

## The Task-Centered Instructional Strategy to Prepare Teachers for Integrating Robotics Activities in Science Education

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**Abstract :** This case study demonstrates how the Task-Centered Instructional Strategy can be used to develop robotics competencies in middle-school science teachers without programming knowledge, thereby reducing their anxiety about robotics. Sixteen middle school science teachers participated in a teachers' professional development program. The strategy combines the progression of real-world tasks with explicit instruction that serves as the backbone of instruction. The designed progression includes three tasks that integrate building and programming robots, pedagogy, and science knowledge, with an increasing level of complexity and decreasing level of support. We used EV3 LEGO kits and programming blocks, a new technology for most of the participating teachers. Pre-post questionnaires were used to examine teachers' anxiety in performing robotics tasks before the program began and after the program ended. In addition, post-program questionnaires were used to obtain teachers' feedback on the program's overall quality. The case study results showed that teachers were less anxious about performing robotics tasks after the program and were highly satisfied with the professional development program. Overall, our research findings indicate a positive effect of the Task-Centered Instructional Strategy for preparing in-service science teachers to integrate robotics activities into their science classes.

**Keywords :** competencies, educational robotics, task-centered instructional strategy, teachers' professional development

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