

Classroom Implementation of "Troubleshooting Tasks" in the Context of In-Service Program for High-School Physics Teachers

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M.Sc. Thesis Abstract

Troubleshooting-Activities require students to detect an error in a statement describing a situation, explain and correct it. If designed appropriately, such activities can serve as a context for refining interpretations of scientific concepts. In particular, statements should include mistaken reasoning reflecting alternative conceptions known from the research literature, and feedback should highlight how the mistaken interpretation differs from the scientific one.

The Troubleshooting-Activities, along with other research based instructional strategies (RBIS) intended to promote learning in the context of problem solving, were presented as part of an in-service program for high-school teachers (N=18) from the Arab sector in Israel. Teacher educators suggest supporting the adoption of instructional innovations by establishing long-term workshops in which teachers inquire their own practice. Accordingly, participants in the in-service program a) Cooperatively developed learning materials accompanying the RBIS to better fit their specific context (e.g. mistaken statements and exemplary diagnosis representing how the teacher would explain and correct an error); b) Reported and reflected on the new practices that they have introduced into their classrooms (e.g. reported their assessment of students' performance and discussed possible responses).

In this context we studied: 1) To what extent did actual implementation confirm with recommended guidelines regarding the implementation of Troubleshooting-Activities that were presented as part of the workshop? 2) What challenges did teachers face when implementing Troubleshooting Tasks?. Data sources consist of mistaken statements and sample solutions composed by the teachers, teachers' evaluations of students' performance, and their reflections regarding their experience, as well as the diagnoses produced by the students (N=152, 9 classrooms 10th and 11th grade).

We found that teachers constructed mistaken statements according to recommended guidelines, and were enthusiastic about the activity. However they perceived students' work as better than it was: they accepted solutions with minimal reasoning and diagnoses that did not highlight how a mistaken interpretation differs from the scientific one. These results highlight the need

to develop in teachers an alternative perception of adequate performance of Troubleshooting-Activities so they can support their students' learning in this context.