

ABSTRACT

As part of an NSF funded project to improve science learning of middle school student with LD, students were taught to create their own Serious Educational Games. An overview of research on self-regulation will be provided along with instructional activities used to foster student self-regulation in this project-based learning activity.

SOCIAL COGNITIVE THEORY

Social cognitive researchers define self-regulated learning (SRL) as a cyclical process where students use feedback from prior task performance to constantly evaluate and adjust methods of learning (Cleary & Chen, 2009; Zimmerman, 2008).

Self-regulation refers to self-generated thoughts, feelings, and behaviors that are oriented to setting and attaining goals, monitoring progress, and reflecting on progress, hence the cyclical three-phase model.

Existing SRL work primarily focuses on well-defined and/or discrete tasks, while less is known about the role of self-regulation in complex, long-term learning tasks (Schunk & Zimmerman, 2003; Bernacki, Nokes-Malach, & Alevan, 2015). Future research is needed in the area of self-regulated learning (SRL) in science-based contexts. (Cleary & Labuhn, 2013).

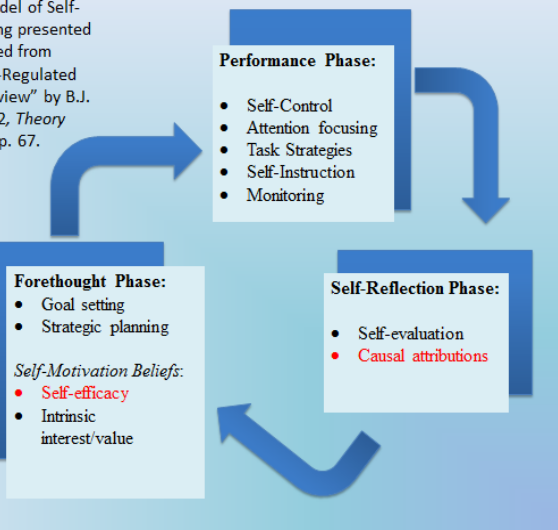
STUDENTS WITH LEARNING DISABILITIES

Recent research (Baird, Scott, Dearing, & Hamill, 2009) found that compared to students without learning disabilities (LD), adolescents with LD were more likely to (a) possess low academic self-efficacy, (b) believe that intelligence was fixed and nonmalleable, (c) prefer performance over learning goals, and (d) interpret the exertion of effort as meaning they possessed limited levels of ability.

Because these students make inappropriate attributions for success and failure in academic contexts (Stipek, 1993), adolescents with LD have cognitive self-regulatory patterns that are particularly maladaptive to mastering academic tasks (Elliot & Dweck, 1988). Findings that students do not attribute success to effort is especially concerning because effort is critical for task persistence, including self-regulation of learning.

Zimmerman's Model of Self-Regulation

Zimmerman's Model of Self-Regulated Learning presented below and adapted from "Becoming a Self-Regulated Learner: An Overview" by B.J. Zimmerman, 2002, *Theory Into Practice*, 41, p. 67.



LEARNING CONTEXT

After learning about alternative energy sources, students applied their learning of this important science content through the creation of their own serious educational game (SEG) about renewable energy sources (solar and wind). Microanalytic protocols (Cleary, Callah, & Zimmerman, 2012) were used to assess student self-regulation of their learning.



GOAL SETTING

- Goals prompt self-monitoring and self-reflective judgments of performance outcomes (Zimmerman, 2002).
- Goal setting and reflection were modeled for students.
- Short-term and long-term goals were taught using scripts to explicitly model the purpose and use of goal setting within a semester long project.
- Students had goal setting and reflection sheets in their science learning binder to set daily goals and reflected on those goals at the end of the period.

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EVIDENCE OF SELF-REGULATION BY ENGAGEMENT DOMAIN

Behavior	"I would probably use the map and then reflecting back on the skills I used to keep focused, which is looking back." "I got through everything I needed to get through, I didn't think I was going to get to the last part, the introduction, but I did." "I stayed focused and if I needed help I asked."
Cognition	"Being able to look back at the stuff I had written down, it went well because I knew what the people were going to say at the beginning and what they were going to look like. I could picture it in my mind how I wanted it to be."
Motivation	"I watch a lot of crime shows – so it was easier for me to figure out how to plan, I watch a lot of TV shows based on what my game is going to be about so it will be easier for me in order to know how to plan it and what things relate to the topic." "I figured out how to get the new update with the teacher and that's why my mom wants me to be a computer person."

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