Abstract

Self-regulated learning (SRL) is a process of forethought, performance, and evaluation that learners use to achieve learning goals. As part of learners' skills in the twenty-first century, teachers are required to nurture independent, active learners who can self-regulate their learning in a student-centered learning environment. However, teachers often lack knowledge regarding SRL, do not believe in its importance, or do not possess suitable teaching practices. Moreover, the assessment of SRL often relies on self-report questionnaires, which may lead to inaccurate results. The present research aims to address teachers' and students' needs and the SRL assessment challenge with a unique theoretical-practical model that results in a parallel teacher-student intervention and its authentic assessment. The proposed theoretical-practical model is based on introducing explicit SRL theory and combining practical training with *Authentic, Interactive, Dynamic Experiences* (AIDE), supported by self-questions. The intervention program called "SRL-AIDE," which is derived from the model, includes immersive simulations with professional actors and video-based learning for teachers and parallel students' experiences.

Authentic experiences portray situations from real life, where learners are active and engaged. They are effective in helping teachers transfer newly learned skills into the classroom, as they imitate realistic teaching scenarios, thereby enabling them to practice in a supportive environment. Simulations with professional actors provide such authentic experiences. The actors play students in a lesson with the participating teacher roleplaying the teacher in a scenario designed to encourage SRL practice. This experience can create immersion in the scenario and, thus, have a powerful impact on affective aspects of the teacher as a learner (Dieker et al., 2014). Another important and effective tool for authentic experiences is video analysis. Analyzing videos of teaching scenarios is cognitively activating and compelling, more so when teachers analyze their own teaching video.

The present research examines the effectiveness of the program and the SRL development process of experimental group compared to a control group, before and after teachers' participation in an innovative training program combining the SRL-AIDE practice learning with theory instruction, which in turn enabled them to deliver the program to their students. In order to assess the development of SRL, authentic

assessment measures were used. For teachers, SRL practice implementation was assessed across the SRL cyclical phases: lesson planning, lesson practice performance, and lesson reflection. For students, the measures related to self-report metacognition, written metacognitive description, SRL strategy use in real-time, academic achievement, and their transfer between domains.

The main goal was addressed in the following three research studies:

Study 1 focused on the design of the SRL-AIDE intervention and its effectiveness among teachers; study 2 focused on the authentic assessment of SRL practices, the similarities, differences, and associations between the development of the practices; and study 3 focused on students' SRL development and academic outcomes. The following research questions were posed:

1. To what extent will there be differences before and after the intervention in teachers' SRL—beliefs, knowledge, and practices between the experimental and control groups?
2. To what extent will there be differences before and after the intervention in *explicitness* level and *duration* (% of lesson time) of two SRL teaching practice types (metacognitive strategies and knowledge construction) between the experimental and control groups and between the two practice types within each group?
3. To what extent will there be pre/post differences in students' metacognition (knowledge of cognition and regulation of cognition), real-time academic performance, written metacognitive description, and strategy use (chunking and monitoring) in language (the trained domain), and math (as a transfer to an untrained domain)?

Method

The *first study* was a quasi-experimental intervention study, with 76 elementary school teachers (grades 3–5; ages 8–10), 38 in an experimental group and 38 in a control group. There were no statistically significant differences between the two study groups in background characteristics. The *second study* had 70 teachers, 35 in the experimental group and 35 in the control group. Here, too, there were no statistically significant differences between the two study groups in background characteristics. Both programs comprised ten sessions of three hours each and were delivered at a professional

development (PD) center. They included an introduction of the theory, group discussion, and practical implementation. The control group participated in a program about effective learning. The experimental group participated in the SRL-AIDE program, which included exposure to the SRL theory, encouragement to use SRL skills, metacognitive questioning prompts, discussions, collaborative learning, and reflections/debriefing of classroom application. Moreover, the SRL-AIDE learning environment included simulations with professional actors followed by a guided debriefing; video-clip analysis of SRL teaching, followed by guided group discussion; and, finally, modeling of SRL practices.

The students' sample in the *third study* comprised 313 students in the third, fourth, and fifth grades (ages 8–10 years). The 186 students of the teachers who participated in the "SRL-AIDE"" program were assigned to the experimental group (59.4%) and the 127 students of the teachers who participated in the "Effective Learning" program were assigned to the control group (40.6%). There were no statistical differences between the groups in terms of background characteristics.

Measurement

The measurement included a combination of self-report and authentic assessments. The instruments for teachers in study 1 included a questionnaire on belief metaphors regarding student-centered learning/teaching, authentic lesson plans, self-videos of a teacher's lesson: real-time in-class practices and a reflection on their own lesson. The instruments in study 2 included explicitness level, on a scale from 0 (the practice was not detected) to 3 (highly explicit instruction including naming, modelling, discussions and visual aids) and duration (% of lesson time) of real-time in-class SRL practices. The instruments for students in study 3 included a self-report metacognition questionnaire, a language test (the trained domain), a math test (as transfer), authentic written metacognitive description, and strategy use during the test.

Findings and Conclusions

To answer the research questions of the first study, Wilcoxon analysis was used for the SRL beliefs, and two–way ANOVAs with repeated measures (Group*Time) were conducted for the SRL knowledge and practices. In addition, significant group-and-time interactions were found for all measures. The results revealed that the *teachers' experimental* group had higher increases than the control group in SRL beliefs, SRL practice in a *lesson plan, lesson practice performance*, and *reflection*. This result

indicates that the unique SRL-AIDE intervention combining immersive simulations and video was effective in supporting teachers' SRL beliefs, SRL knowledge as expressed in planning and reflection on the lesson, and the implementation of SRL practices in teachers' real-time class teaching.

The second study focused on addressing the need for authentic assessment of SRL practice implementation. Using three-way and two-way ANOVAs, significant differences were revealed between two main SRL practices in real-time: metacognitive strategies and knowledge construction in the experimental group only. A significant three-way interaction of time (pre/post), group, and practice type were found for the explicitness level of the practices. A two-way interaction of group and time was found for the duration. For the experimental group, the practice of metacognitive practice showed a significantly higher increase in explicitness level than knowledge construction, but the increase in duration (% of time) was similar for both practices. No such differences were found for the control group. In addition, positive correlations were revealed in the entire sample between the explicitness and duration for each practice separately and also between the durations of both practices.

The third study, which focused on students' outcomes, revealed that the experimental group showed higher increases than the control group in language (the trained domain), math (transfer), and SRL in real-time—written metacognitive description and strategy use. The following mediation effect was found: the written metacognitive description mediated the relationship between group participation (experimental/control) and academic achievement. In addition, significant positive correlations were found among achievement, metacognitive description, and metacognitive strategies.

The findings led to the main conclusion that the SRL-AIDE was effective in helping teachers implement SRL practices in real-time teaching and that it was also effective among students. **Theoretically,** the study contributes to the body of SRL knowledge and practice. **Methodologically**, the study uses a variety of authentic and innovative real-time measurements for both teachers' and students' *parallel development.* The study holds **practical implications** for teacher training and professional development and paves the way for future research to continue to investigate the effects of the program in a variety of settings.