect data about teaching and learning based on their practice to understand or change something (Borg, 2010). However, studies have identified the reasons why teachers rarely carry out research. It has been disclosed that teachers are required to solve problems fast and effectively, while research is too abstract and general (<sup>1</sup>Block, 2000). Finally, supporting pupils' knowledge of research is also seen as part of a teachers' research literacy. This includes teaching pupils about research methods and analysis, as well as reading, writing and discussing empirical papers.

The Estonian teachers' professional standards state that teachers must have the competence to be updated regarding recent research on teaching and learning, and collect evidence from their practice and share it with colleagues (e.g. Kutsestandard. Õpetaja, tase 7). Therefore, it is essential that knowledge of research is included in pre-service as well as in-service teacher training. A recent study at Tartu University (Estonia) showed that pre-service students have more opportunities to test different theories during their school traineeship. However, the students disagree that teachers use the same theories in schools as taught at university (Malva & Leijen, 2020). This may indicate the gap between university and schools, as working teachers have finished teacher

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education years before and are not familiar with the newest theoretical knowledge taught at universities.

Based on the above, the current study aims to give a detailed overview of Estonian pre-service teachers', in-service teachers' and teacher educators' knowledge about research, as well as to describe the application of research in teachers' everyday work. The study will answer the following research questions:

- 1) What research-related knowledge do Estonian pre-service teachers, in-service teachers and teacher educators possess?
- 2) How do Estonian in-service teachers describe the application of research in their everyday practice?

### Methodology

*Sample.* In order to answer the research questions, two studies were carried out. The quantitative study sample consisted of 164 pre-service teachers, 161 in-service teachers and 45 teacher educators. The pre-service teachers were studying either at Bachelors' or Masters' level from various teacher education curricula. The in-service teachers teaching science, mathematics and/or Estonian language for students at ISCED level 2 (grades 7 to 9) had an average of 21 years of teaching experience. Among the teacher educators, 73% had worked in general education schools. The qualitative study sample consisted of seven experienced and valued teachers from ISCED level 2, three of whom were teaching science, three the Estonian language and one taught mathematics. The average teaching experience was 12 years. All seven teachers had completed their teaching education at the Masters' level and were full-time teachers.

*Instrument.* For the first study, the Teacher Knowledge Survey (Sonmark et al., 2017) was used. The survey is aimed at assessing teachers' general pedagogical knowledge, and one scale-out of the six focused on research literacy. The research literacy scale consisted of six multiple-choice questions, requiring the respondents to give the correct answer to the question. The second study was carried out as a video stimulated recall interview where the participants had a chance to view the recording of their own teaching and mark in an observation protocol the time slots where they recalled using general pedagogical knowledge (see also Malva, Leijen, & Arcidiacono, 2021). In the observation protocol, one section focused on research literacy. Then, the researcher carried out semi-structured interviews to get a detailed overview of the application of research literacy in their practice.

*Data analysis.* In order to answer the first research question, the Item Response Theory was applied to calculate the mean. Then, ANOVA together with the Tukey HSD post hoc test was used to compare the results of the three sample groups. For the second research question, an inductive content analysis was carried out. Finally, when organising the codes under categories, the research literacy distribution retrieved from theory was applied as a sensitising concept (Bowen, 2006).

### Results and discussions

The results showed that there is a statistically significant difference ( $p < .01$ ) between teacher educators (mean = 628) and pre-service teachers (mean = 514), as well as teacher educators and in-service teachers (mean = 530) when looking at the research literacy scale. The teacher educators, as expected, outperformed other sample groups. Teacher educators have an essential role in shaping future teachers' knowledge when guiding the meaningful connection of theory and practice (Boyd et al., 2009). However, the knowledge of pre-service teachers and in-service teachers appeared to be on a very similar level with no significant difference. Studies have shown that in-service teachers' knowledge should continue to develop after graduating (König et al., 2014). In our study, most of the participants graduated from teacher education a couple of decades ago, having had at least 21 years of experience. During those years, teacher education has had several major changes, including enhancing research-based teaching (see, for example, Malva & Leijen, 2020). This explains why the pre-service teachers possess the same knowledge of research literacy as in-service teachers. One solution here could be improving the professional education courses, although the quality and level of these courses can vary. What is more, the interview results revealed that in-service teachers prefer professional development courses that are more practical and include discussions with their colleagues. It can be assumed that when starting a teaching job, practical knowledge becomes more important than empirical knowledge as teaching is very much connected to context, which in turn makes it difficult to translate research results into practice (Berliner, 2004).

The interview results also indicated that teachers do not usually carry out research based on their practice. Also, previous survey research in Estonia showed that only one-third of teachers analyse data from their students' work or carry out action research. This raises questions about teachers' readiness to carry out research. Again, the university has an important role in supporting and educating future teachers on the research methods that are necessary and applicable in classroom settings (Aspfors & Eklund, 2017). Also, universities

should promote more joint projects to develop a professional community of research-based teacher educators and in-service teachers (Cochran-Smith & Lytle, 1999).

Nevertheless, of those teachers interviewed, most wanted the opportunity to support the students' knowledge of research. They brought out examples of using data in students' learning, as well as forming an academic text and interpreting the results. Supporting students' knowledge of research has been considered a part of teachers' research literacy (Evans et al., 2017) and based on our study, this can be the most commonly used way of using teachers' research literacy.

In conclusion, connecting theory and practice in teacher education is an ongoing challenge in many countries (e.g. Malva & Leijen, 2020; Boyd et al., 2009) and based on this study, one possible way of solving it would be to provide more support in teachers' knowledge of research methods. This, in return, can enhance teachers' research-based teaching. In order to extend the current study, the research literacy scale from the Teacher Knowledge Survey should be supplemented with questions that are more related to the real teaching context. However, the strength of the test instrument is its international perspective that was applied in both the development process and during the piloting stage (see Sonmark et al., 2017). As there is not much evidence on teachers' research literacy, it would be interesting to study it on a broader scale and include schools and teachers' role in a professional community. Our study indicated several areas of research literacy that could be included in future studies carried out in different contexts of teachers' practical work.

*Keywords:* research literacy, knowledge of research, research-based teaching