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# From ‘technical rationality’ and ‘reflective rationality’ to ‘societal rationality’

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## ‘Implementation’ as a challenge for policy, practice, and research

This contribution builds on Koichu, Aguilar, and Misfeldt (2021), who regard implementation as “an ecological disruption to a particular mathematics education system, through the gradual endorsement of innovation in conjunction with an action plan” (p. 986), and follows Willke (2005), who regards observation as noticing a “meaningful difference”, and intervention as “effecting” (generating, making) the “meaningful difference”, thus ‘implementing’ steps towards the desired situation.

Based on four examples, Krainer (2021) argues that the implementation of research, and its implementability, are dependent not only on researchers and on practitioners, but also on policymakers, too, in particular if scaling up is regarded as important. Writing a paper for a special issue on implementation-related research in mathematics education (see Koichu, Aguilar, & Misfeldt, 2021), reflecting on the long-lasting Austrian initiative IMST (which mainly aims at scaling up innovations in mathematics, computer science, science, and technology teaching), inspired the author to theoretical considerations on the interplay between policy, practice, and research in the IMST context. He describes two contrasting approaches related to implementation and implementability of research, namely ‘technical rationality’ and ‘reflective rationality’, and develops a third approach named ‘societal rationality’.

In the following, these three approaches are sketched for further discussion in the TWG.

## ‘Technical rationality’, ‘reflective rationality’, and ‘societal rationality’

‘Technical rationality’ was introduced by Schön (1983) and follows three basic assumptions:

- There are general solutions to practical problems.
- These solutions can be developed outside practical situations (in research or administrative centres).
- The solutions can be translated into practitioners’ actions by means of publications, training, administrative orders, etc.

In contrast to technical rationality, reflective rationality (e.g., Altrichter et al., 2008, p. 270), building on the notion of “reflective practitioner” (Schön, 1983), follows three very different assumptions:

- Complex practical problems require particular solutions.
- These solutions can be developed only inside the context in which the problem arises and in which the practitioner is a crucial and determining element.

- The solutions can only rarely be successfully applied to other contexts, but they can be made accessible to other practitioners as hypotheses to be tested in practice.

Comparing the strengths and weaknesses of these two approaches leads to the insight that the ‘meaningful difference’ (Willke, 2005) lies between the ‘general’ (main focus of ‘technical rationality’) and the ‘particular’ (main focus of ‘reflective rationality’). However, they should not be regarded as opposite, but as complementing each other. When implementations aim at spreading to a larger number of people, the perspectives of practice, research, and policy need to be included. All these stakeholders should be jointly co-responsible for a successful implementation. Therefore, a third approach, building on the strengths of the two mentioned approaches and on the societal dimension of this process, Krainer (2021) proposes ‘societal rationality’ as a third approach, following three alternative assumptions:

- Practical problems require an adequate link between general and particular solutions. The more complex the problem, the more important the particular.
- The solutions gain in quality if all concerned (including policy, research and practice) are involved in the problem definition and in the solution and evaluation process.
- The solutions can at best be partially applied to other contexts. Concrete examples, critical reflections, theoretical considerations, empirical findings, general guidelines, specific or general quality criteria can be used to adapt solutions context-sensitive.

Reflections on these approaches may lead to new questions and insights on teacher educators’ identity and professional growth (Krainer, Even, Park Rogers, & Berry, 2021).

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